Karuna Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware

2834

27-0605902

(Primary Standard Industrial Classification Code Number)

33 Arch Street, Suite 3110

(857) 449-2244

(Boston, Massachusetts 02110)

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Steven Paul, M.D.

Chief Executive Officer, President and Chairman

Karuna Therapeutics, Inc.

33 Arch Street, Suite 3110

(857) 449-2244

(Boston, Massachusetts 02110)

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Approximate date of commencement of proposed sale to the public:

As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box. ☐

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☒ Smaller reporting company ☐ Emerging growth company ☒

If an emerging growth company, indicate by check mark whether the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. ☐

CALCULATION OF REGISTRATION FEE

<table>
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<tr>
<th>Class of Securities To Be Registered</th>
<th>Proposed Maximum Aggregate Offering Price(1)(2)</th>
<th>Amount of Registration Fee(2)(3)</th>
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<tr>
<td>Common Stock, $0.0001 par value per share</td>
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<td>$9,090</td>
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(1) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended.

(2) Includes the offering price of additional shares of common stock that the underwriters have the option to purchase.

(3) Calculated pursuant to Rule 457(o) under the Securities Act of 1933, as amended, based on an estimate of the proposed maximum aggregate offering price.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.
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The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

**Subject To Completion. Dated May 31, 2019.**

**Shares**

![Karuna Therapeutics Logo]

**Common Stock**

This is an initial offering of shares of common stock of Karuna Therapeutics, Inc.

We are offering shares of our common stock.

Prior to this offering, there has been no public market for the common stock. It is currently estimated that the initial public offering price per share will be between $ and $. We have applied to list our common stock on the Nasdaq Global Market under the symbol “KRTX.”

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements.

**Investing in our common stock involves a high degree of risk.** See “Risk Factors” beginning on page 12 to read about factors you should consider before buying shares of our common stock.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities nor passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

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<th>Per Share</th>
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<tr>
<td>Initial public offering price</td>
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<td>$</td>
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<tr>
<td>Underwriting discounts(1)</td>
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<td>Proceeds, before expenses, to Karuna Therapeutics, Inc.</td>
<td>$</td>
<td>$</td>
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</tbody>
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(1) See the section titled “Underwriting” for a description of the compensation payable to the underwriters.

To the extent that the underwriters sell more than shares of common stock, the underwriters have the option to purchase up to an additional shares from us at the initial price to the public less the underwriting discount.

The underwriters expect to deliver the shares against payment in New York, New York on , 2019.

**Goldman Sachs & Co. LLC**

**Citigroup**

**Wells Fargo Securities**

**Wedbush PacGrow**

Prospectus dated , 2019
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Neither we nor the underwriters have authorized anyone to provide you with any information or to make any representations other than those contained in this prospectus, any amendment or supplement to this prospectus or in any free writing prospectus we may authorize to be delivered or made available to you. Neither we nor the underwriters take responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We and the underwriters are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date on the front cover of this prospectus, or other earlier date stated in this prospectus, regardless of the time of delivery of this prospectus or any sale of shares of our common stock. Our business, financial condition, results of operations and prospects may have changed since that date.

For investors outside of the United States: We have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside the United States.
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In this prospectus, unless otherwise stated or the context otherwise requires, references to “Karuna,” the “Company,” “we,” “us,” “our” and similar references refer to Karuna Therapeutics, Inc. Karuna and other trademarks or service marks of Karuna appearing in this prospectus are the property of Karuna. The other trademarks, trade names and service marks appearing in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus are referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

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PROSPECTUS SUMMARY

This summary highlights, and is qualified in its entirety by, the more detailed information and financial statements and the accompanying notes included elsewhere in this prospectus. This summary does not contain all of the information that may be important to you. You should carefully consider, among other things, the matters discussed in “Risk Factors,” our financial statements and the accompanying notes, and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” in each case included elsewhere in this prospectus.

Overview

We are an innovative clinical-stage biopharmaceutical company primarily focused on developing novel therapies to address disabling neuropsychiatric conditions characterized by significant unmet medical need. Our pipeline is built on the broad therapeutic potential of our lead product candidate, KarXT, an oral modulator of muscarinic receptors that are located both in the central nervous system, or CNS, and various peripheral tissues. KarXT is our proprietary product candidate that combines xanomeline, a novel muscarinic agonist, with trospium, an approved muscarinic antagonist, to preferentially stimulate muscarinic receptors in the CNS. We are currently conducting a Phase 2 clinical trial of KarXT for the treatment of acute psychosis in patients with schizophrenia and expect topline results in late 2019. We also plan to initiate clinical trials of KarXT to evaluate its potential therapeutic benefit in other CNS disorders, including psychosis in Alzheimer’s disease, or AD, as well as pain. We have assembled members of a team who have extensive expertise in the research, development and commercialization of numerous CNS agents, as well as deep familiarity with the biology of neuropsychiatric disorders, such as schizophrenia and AD, including the role of muscarinic receptors in their potential treatment. We plan to leverage this expertise to develop a pipeline of product candidates targeting a broad range of psychiatric and neurological conditions.

Psychosis is a prominent and debilitating symptom that occurs in many neuropsychiatric disorders, including schizophrenia, AD, bipolar disorder, Parkinson’s disease, major depressive disorder and inflammatory neurological diseases, such as multiple sclerosis. Patients with schizophrenia experience psychotic symptoms, also known as positive symptoms, such as hallucinations and delusions. Schizophrenia is a chronic disabling disorder that is typically diagnosed in late teenage years or early adulthood and is characterized by recurring episodes of psychosis requiring long-term treatment with antipsychotic drugs in most patients. The World Health Organization ranks psychosis as the third-most disabling medical condition in the world. In 2017, an estimated 2.7 million Americans, or approximately 0.5% to 1.0% of the United States population, had schizophrenia. Additionally, up to 50% of the estimated 5.7 million patients with AD in the United States experience psychosis at some point during the course of their disease, which often leads to institutional care in a hospital or nursing home.

Worldwide sales of antipsychotic drugs exceeded $11 billion in 2015 and are expected to exceed $14 billion by 2025, despite a highly generic market. Several branded market-leading antipsychotic medicines have each achieved worldwide annual sales in excess of $5 billion. Despite the large number of antipsychotic drugs developed over the last 20 years, current medicines have undergone only modest innovation relative to first generation drugs developed in the 1950s. In many patients, current antipsychotics are hampered by modest efficacy and significant side effects. At least half of patients fail to adequately respond to antipsychotic drugs. Additionally, in many patients, these treatments are associated with severe side effects including sedation, extrapyramidal side effects, such as motor rigidity, tremors and slurred speech, and significant weight gain resulting in the complications of diabetes, hyperlipidemia, hypertension and cardiovascular disease. The clinical benefit of current antipsychotics is further limited by poor adherence. In a 1,493-patient clinical study funded by the National Institutes of Health, approximately 75% of patients reported discontinuing their antipsychotic medication within 18 months of starting treatment.
Current antipsychotic treatments work primarily by inhibiting D2 dopamine receptors and are often used by physicians to address a wide range of disorders in addition to schizophrenia, including bipolar disorder and psychotic depression, as well as psychosis and agitation in elderly patients with dementia. Muscarinic receptor agonists emerged in the 1990s as a potential alternative approach for treating psychosis. There are five distinct muscarinic receptors, M1 through M5, which are found in the brain as well as various peripheral tissues. The link between muscarinic receptor stimulation in the CNS, particularly stimulation of M1 and M4 receptors, and the reduction of psychotic symptoms and cognitive impairment, has been well studied and is supported by data from preclinical studies and two third-party clinical trials published in peer reviewed journals. However, the successful development of a therapeutic agent targeting muscarinic receptors has been limited by undesirable side effects that are believed to arise primarily as a result of stimulation of muscarinic receptors in peripheral tissues. We believe a therapeutic agent that can preferentially target and stimulate muscarinic receptors in the CNS, but not in peripheral tissues, has the potential to treat psychosis in schizophrenia and AD, including the associated agitation in patients with AD. We also believe the preferential stimulation of M1 and M4 muscarinic receptors in the CNS may address the negative symptoms of schizophrenia, such as apathy, reduced social drive and loss of motivation, as well as cognitive deficits in working memory and attention, all of which currently lack any approved treatments. This approach has the potential to produce a differentiated therapy relative to current D2 dopamine receptor-based antipsychotic drugs and to beneficially impact the lives of millions of patients with schizophrenia and other psychotic and cognitive disorders.

Pipeline Overview

We are advancing a pipeline of therapeutic programs to address the positive, negative and cognitive symptoms associated with schizophrenia and psychosis associated with AD, as well as various forms of pain. In addition, we are leveraging our expertise and experience to explore the development of KarXT for additional CNS disorders, as well as advance other muscarinic-targeted drug candidates.
We are initially developing our lead product candidate, KarXT, for the treatment of acute psychosis in patients with schizophrenia. KarXT combines xanomeline, a muscarinic receptor agonist that preferentially stimulates M1 and M4 muscarinic receptors, and trospium, an approved muscarinic receptor antagonist that does not measurably cross the blood-brain barrier, confining its effects to peripheral tissues. M1 and M4 muscarinic receptors are the receptor subtypes believed to mediate the antipsychotic, procognitive and analgesic effects of xanomeline and other muscarinic agonists. Results from preclinical studies and clinical trials conducted by third parties support the hypothesis that xanomeline can reduce psychosis and improve cognition. Like all muscarinic receptor agonists studied to date, however, xanomeline's tolerability has been limited by side effects arising from muscarinic receptor stimulation in peripheral tissues, leading to nausea, vomiting, diarrhea and increased salivation and sweating, collectively referred to as cholinergic adverse events. Trospium is a muscarinic receptor antagonist approved in the United States and Europe for the treatment of overactive bladder that inhibits all five muscarinic receptor subtypes in peripheral tissues. We believe that a combination therapy of xanomeline and trospium has the potential to preferentially stimulate M1 and M4 muscarinic receptors in the brain without stimulating muscarinic receptors in peripheral tissues in order to achieve meaningful therapeutic benefit in patients with psychotic and cognitive disorders.

Third-Party Clinical Trials Support Xanomeline’s Development

Xanomeline as a treatment for psychosis and related neuropsychiatric disorders has been examined in clinical trials enrolling over 800 subjects or patients conducted by us and third parties, with 68 patients being dosed for at least one year and a maximum treatment duration of almost four years. We believe that the results from these clinical trials, as well as results from numerous preclinical studies, supports the further development of xanomeline, in the form of KarXT, as an antipsychotic and procognitive therapeutic agent.

Eli Lilly and Company, or Eli Lilly, conducted a 343-patient, randomized, double-blind, placebo-controlled Phase 2 clinical trial of xanomeline in patients with mild to moderate AD, administering up to 225 mg of xanomeline daily (75 mg three times a day, or TID), for 24 weeks. In this trial, patients on xanomeline were observed to have dose-dependent decreases in multiple psychotic symptoms and related behaviors, including hallucinations, delusions and agitation, as compared to patients on placebo. These responses were seen as early as two to three weeks after commencement of dosing with xanomeline. Xanomeline was also observed to reduce the emergence of psychotic symptoms over the course of the six-month trial in patients who did not have psychotic symptoms at the initiation of the trial. In this same trial, cognitive symptoms of patients with AD treated with xanomeline also showed improvements compared to placebo as measured by both the ADAS-Cog and the CIBIC+, suggesting that xanomeline may also improve cognition. The Alzheimer’s Disease Assessment Scale-Cognitive Subscale, or ADAS-Cog, is one of the most frequently used tests to measure cognition while the Clinician Interview-Based Impression of Change plus caregiver interview, or CIBIC+, examines disease severity and changes in behavior, cognition and overall function. There was a 48% and 59% rate of discontinuation in the mid- and high-dose xanomeline cohorts, respectively, leading to a substantial reduction of statistical power in this trial. Despite this reduction in statistical power, patients in the mid-dose cohort showed a statistically significant benefit on the CIBIC+ as compared to placebo (p=0.02, 4.11 vs. 4.34, respectively). An analysis of patients who completed the trial identified a mean benefit of 2.84 units on the ADAS-Cog for the 225 mg xanomeline arm over placebo (p<0.05), which is similar to the effect seen with donepezil, an approved treatment for cognitive impairment associated with AD.

A randomized, double-blind, placebo-controlled, small Phase 2 trial of xanomeline was conducted in 20 patients with schizophrenia with acute psychosis, as a collaboration between Eli Lilly and the Indiana University School of Medicine. This monotherapy trial used the Positive and Negative
Syndrome Scale, or PANSS, as a primary endpoint. The PANSS is a set of measurements used for evaluating symptom severity in patients with schizophrenia and the change in PANSS score has been used as the primary endpoint in many registrational trials of antipsychotic medicines. As depicted in the figure below, a clinically meaningful and statistically significant 24-point PANSS score difference was observed between xanomeline and placebo was observed after 18 days of treatment which was the pre-specified analysis time point. By comparison, meta-analyses of published clinicals trials of currently approved antipsychotic medicines report an average difference of nine to ten points in PANSS score versus placebo. Historically, changes as small as five points have supported the approval of current antipsychotics.

Our Clinical Trials

In our initial Phase 1 clinical trial, we observed that in healthy volunteers the combination of xanomeline and trospium was associated with 46% fewer cholinergic adverse events as compared to xanomeline administered with placebo. Additionally, we have completed a randomized, double-blind, placebo-controlled multiple ascending dose Phase 1 clinical trial in healthy volunteers, in which we optimized the dosing of our proprietary KarXT co-formulation.

In September 2018, we initiated a multi-site, double-blind, placebo-controlled Phase 2 clinical trial of KarXT in patients with schizophrenia with acute psychosis. The primary endpoint in this trial is the change from baseline in PANSS total scores for KarXT versus placebo treated patients over the course of the five week treatment. Our trial has the same fundamental design and primary endpoint as the previous xanomeline trial in psychosis in schizophrenia. Additional endpoints of our trial include changes in PANSS Marder Factor score (including the negative symptom factor), a cognitive battery and the clinical global impression (CGI-S). We anticipate enrolling 180 patients in this trial and expect topline results in late 2019. An Interim Safety Monitoring Committee, or ISMC, will review the safety data at three prescribed intervals throughout the course of the trial. To date, two ISMC reviews have been completed and the ISMC recommended that the trial continue without modification. We anticipate the third and final pre-specified review by the ISMC later this year.

Based on our clinical data with KarXT and third-party published clinical data with xanomeline, we believe that KarXT has potential therapeutic benefit in multiple CNS disorders, including the treatment of positive, negative and cognitive symptoms of schizophrenia and psychosis, as well as agitation associated with AD and other forms of dementia. We anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT in the second half of 2019 for the treatment of psychosis in patients with AD. In addition, we believe published third-party preclinical data support the development of KarXT as a novel non-opioid therapeutic for various forms of post-operative, inflammatory and neuropathic pain. We anticipate initiating a Phase 1b clinical trial for the treatment of experimentally induced pain in health volunteers in the second half of 2019.

We plan to utilize the data from our Phase 2 clinical trial of KarXT for the treatment of psychosis to help us guide KarXT’s future development for negative and cognitive symptoms of schizophrenia, for which there are currently no approved treatments. We anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT for the treatment of the cognitive symptoms in the first half of 2020 and a Phase 1b clinical trial to assess the safety and tolerability of KarXT for the treatment of the negative symptoms in the first half of 2020.
Our Strategy
Our goal is to become a leading biopharmaceutical company focused on the development and commercialization of novel therapies for the treatment of CNS disorders. To achieve this, we are focused on the following key strategies:

- Advance KarXT in our initial indications of psychosis in patients with schizophrenia and AD, as well as pain;
- Apply our expertise in muscarinic receptor biology to expand into other indications for KarXT;
- Advance the development of additional KarXT formulations;
- Develop and advance our early-stage pipeline; and
- Selectively collaborate to realize the potential of our product candidates.

Our Leadership Team
Our co-founder, Andrew Miller, Ph.D., was responsible for identifying, developing and testing the initial hypothesis supporting a combination of xanomeline and trospium. We have since assembled a team of employees and advisors who have expertise and extensive experience in developing psychiatric and neurological drugs, including several former scientists at Eli Lilly, who were actively involved in xanomeline’s initial development. Steven Paul, M.D., our Chief Executive Officer and Chairman, was formerly the Executive Vice President for Science and Technology and President of the Lilly Research Laboratories at Eli Lilly, where he helped develop the antipsychotic drug Zyprexa and the antidepressant Cymbalta. Dr. Paul was the senior author of the initial publication evaluating xanomeline’s effects in treating psychosis and agitation in patients with AD. Stephen Brannan, M.D., our Chief Medical Officer, was previously the Therapeutic Head of Neuroscience at Takeda Pharmaceutical Company Ltd. Alan Breier, M.D., our Chief Clinical Advisor and Chair of our Scientific Advisory Board, was previously Chief Medical Officer at Eli Lilly.

Risks Associated with Our Business
Our business is subject to a number of risks of which you should be aware before making an investment decision. These risks are discussed more fully in the “Risk Factors” section of this prospectus immediately following this prospectus summary. These risks include the following, among others:

- We are a clinical-stage biopharmaceutical company and we have incurred significant losses since our inception. We anticipate that we will continue to incur significant losses for the foreseeable future.
- Even if we consummate this offering, we will need substantial additional funding, and if we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product discovery and development programs or commercialization efforts.
- Our business substantially depends upon the successful development of KarXT. If we are unable to obtain regulatory approval for or successfully commercialize KarXT, our business may be materially harmed.
- The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.
The results of early-stage clinical trials and preclinical studies may not be predictive of future results. Initial success in our ongoing clinical trials may not be indicative of results obtained when these trials are completed or in later stage trials.

Our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following regulatory approval, if obtained.

We may seek to establish collaborations and, if we are not able to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.

Our commercial success depends on our ability to protect our intellectual property and proprietary technology.

If we fail to comply with our obligations in our current and future intellectual property licenses with third parties, we could lose rights that are important to our business.

Corporate Information

We were incorporated under the laws of the State of Delaware in July 2009 under the name Karuna Pharmaceuticals, Inc. and changed our name to Karuna Therapeutics, Inc. in March 2019. Our executive offices are located at 33 Arch Street, Suite 3110, Boston, Massachusetts 02110, and our telephone number is (857) 449-2244. Our website address is www.karunatx.com. The information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

Implications of Being an Emerging Growth Company

As a company with less than $1.07 billion of revenue during our last fiscal year, we qualify as an “emerging growth company” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We may remain an emerging growth company for up to five years following the completion of this offering, or until such earlier time as we have more than $1.07 billion in annual revenue, the last day of the fiscal year in which we are deemed to be a “large accelerated filer” as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended, or the Exchange Act, which would occur if the market value of our common stock held by non-affiliates exceeded $700 million as of the last business day of the second fiscal quarter of such year or we issue more than $1 billion of non-convertible debt over a three-year period. For so long as we remain an emerging growth company, we are permitted to rely on exemptions from certain disclosure and other requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- only two years of audited financial statements in addition to any required unaudited interim financial statements with correspondingly reduced “Management's Discussion and Analysis of Financial Condition and Results of Operations” disclosure;
- reduced disclosure about our executive compensation arrangements;
- no non-binding advisory votes on executive compensation or golden parachute arrangements;
- exemption from the auditor attestation requirement in the assessment of our internal control over financial reporting; and
- an exemption from new or revised financial accounting standards until they would apply to private companies and from compliance with any new requirements adopted by the Public Company Accounting Oversight Board requiring mandatory audit firm rotation.
In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This provision allows an emerging growth company to delay the adoption of some accounting standards until those standards would otherwise apply to private companies. We have elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.
### THE OFFERING

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<tr>
<td>Option to purchase additional shares</td>
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<tr>
<td>Common stock to be outstanding immediately after this offering</td>
<td>shares (                  shares if the underwriters exercise their option to purchase additional shares in full).</td>
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**Use of proceeds**

We estimate that the net proceeds to us from this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, will be approximately $        million, or approximately $        million if the underwriters exercise their option to purchase additional shares from us in full, assuming an initial public offering price of $        per share, which is the midpoint of the price range set forth on the cover page of this prospectus.

We intend to use the net proceeds from this offering, together with our existing cash, cash equivalents and short-term investments, to fund (i) the completion of our ongoing Phase 2 clinical trial and the completion of a planned Phase 3 clinical trial for the treatment of psychosis in schizophrenia; (ii) the completion of our planned Phase 1b clinical trial and the completion of a planned Phase 2 clinical trial for the treatment of psychosis in AD; (iii) the completion of our planned Phase 1b clinical trials for the cognitive and negative symptoms in schizophrenia; (iv) the completion of our planned Phase 1b clinical trial and the completion of a planned Phase 2 clinical trial for the treatment of pain; (v) the development and expansion of our pipeline, including other muscarinic candidates, formulations and derivatives; and (vi) for working capital and other general corporate activities. See the “Use of Proceeds” section in this prospectus for a more complete description of the intended use of proceeds from this offering.

**Risk factors**

You should read the “Risk Factors” section of this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.

**Proposed Nasdaq Global Market symbol**

“KRTX”

The number of shares of our common stock to be outstanding after this offering is based on (i) 45,400 shares of our common stock outstanding as of May 30, 2019, (ii) 12,962,045 additional
shares of our common stock issuable upon the automatic conversion of all outstanding shares of our preferred stock upon the closing of this offering, and (iii) 80,976 shares of common stock underlying fully vested restricted stock units we issued in May 2019, which we are obligated to deliver no later than March 15, 2020, and excludes:

- 2,875,488 shares of our common stock issuable upon the exercise of stock options outstanding as of May 30, 2019, at a weighted average exercise price of $8.62 per share;
- 25,116 shares of our common stock available for future issuance as of May 30, 2019 under our 2009 stock incentive plan;
- shares of our common stock issuable upon the exercise of stock options that we will grant to Dr. Paul upon completion of this offering pursuant to his current employment agreement, based on the assumed number of shares offered set forth on the cover of this prospectus, with an exercise price equal to the initial public offering price per share in this offering;
- shares of our common stock that will become available for future issuance under our 2019 Stock Option and Incentive Plan, which will become effective in connection with the completion of this offering; and
- shares of our common stock that will become available for future issuance under our 2019 Employee Stock Purchase Plan, which will become effective in connection with the completion of this offering.

Unless otherwise indicated, all information in this prospectus assumes:

- no exercise of the outstanding options described above;
- no exercise by the underwriters of their option to purchase up to additional shares of our common stock;
- the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of our common stock upon the closing of this offering;
- a 1-for- split of our common stock effected on ; and
- the restatement of our certificate of incorporation and the amendment and restatement of our bylaws upon the closing of this offering.
You should read the following summary financial data together with “Selected Financial Data,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the financial statements, related notes and other financial information included elsewhere in this prospectus. The summary financial data in this section are not intended to replace the financial statements and are qualified in their entirety by the financial statements and related notes included elsewhere in this prospectus. We have derived the statement of operations data for the years ended December 31, 2017 and 2018 from our audited financial statements appearing at the end of this prospectus. We have derived the statement of operations data for the three months ended March 31, 2018 and 2019 and the balance sheet data as of March 31, 2019 from our unaudited interim financial statements appearing at the end of this prospectus. The unaudited interim financial statements have been prepared on the same basis as the audited financial statements and reflect, in the opinion of management, all adjustments of a normal, recurring nature that are necessary for a fair statement of the financial information included in those unaudited interim financial statements. Our historical results are not necessarily indicative of the results that may be expected in the future, and the results for the three months ended March 31, 2019 are not necessarily indicative of results to be expected for the full year or any other period.

### Year Ended December 31, 2017

<table>
<thead>
<tr>
<th>Revenue</th>
<th>$3,616 (in thousands)</th>
<th>$11,536</th>
<th>$1,224</th>
<th>$6,967</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating expenses:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>$3,616</td>
<td>$11,536</td>
<td>$1,224</td>
<td>$6,967</td>
</tr>
<tr>
<td>General and administrative</td>
<td>1,190</td>
<td>2,974</td>
<td>236</td>
<td>4,606</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>4,806</td>
<td>14,510</td>
<td>1,460</td>
<td>11,573</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(4,806)</td>
<td>(14,510)</td>
<td>(1,460)</td>
<td>(11,573)</td>
</tr>
<tr>
<td>Other income (expense):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest (expense) income</td>
<td>(555)</td>
<td>(407)</td>
<td>(281)</td>
<td>11</td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>115</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>(616)</td>
<td>(2,176)</td>
<td>(587)</td>
<td>(423)</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>(55)</td>
<td>(444)</td>
<td>(80)</td>
<td>(135)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(1,226)</td>
<td>(3,002)</td>
<td>(948)</td>
<td>(432)</td>
</tr>
<tr>
<td>Net loss before income taxes</td>
<td>$6,032</td>
<td>$17,512</td>
<td>$2,408</td>
<td>$12,005</td>
</tr>
</tbody>
</table>

### Three Months Ended March 31, 2018

| Revenue       | - | - | - | - |
| Operating expenses: |
| Research and development | - | - | - | - |
| General and administrative | - | - | - | - |
| Total operating expenses | - | - | - | - |
| Loss from operations | - | - | - | - |
| Other income (expense): |
| Interest (expense) income | - | - | - | - |
| Interest income | - | - | - | - |
| Accretion of debt discount | - | - | - | - |
| Change in fair value of derivative | - | - | - | - |
| Total other income (expense), net | - | - | - | - |
| Net loss before income taxes | - | - | - | - |

### Year Ended December 31, 2018

| Revenue       | - | - | - | - |
| Operating expenses: |
| Research and development | - | - | - | - |
| General and administrative | - | - | - | - |
| Total operating expenses | - | - | - | - |
| Loss from operations | - | - | - | - |
| Other income (expense): |
| Interest (expense) income | - | - | - | - |
| Interest income | - | - | - | - |
| Accretion of debt discount | - | - | - | - |
| Change in fair value of derivative | - | - | - | - |
| Total other income (expense), net | - | - | - | - |
| Net loss before income taxes | - | - | - | - |

### Three Months Ended March 31, 2019

| Revenue       | - | - | - | - |
| Operating expenses: |
| Research and development | - | - | - | - |
| General and administrative | - | - | - | - |
| Total operating expenses | - | - | - | - |
| Loss from operations | - | - | - | - |
| Other income (expense): |
| Interest (expense) income | - | - | - | - |
| Interest income | - | - | - | - |
| Accretion of debt discount | - | - | - | - |
| Change in fair value of derivative | - | - | - | - |
| Total other income (expense), net | - | - | - | - |
| Net loss before income taxes | - | - | - | - |

### Summary Financial Data

<table>
<thead>
<tr>
<th>Year Ended December 31</th>
<th>Three Months Ended March 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in thousands, except share and per share data)</td>
<td></td>
</tr>
<tr>
<td>Statement of Operations Data:</td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>-</td>
</tr>
<tr>
<td>Operating expenses:</td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>$3,616</td>
</tr>
<tr>
<td>General and administrative</td>
<td>1,190</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>4,806</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(4,806)</td>
</tr>
<tr>
<td>Other income (expense):</td>
<td></td>
</tr>
<tr>
<td>Interest (expense) income</td>
<td>(555)</td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>(616)</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>(55)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(1,226)</td>
</tr>
<tr>
<td>Net loss before income taxes</td>
<td>$6,032</td>
</tr>
<tr>
<td>Net loss per share—basic and diluted(1)</td>
<td>$ (4,378,000)</td>
</tr>
<tr>
<td>Weighted-average number of common shares used in net loss per share—basic and diluted(1)</td>
<td>4</td>
</tr>
<tr>
<td>Pro forma net loss per share—basic and diluted (unaudited)(1)</td>
<td>$ (3.06)</td>
</tr>
<tr>
<td>Weighted-average number of common shares used in pro forma net loss per share—basic and diluted (unaudited)(1)</td>
<td>5,714,378</td>
</tr>
</tbody>
</table>

(1) See Note 2 in the notes to our financial statements appearing at the end of this prospectus for a description of the method used to calculate basic and diluted net loss per share and unaudited pro forma basic and diluted net loss per share.
### Balance Sheet Data

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Pro Forma (1)</th>
<th>Pro Forma As Adjusted (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash, cash equivalents and short term investments</td>
<td>$ 84,275</td>
<td>$ 85,843</td>
<td></td>
</tr>
<tr>
<td>Working capital</td>
<td>82,967</td>
<td>84,535</td>
<td></td>
</tr>
<tr>
<td>Total assets</td>
<td>85,400</td>
<td>86,968</td>
<td></td>
</tr>
<tr>
<td>Redeemable convertible preferred stock</td>
<td>121,806</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total stockholders’ deficit</td>
<td>(38,765)</td>
<td>84,609</td>
<td></td>
</tr>
</tbody>
</table>

(1) Pro forma amounts give effect to (i) the sale and issuance of 137,743 shares of our Series B preferred stock in April 2019, (ii) the issuance of 30,000 shares of common stock upon exercise of an outstanding option in April 2019, (iii) the automatic conversion of all outstanding shares of preferred stock into an aggregate of 12,962,045 shares of common stock upon the closing of this offering and (iv) the future issuance of 80,976 shares of common stock underlying fully vested restricted stock units we issued in May 2019, which we are obligated to deliver no later than March 15, 2020.

(2) Pro forma as adjusted amounts reflect pro forma adjustments described in footnote (1) as well as the sale of shares of our common stock in this offering at the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us. A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalents and short-term investments, working capital, total assets and total stockholders’ equity by $ million, assuming that the number of shares offered by us, as set forth on the cover of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Similarly, each increase (decrease) of 1,000,000 shares offered by us in this offering would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalents and short-term investments, working capital, total assets and total stockholders’ equity by $ million, assuming the assumed initial public offering price remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.
RISK FACTORS

Investing in our common stock involves a high degree of risk. Before you decide to invest in our common stock, you should consider carefully the risks described below, together with the other information contained in this prospectus, including our financial statements and the related notes and “Management's Discussion and Analysis of Financial Condition and Results of Operations,” appearing elsewhere in this prospectus. We believe the risks described below are the risks that are material to us as of the date of this prospectus. If any of the following risks actually occur, our business, financial condition, results of operations and growth prospects could be materially and adversely affected. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment.

Risks Related to Our Financial Position and Need for Capital

We are a clinical-stage biopharmaceutical company and we have incurred significant losses since our inception. We anticipate that we will continue to incur significant losses for the foreseeable future.

Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval and become commercially viable. We have no products approved for commercial sale and have not generated any revenue from product sales to date, and we will continue to incur significant research and development and other expenses related to our clinical development and ongoing operations. As a result, we are not profitable and have incurred losses in each period since our inception. Since our inception, we have devoted substantially all of our financial resources and efforts to research and development, including preclinical studies and our clinical trials. Our financial condition and operating results, including net losses, may fluctuate significantly from quarter to quarter and year to year. Accordingly, you should not rely upon the results of any quarterly or annual periods as indications of future operating performance. Additionally, net losses and negative cash flows have had, and will continue to have, an adverse effect on our stockholders’ equity and working capital. Our net losses were $6.0 million and $17.5 million for the years ended December 31, 2017 and 2018, respectively, and $12.0 million for the three months ended March 31, 2019. As of March 31, 2019, we had an accumulated deficit of $43.6 million. We expect to continue to incur significant losses for the foreseeable future, and we expect these losses to increase as we continue our research and development of, and seek regulatory approvals for KarXT in our initial and potential additional indications as well as for other product candidates.

We anticipate that our expenses will increase substantially if and as we:

- continue to develop and conduct clinical trials for KarXT for our initial and potential additional indications;
- initiate and continue research, preclinical and clinical development efforts for any future product candidates;
- seek to identify additional product candidates;
- seek regulatory approvals for KarXT, or any other product candidates that successfully complete clinical development;
- add operational, financial and management information systems and personnel, including personnel to support our product candidate development and help us comply with our obligations as a public company;
- hire and retain additional personnel, such as clinical, quality control, scientific, commercial and administrative personnel;
• maintain, expand and protect our intellectual property portfolio;
• establish sales, marketing, distribution, manufacturing, supply chain and other commercial infrastructure in the future to commercialize various products for which we may obtain regulatory approval;
• add equipment and physical infrastructure to support our research and development; and
• acquire or in-license other product candidates and technologies.

Our expenses could increase beyond our expectations if we are required by the U.S. Food and Drug Administration, or FDA, or other regulatory authorities to perform clinical trials in addition to those that we currently expect, or if there are any delays in establishing appropriate manufacturing arrangements for or in completing our clinical trials or the development of any of our product candidates.

We have never generated revenue from product sales and may never be profitable.

Our ability to become and remain profitable depends on our ability to generate revenue. We do not expect to generate significant revenue, if any, unless and until we, either alone or with a collaborator, are able to obtain regulatory approval for, and successfully commercialize, KarXT for our initial and potential additional indications, or any other product candidates we may develop. Successful commercialization will require achievement of many key milestones, including demonstrating safety and efficacy in clinical trials, obtaining regulatory, including marketing, approval for these product candidates, manufacturing, marketing and selling those products for which we, or any of our future collaborators, may obtain regulatory approval, satisfying any post-marketing requirements and obtaining reimbursement for our products from private insurance or government payors. Because of the uncertainties and risks associated with these activities, we are unable to accurately and precisely predict the timing and amount of revenues, the extent of any further losses or if or when we might achieve profitability. We and any future collaborators may never succeed in these activities and, even if we do, or any future collaborators do, we may never generate revenues that are large enough for us to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Additionally, our expenses could increase if we are required by the FDA or any comparable foreign regulatory authority to perform clinical trials in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our product candidates.

Our failure to become and remain profitable may depress the market price of our common stock and could impair our ability to raise capital, expand our business, diversify our product offerings or continue our operations. If we continue to suffer losses as we have in the past, investors may not receive any return on their investment and may lose their entire investment.

We have a limited operating history, which may make it difficult to evaluate the prospects for our future viability.

We were formed by PureTech Health LLC, or PureTech Health, in 2009 and have only recently begun the transition to operate as a standalone entity. Our operations to date have been limited to organizing, staffing and financing our company, raising capital, in-licensing our technology and conducting research and development activities, including preclinical studies and clinical trials, for our product candidates. We have not yet demonstrated an ability to generate revenues, obtain regulatory approvals, manufacture a commercial-scale product, or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. Accordingly, you should consider our prospects in light of the costs, uncertainties, delays and
difficulties frequently encountered by companies in clinical development, especially clinical-stage biopharmaceutical companies such as ours. Any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing pharmaceutical products.

We may encounter unforeseen expenses, difficulties, complications, delays and other known or unknown factors in achieving our business objectives. We will eventually need to transition from a company with a development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

**Even if we consummate this offering, we will need substantial additional funding, and if we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product discovery and development programs or commercialization efforts.**

Our operations have consumed substantial amounts of cash since inception. We expect to continue to spend substantial amounts to continue the preclinical and clinical development of our current and future programs. If we are able to gain marketing approval for product candidates that we develop, including any indication for which we are developing or may develop KarXT, we will require significant additional amounts of cash in order to launch and commercialize such product candidates to the extent that such launch and commercialization are not the responsibility of a future collaborator that we may contract with in the future. In addition, other unanticipated costs may arise in the course of our development efforts. Because the design and outcome of our planned and anticipated clinical trials is highly uncertain, we cannot reasonably estimate the actual amounts necessary to successfully complete the development and commercialization of any product candidate we develop.

Our future capital requirements depend on many factors, including:

- the scope, progress, results and costs of researching and developing KarXT for our initial and potential additional indications, as well as other product candidates we may develop;
- the timing of, and the costs involved in, obtaining marketing approvals for KarXT for our initial and potential additional indications, and other product candidates we may develop and pursue;
- the number of future product candidates that we may pursue and their development requirements;
- if approved, the costs of commercialization activities for KarXT for any approved indications, or any other product candidate that receives regulatory approval to the extent such costs are not the responsibility of any future collaborators, including the costs and timing of establishing product sales, marketing, distribution and manufacturing capabilities;
- subject to receipt of regulatory approval, revenue, if any, received from commercial sales of KarXT for any approved indications or any other product candidates;
- the extent to which we in-license or acquire rights to other products, product candidates or technologies;
- our headcount growth and associated costs as we expand our research and development and establish a commercial infrastructure;
- the costs of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights, including enforcing and defending intellectual property related claims; and
- the costs of operating as a public company.

We cannot be certain that additional funding will be available on acceptable terms, or at all. We have no committed source of additional capital and if we are unable to raise additional capital in
sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or commercialization of our product candidates or other research and development initiatives. Any of our current or future license agreements may also be terminated if we are unable to meet the payment or other obligations under the agreements.

We believe that the net proceeds from this offering, together with our existing cash, cash equivalents and short-term investments, will enable us to fund our operating expenses and capital expenditure requirements through the . Our estimate may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Further, changing circumstances, some of which may be beyond our control, could cause us to consume capital significantly faster than we currently anticipate, and we may need to seek additional funds sooner than planned.

Raising additional capital may cause dilution to our stockholders, including purchasers of common stock in this offering, restrict our operations or require us to relinquish rights to our technologies or product candidates.

We expect our expenses to increase in connection with our planned operations. Unless and until we can generate a substantial amount of revenue from our product candidates, we expect to finance our future cash needs through public or private equity offerings, debt financings, collaborations, licensing arrangements or other sources, or any combination of the foregoing. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans.

To the extent that we raise additional capital through the sale of common stock, convertible securities or other equity securities, your ownership interest may be diluted, and the terms of these securities could include liquidation or other preferences and anti-dilution protections that could adversely affect your rights as a common stockholder. In addition, debt financing, if available, may result in fixed payment obligations and may involve agreements that include restrictive covenants that limit our ability to take specific actions, such as incurring additional debt, making capital expenditures, creating liens, redeeming stock or declaring dividends, that could adversely impact our ability to conduct our business. In addition, securing financing could require a substantial amount of time and attention from our management and may divert a disproportionate amount of their attention away from day-to-day activities, which may adversely affect our management's ability to oversee the development of our product candidates.

If we raise additional funds through collaborations or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our ability to use net operating losses and research and development credits to offset future taxable income may be subject to certain limitations.

As of December 31, 2018, we had federal net operating loss carryforwards totaling $23.0 million of which $9.7 million begin to expire in 2029 and $13.3 million can be carried forward indefinitely. As of December 31, 2018, we had state net operating loss carryforwards totaling $22.9 million which begin to expire in 2029. As of December 31, 2018, we also had federal and state research and development tax credit carryforwards of $0.5 million and less than $0.1 million, respectively, which expire in 2038 and 2033, respectively. These net operating loss and tax credit carryforwards could expire unused and be unavailable to offset future income tax liabilities. In addition, in general, under Sections 382 and 383 of
the Internal Revenue Code of 1986, as amended, or the Code, a corporation that undergoes an “ownership change” is subject to limitations on its ability to utilize its pre-change net operating losses or tax credits, or NOLs or credits, to offset future taxable income or taxes. For these purposes, an ownership change generally occurs where the aggregate stock ownership of one or more stockholders or groups of stockholders who owns at least 5% of a corporation's stock increases its ownership by more than 50 percentage points over its lowest ownership percentage within a specified testing period. Our existing NOLs or credits may be subject to limitations arising from previous ownership changes, and if we undergo an ownership change in connection with or after this offering, our ability to utilize NOLs or credits could be further limited by Sections 382 and 383 of the Code. In addition, future changes in our stock ownership, many of which are outside of our control, could result in an ownership change under Sections 382 and 383 of the Code. Our NOLs or credits may also be impaired under state law. Accordingly, we may not be able to utilize a material portion of our NOLs or credits. If we determine that an ownership change has occurred and our ability to use our historical NOLs or credits is materially limited, it would harm our future operating results by effectively increasing our future tax obligations.

Furthermore, our ability to utilize our NOLs or credits is conditioned upon our attaining profitability and generating U.S. federal and state taxable income. As described above under “—Risks Related to Our Financial Position and Need for Additional Capital,” we have incurred significant net losses since our inception and anticipate that we will continue to incur significant losses for the foreseeable future; and therefore, we do not know whether or when we will generate the U.S. federal or state taxable income necessary to utilize our NOL or credit carryforwards that are subject to limitation by Sections 382 and 383 of the Code.

Comprehensive tax reform legislation could adversely affect our business and financial condition.

The U.S. government has recently enacted comprehensive tax legislation that includes significant changes to the taxation of business entities. These changes include, among others, a permanent reduction to the corporate income tax rate. Notwithstanding the reduction in the corporate income tax rate, the overall impact of this tax reform is uncertain, and our business and financial condition could be adversely affected. This prospectus does not discuss any such tax legislation or the manner in which it might affect purchasers of our common stock. We urge our stockholders to consult with their legal and tax advisors with respect to any such legislation and the potential tax consequences of investing in our common stock.

Risks Related to the Discovery, Development and Commercialization of Our Product Candidates

Our business substantially depends upon the successful development of KarXT. If we are unable to obtain regulatory approval for, and successfully commercialize, KarXT, our business may be materially harmed.

We currently have no products approved for sale and are investing the majority of our efforts and financial resources in the development of our lead product candidate, KarXT for psychosis in patients with schizophrenia and AD as well as pain. Successful continued development and ultimate regulatory approval of KarXT for our initial and potential additional indications is critical to the future success of our business. We will need to raise sufficient funds for, and successfully enroll and complete, our clinical development programs of KarXT for psychosis in patients with schizophrenia and AD as well as pain, and possibly other diseases. The future regulatory and commercial success of KarXT is subject to a number of risks, including the following:

• successful completion of preclinical studies and clinical trials;
• successful patient enrollment in clinical trials;
• successful data from our clinical program that supports an acceptable risk-benefit profile of our product candidates in the intended populations;
• receipt and maintenance of marketing approvals from applicable regulatory authorities;
• obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
• making arrangements with third-party manufacturers, or establishing manufacturing capabilities, for both clinical and commercial supplies of our product candidates;
• entry into collaborations to further the development of our product candidates;
• establishing sales, marketing and distribution capabilities and launching commercial sales of our products, if and when approved, whether alone or in collaboration with others;
• successfully launching commercial sales of our product candidates, if and when approved;
• acceptance of our products, if and when approved, by patients, the medical community and third-party payors;
• obtaining and maintaining third-party coverage and adequate reimbursement;
• maintaining a continued acceptable safety profile of the products following approval;
• effectively competing with other therapies; and
• enforcing and defending intellectual property rights and claims.

Many of these risks are beyond our control, including the risks related to clinical development, the regulatory submission process, potential threats to our intellectual property rights and the manufacturing, marketing and sales efforts of any future collaborator. If we are unable to develop, receive regulatory approval for, or successfully commercialize KarXT for the indications we are developing it for, or if we experience delays as a result of any of these risks or otherwise, our business could be materially harmed.

In addition, of the large number of drugs in development in the pharmaceutical industry, only a small percentage result in the submission of a new drug application, or NDA, to the FDA and even fewer are approved for commercialization. Furthermore, even if we do receive regulatory approval for KarXT for any indication, any such approval may be subject to limitations on the indications or uses or patient populations for which we may market the product. Accordingly, even if we are able to obtain the requisite financing to continue to fund our development programs, we cannot assure you that we will successfully develop or commercialize KarXT for any indication. If we or any of our future collaborators are unable to develop, or obtain regulatory approval for, or, if approved, successfully commercialize KarXT for our initial or potential additional indications, we may not be able to generate sufficient revenue to continue our business. In addition, our failure to demonstrate positive results in our clinical trials in any indication for which we are developing KarXT could adversely affect our development efforts for KarXT in other indications.

Our company has never commercialized a product candidate and may experience delays or unexpected difficulties in obtaining regulatory approval for KarXT for our initial or potential additional indications.

Our company has never obtained regulatory approval for, or commercialized, a drug. It is possible that the FDA may refuse to accept any or all of our planned NDAs for substantive review or may conclude after review of our data that our application is insufficient to obtain regulatory approval for any
product candidates. If the FDA does not approve any of our planned NDAs, it may require that we conduct additional costly clinical, nonclinical or manufacturing validation studies before it will reconsider our applications. Depending on the extent of these or any other FDA-required studies, approval of any NDA or other application that we submit may be significantly delayed, possibly for several years, or may require us to expend more resources than we have available. Any failure or delay in obtaining regulatory approvals would prevent us from commercializing KarXT for any indication or any other product candidate, generating revenues and achieving and sustaining profitability. It is also possible that additional studies, if performed and completed, may not be considered sufficient by the FDA to approve any NDA or other application that we submit. If any of these outcomes occur, we may be forced to abandon the development of our product candidates, which would materially adversely affect our business and could potentially cause us to cease operations. We face similar risks for our applications in foreign jurisdictions. In addition, difficulties in obtaining approval of KarXT in any of the initial indications for which we are developing it could adversely affect our efforts to seek approval from regulatory authorities for KarXT in other indications.

The regulatory approval processes of the FDA and comparable foreign authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.

We, and any future collaborators, are not permitted to commercialize, market, promote or sell any product candidate in the United States without obtaining regulatory approval from the FDA. Foreign regulatory authorities, such as the European Medicines Agency, or EMA, impose similar requirements. The time required to obtain approval by the FDA and comparable foreign authorities is unpredictable, but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including substantial discretion of the regulatory authorities. In addition, approval policies, regulations, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate’s clinical development and may vary among jurisdictions. To date, we have not submitted an NDA to the FDA or similar drug approval submissions to comparable foreign regulatory authorities for KarXT or any other product candidate. We, and any future collaborators, must complete additional preclinical or nonclinical studies and clinical trials to demonstrate the safety and efficacy of our product candidates in humans before we will be able to obtain these approvals.

Clinical testing is expensive, difficult to design and implement, can take many years to complete and is inherently uncertain as to outcome. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. The clinical development of KarXT for our initial and potential additional indications or other product candidates is susceptible to the risk of failure inherent at any stage of development, including failure to demonstrate efficacy in a clinical trial or across a broad population of patients, the occurrence of adverse events that are severe or medically or commercially unacceptable, failure to comply with protocols or applicable regulatory requirements, and determination by the FDA or any comparable foreign regulatory authority that a product candidate may not continue development or is not approvable. It is possible that even if KarXT or any other product candidate has a beneficial effect, that effect will not be detected during clinical evaluation as a result of one or more of a variety of factors, including the size, duration, design, measurements, conduct or analysis of our clinical trials. Conversely, as a result of the same factors, our clinical trials may indicate an apparent positive effect of KarXT or any other product candidate that is greater than the actual positive effect, if any. Similarly, in our clinical trials we may fail to detect toxicity of or intolerability caused by KarXT or any other product candidate, or mistakenly believe that our product candidates are toxic or not well-tolerated when that is not in fact the case.
Our current and future product candidates could fail to receive regulatory approval for many reasons, including the following:

• the FDA or comparable foreign regulatory authorities may disagree as to the design or implementation of our clinical trials;

• we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication;

• the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;

• we may be unable to demonstrate that a product candidate’s clinical and other benefits outweigh its safety risks;

• the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from clinical trials or preclinical studies;

• the data collected from clinical trials of our product candidates may not be sufficient to support the submission of a NDA, to the FDA or other submission or to obtain regulatory approval in the United States, the European Union or elsewhere;

• the FDA or comparable foreign regulatory authorities may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and

• the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of clinical trial results may result in our failing to obtain regulatory approval to market any product candidate we develop, which would significantly harm our business, results of operations and prospects. There is no assurance that the endpoints and trial designs used for the approval of currently approved CNS drugs will be acceptable for future approvals, including for KarXT. The FDA and other comparable foreign authorities have substantial discretion in the approval process, and determining when or whether regulatory approval will be obtained for any product candidate that we develop. Even if we believe the data collected from future clinical trials of our product candidates are promising, such data may not be sufficient to support approval by the FDA or any other regulatory authority.

In addition, even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may not approve the price we intend to charge for our products, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

We may incur unexpected costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

To obtain the requisite regulatory approvals to commercialize any of our product candidates, we must demonstrate through extensive preclinical studies and clinical trials that our product candidates are safe and effective in humans. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process and our future clinical trial results may not be successful.
We may experience delays in completing our clinical trials or preclinical studies and initiating or completing additional clinical trials. We may also experience numerous unforeseen events during our clinical trials that could delay or prevent our ability to receive marketing approval or commercialize the product candidates we develop, including:

- regulators, or institutional review boards, or IRBs, or other reviewing bodies may not authorize us or our investigators to commence a clinical trial, or to conduct or continue a clinical trial at a prospective or specific trial site;
- we may not reach agreement on acceptable terms with prospective contract research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- the number of subjects or patients required for clinical trials of KarXT in an indication or any other product candidate may be larger than we anticipate, enrollment in these clinical trials may be insufficient or slower than we anticipate, and the number of clinical trials being conducted at any given time may be high and result in fewer available patients for any given clinical trial, or patients may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors, including those manufacturing our product candidates or conducting clinical trials on our behalf, may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may have to amend clinical trial protocol submitted to regulatory authorities or conduct additional studies to reflect changes in regulatory requirements or guidance, which we may be required to resubmit to an IRB and regulatory authorities for re-examination;
- regulators, IRBs or other reviewing bodies may fail to approve or subsequently find fault with the manufacturing processes or facilities of third-party manufacturers with which we enter into agreement for clinical and commercial supplies, or the supply or quality of KarXT or any other product candidate or other materials necessary to conduct clinical trials of our product candidates may be insufficient, inadequate or not available at an acceptable cost, or we may experience interruptions in supply; and
- the potential for approval policies or regulations of the FDA or the applicable foreign regulatory agencies to significantly change in a manner rendering our clinical data insufficient for approval.

Regulators, IRBs of the institutions in which clinical trials are being conducted or data monitoring committees may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. For example, a previous Phase 1 clinical trial of KarXT conducted by us was put on hold by the FDA in April 2017 after one and half days of dosing due to preliminary assessment of preclinical findings. Although this hold was lifted in August 2017 after the FDA's complete review of the preclinical data and our proposed addition of monitoring for potential decreased gastrointestinal motility to the clinical protocol, we face the risk of future clinical holds that may not be lifted in a timely manner, if at all.

Negative or inconclusive results from our ongoing clinical trial of KarXT for the treatment of psychosis in patients with schizophrenia, or any other clinical trial or preclinical studies in animals that we conduct, could mandate repeated or additional clinical trials and could result in changes to or delays in clinical trials KarXT in other indications. We do not know whether any clinical trials that we
may conduct will demonstrate adequate efficacy and safety to result in regulatory approval to market KarXT for our initial or potential additional indications, or any other product candidate. If later stage clinical trials do not produce favorable results, our ability to obtain regulatory approval for KarXT for initial or potential additional indications, or any other product candidate, may be adversely impacted.

Our failure to successfully initiate and complete clinical trials of KarXT for our initial or potential additional indications or any other product candidate and to demonstrate the efficacy and safety necessary to obtain regulatory approval to market KarXT or any other product candidate would significantly harm our business. Our product candidate development costs will also increase if we experience delays in testing or regulatory approvals and we may be required to obtain additional funds to complete clinical trials. We cannot assure you that our clinical trials will begin as planned or be completed on schedule, if at all, or that we will not need to restructure our trials after they have begun. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates, which may harm our business and results of operations. In addition, many of the factors that cause, or lead to, delays of clinical trials may ultimately lead to the denial of regulatory approval of KarXT or any other product candidate.

Even if we complete the necessary preclinical studies and clinical trials, the marketing approval process is expensive, time-consuming and uncertain and may prevent us or any future collaboration partners from obtaining approvals for the commercialization of KarXT for our initial or potential additional indications as well as for any other product candidate we develop.

Any product candidate we may develop and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale, and distribution, are subject to comprehensive regulation by the FDA and other regulatory authorities in the United States and by comparable authorities in other countries. Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate in a given jurisdiction. We have not received approval to market any product candidates from regulatory authorities in any jurisdiction and it is possible that none of the product candidates we may seek to develop in the future will ever obtain regulatory approval. We have no experience in filing and supporting the applications necessary to gain marketing approvals and expect to rely on third-party CROs or regulatory consultants to assist us in this process. Securing regulatory approval requires the submission of extensive preclinical and clinical data and supporting information to the various regulatory authorities for each therapeutic indication to establish the biologic product candidate’s safety, purity, efficacy and potency. Securing regulatory approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Any product candidates we develop may not be effective, may be only moderately effective, or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use.

The process of obtaining marketing approvals, both in the United States and abroad, is expensive, may take many years if additional clinical trials are required, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity, and novelty of the product candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted product application, may cause delays in the approval or rejection of an application. The FDA and comparable authorities in other countries have substantial discretion in the approval process and may refuse to accept any application or may decide that our data are insufficient for approval and require additional preclinical, clinical or other studies. In addition, varying
interpretations of the data obtained from preclinical and clinical testing could delay, limit, or prevent marketing approval of a product candidate. Any marketing approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

If we experience delays in obtaining approval or if we fail to obtain approval of any product candidates we may develop, the commercial prospects for those product candidates, including for KarXT in other indications, may be harmed, and our ability to generate revenues will be materially impaired.

**Risks associated with the in-licensing or acquisition of product candidates could cause substantial delays in the preclinical and clinical development of our product candidates.**

We have relied on Eli Lilly and Company, or Eli Lilly, to have conducted research and development in accordance with the applicable protocol, legal, regulatory and scientific standards, having accurately reported the results of all clinical trials conducted prior to our acquisition of KarXT and having correctly collected and interpreted the data from these trials. If the research and development processes or the results of the development programs prior to our development of KarXT prove to be unreliable, this could result in increased costs and delays in the development of KarXT, which could adversely affect any future revenue from this product candidate.

We may also acquire or in-license additional product candidates for preclinical or clinical development in the future as we continue to build our pipeline. The risks associated with acquiring or in-licensing product candidates could result in delays in the commencement or completion of our preclinical studies and clinical trials, if ever, and our ability to generate revenues from our product candidates may be delayed.

**The results of early-stage clinical trials and preclinical studies may not be predictive of future results. Initial data in our ongoing clinical trials may not be indicative of results obtained when these trials are completed or in later stage trials.**

The results of preclinical studies may not be predictive of the results of clinical trials, and the results of any early-stage clinical trials we commence may not be predictive of the results of the later-stage clinical trials. In addition, initial data in clinical trials may not be indicative of results obtained when such trials are completed. There can be no assurance that any of our clinical trials will ultimately be successful or support further clinical development of any of our product candidates. There is a high failure rate for drugs and biologics proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving promising results in earlier studies, and any such setbacks in our clinical development could have a material adverse effect on our business and operating results.

*Interim topline and preliminary data from our clinical trials that we announce or publish from time to time may change as more patient data become available and are subject to audit and verification procedures that could result in material changes in the final data.*

From time to time, we may publish interim topline or preliminary data from our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Preliminary or topline data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could significantly harm our reputation and business prospects.
If we encounter difficulties enrolling patients in our future clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

We may experience difficulties in patient enrollment in our clinical trials for a variety of reasons. The timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who remain in the study until its conclusion.

Patient enrollment is affected by many factors, including:

- the patient eligibility criteria defined in the protocol;
- the size of the patient population required for analysis of the trial’s primary endpoints;
- the proximity of patients to study sites; the design of the trial;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;
- competing clinical trials and clinicians’ and patients’ perceptions as to the potential advantages and risks of the product candidate being studied in relation to other available therapies, including any new drugs that may be approved for the indications that we are investigating;
- our ability to obtain and maintain patient consents; and
- the risk that patients enrolled in clinical trials will drop out of the trials before completion.

In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Since the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials in such clinical trial site.

Our inability to enroll a sufficient number of patients for our clinical trials would result in significant delays or might require us to abandon one or more clinical trials altogether. Delays in patient enrollment may result in increased costs, affect the timing or outcome of the planned clinical trials, product candidate development and approval process and jeopardize our ability to seek and obtain the regulatory approval required to commence product sales and generate revenue, which could prevent completion of these trials, adversely affect our ability to advance the development of our product candidates, cause the value of our company to decline and limit our ability to obtain additional financing if needed.

Changes in methods of product candidate manufacturing or formulation may result in additional costs or delay.

As product candidates proceed through preclinical studies to late-stage clinical trials towards potential approval and commercialization, it is common that various aspects of the development program, such as manufacturing methods and formulation, are altered along the way in an effort to optimize processes and results. For example, we are exploring other formulations and modes of administration for KarXT. Also, in our ongoing Phase 2 clinical trial, we are using a co-formulation of KarXT, whereas previous clinical data were based on xanomeline alone. Such changes carry the risk that they will not achieve these intended objectives. Any of these changes could cause our product candidates to perform differently and affect the results of planned clinical trials or other future clinical trials conducted with the materials manufactured using altered processes. Such changes may also require additional testing, FDA notification or FDA approval. This could delay completion of clinical
trials, require the conduct of bridging clinical trials or the repetition of one or more clinical trials, increase clinical trial costs, delay approval of our product candidates and jeopardize our ability to commence sales and generate revenue.

Our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following regulatory approval, if obtained.

Undesirable side effects caused by KarXT, or any future product candidate, could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or comparable foreign regulatory authorities. Results of our clinical trials could reveal a high and unacceptable severity and prevalence of side effects or unexpected characteristics. In clinical trials of KarXT to date, there were no observed drug-related serious adverse events. The majority of observed drug-related cholinergic adverse events were mild or moderate in severity, transient and resolved without discontinuation of the KarXT trial. However, there can be no guarantee that we would observe a similar tolerability profile of KarXT in our ongoing Phase 2 clinical trial or in future clinical trials. Many compounds that initially showed promise in clinical or earlier stage testing are later found to cause undesirable or unexpected side effects that prevented further development of the compound.

If unacceptable side effects arise in the development of our product candidates, we, the FDA or comparable foreign regulatory authorities, the IRBs, or independent ethics committees at the institutions in which our trials are conducted, or the independent safety monitoring committee could suspend or terminate our clinical trials or the FDA or comparable foreign regulatory authorities could order us to cease clinical trials or deny approval of our product candidates for any or all targeted indications. Treatment-emergent side effects that are deemed to be drug-related could also affect subject recruitment or the ability of enrolled subjects to complete the trial or result in potential product liability claims. Undesirable side effects in one of our clinical trials for KarXT in one indication could adversely affect enrollment in clinical trials, regulatory approval and commercialization of KarXT in other indications. In addition, these side effects may not be appropriately recognized or managed by the treating medical staff. We expect to have to train medical personnel using our product candidates to understand the side effect profiles for our clinical trials and upon any commercialization of any of our product candidates. Inadequate training in recognizing or managing the potential side effects of our product candidates could result in patient injury or death. Any of these occurrences may harm our business, financial condition and prospects significantly.

Moreover, clinical trials of our product candidates are conducted in carefully defined sets of patients who have agreed to enter into clinical trials. Consequently, it is possible that our clinical trials, or those of any future collaborator, may indicate an apparent positive effect of a product candidate that is greater than the actual positive effect, if any, or alternatively fail to identify undesirable side effects.

Even if KarXT or any future product candidate of ours receives regulatory approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success, in which case we may not generate significant revenues or become profitable.

We have never commercialized a product, and even if KarXT for the treatment of any indication, or any future product candidate of ours, is approved by the appropriate regulatory authorities for marketing and sale, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. Physicians may be reluctant to take their patients off their current medications and switch their treatment regimen to KarXT. Further, patients often acclimate to the treatment regime that they are currently taking and do not want to
switch unless their physicians recommend switching products or they are required to switch due to lack of coverage and adequate reimbursement. In addition, even if we are able to demonstrate our product candidates’ safety and efficacy to the FDA and other regulators, safety or efficacy concerns in the medical community may hinder market acceptance.

Efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources, including management time and financial resources, and may not be successful. In particular, we may have difficulty in convincing the medical community that KarXT’s preferential targeting and stimulation of certain muscarinic receptors has the potential to avoid the undesirable side effects associated with stimulation of muscarinic receptors in the peripheral tissues. If KarXT or any other product candidate is approved but does not achieve an adequate level of market acceptance, we may not generate significant revenues and we may not become profitable. The degree of market acceptance of our product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and safety of the product;
- the potential advantages of the product compared to competitive therapies;
- the prevalence and severity of any side effects;
- whether the product is designated under physician treatment guidelines as a first-, second- or third-line therapy;
- our ability, or the ability of any future collaborators, to offer the product for sale at competitive prices;
- the product’s convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try, and of physicians to prescribe, the product;
- limitations or warnings, including distribution or use restrictions contained in the product’s approved labeling;
- the strength of sales, marketing and distribution support;
- changes in the standard of care for the targeted indications for the product; and
- availability and adequacy of coverage and reimbursement from government payors, managed care plans and other third-party payors.

Any failure by KarXT or any other potential product candidate of ours that obtains regulatory approval to achieve market acceptance or commercial success would adversely affect our business prospects.

**If we fail to develop and commercialize KarXT for additional indications or fail to discover, develop and commercialize other product candidates, we may be unable to grow our business and our ability to achieve our strategic objectives would be impaired.**

Although the development and commercialization of KarXT for the treatment of psychosis in patients with schizophrenia and AD as well as pain is our primary focus, as part of our longer-term growth strategy, we plan to evaluate KarXT in other indications and develop other product candidates. We intend to evaluate internal opportunities from KarXT or other potential product candidates, and also may choose to in-license or acquire other product candidates as well as commercial products to treat patients suffering from other disorders with significant unmet medical needs and limited treatment options. These other potential product candidates will require additional, time-consuming development.
efforts prior to commercial sale, including preclinical studies, clinical trials and approval by the FDA and/or applicable foreign regulatory authorities. All product candidates are prone to the risks of failure that are inherent in pharmaceutical product development, including the possibility that the product candidate will not be shown to be sufficiently safe and effective for approval by regulatory authorities. In addition, we cannot assure you that any such products that are approved will be manufactured or produced economically, successfully commercialized or widely accepted in the marketplace or be more effective than other commercially available alternatives.

Research programs to identify product candidates require substantial technical, financial and human resources, whether or not any product candidates are ultimately identified. Our research programs may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for many reasons, including the following:

- the research methodology used may not be successful in identifying potential product candidates;
- competitors may develop alternatives that render our product candidates obsolete;
- product candidates that we develop may nevertheless be covered by third parties’ patents or other exclusive rights;
- a product candidate may, on further study, be shown to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria;
- a product candidate may not be capable of being produced in commercial quantities at an acceptable cost, or at all; and
- a product candidate may not be accepted as safe and effective by patients, the medical community or third-party payors.

If we are unsuccessful in identifying and developing additional product candidates, our potential for growth and achieving our strategic objectives may be impaired.

We may expend our resources to pursue a particular product candidate or indication and forgo the opportunity to capitalize on product candidates or indications that may ultimately be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we intend to focus on developing product candidates for specific indications that we identify as most likely to succeed, in terms of both their potential for regulatory approval and commercialization. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that may prove to have greater commercial potential.

Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on research and development programs and product candidates for specific indications may not yield any commercially viable product candidates. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to the product candidate.

The market for KarXT for schizophrenia, AD and pain and any other product candidates we may develop may be smaller than we expect.

Our estimates of the potential market opportunity for KarXT for the treatment of psychosis in patients with schizophrenia and AD and in pain as well as any other product candidates include several
key assumptions based on our industry knowledge, industry publications and third-party research reports. There can be no assurance that any of these assumptions are, or will remain, accurate. If the actual market for KarXT for these or other indications, or for any other product candidate we may develop, is smaller than we expect, our revenues, if any, may be limited and it may be more difficult for us to achieve or maintain profitability.

**Competitive products may reduce or eliminate the commercial opportunity for KarXT for our current or future indications. If our competitors develop technologies or product candidates more rapidly than we do, or their technologies are more effective or safer than ours, our ability to develop and successfully commercialize KarXT may be adversely affected.**

The clinical and commercial landscape for the treatment of psychosis in patients with schizophrenia and AD as well as in pain is highly competitive and subject to rapid and significant technological change. We face competition with respect to our indications for KarXT and will face competition with respect to any other drug candidates that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. There are a number of large pharmaceutical and biotechnology companies that currently market and sell drugs or are pursuing the development of drug candidates for the treatment of the indications that we are pursuing. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization.

Although there are no FDA-approved drugs for the negative and cognitive symptoms of schizophrenia, many large pharmaceutical companies market FDA-approved drugs for the treatment of the psychotic symptoms of schizophrenia. These drugs include: Abilify, marketed by Bristol-Myers Squibb Company, Zyprexa, marketed by Eli Lilly, Vraylar, marketed by Allergan, Clozaril, marketed by Mylan Products Ltd., and Latuda, marketed by Sumitomo Dainippon Pharma Co., Ltd. Similarly, while there are currently no FDA-approved treatments for psychosis related to AD, patients with AD are prescribed drugs for enhancing their cognition, and include acetylcholinesterase inhibitors such as, donepezil, galantamine, rivastigmine and memantine. These medications are available generically although specific dosage forms and combinations are proprietary and marketed by large pharmaceutical companies such as, Allergan, Janssen Pharmaceuticals NV, Novartis International AG and Pfizer Inc. Furthermore, patients with AD may be prescribed antipsychotic medications that are indicated and approved for schizophrenia.

The current standard of care for neuropathic and inflammatory pain include opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), topical agents, anticonvulsants and antidepressants. We are aware of many FDA-approved drugs for the treatment of neuropathic and inflammatory pain, including Lyrica, marketed by Pfizer Inc., Suboxone, marketed by Reckitt Benckiser Group plc, Oxecta, marketed by Pfizer Inc., and OxyContin, marketed by Purdue Pharma.

We believe that a significant number of product candidates are currently under development for the same indications we are currently pursuing, and may become commercially available in the future, for the treatment of conditions for which we may try to develop product candidates. Our potential competitors include large pharmaceutical and biotechnology companies, specialty pharmaceutical and generic drug companies, academic institutions, government agencies and research institutions.

Our competitors may have significantly greater financial resources, established presence in the market, expertise in research and development, manufacturing, preclinical and clinical testing, obtaining regulatory approvals and reimbursement and marketing approved products than we do. Accordingly, our competitors may be more successful than we may be in obtaining regulatory approval.
for therapies and achieving widespread market acceptance. Our competitors’ products may be more effective, or more effectively marketed and sold, than any product candidate we may commercialize and may render our therapies obsolete or non-competitive before we can recover development and commercialization expenses. If KarXT is approved for the indications we are currently pursuing, it could compete with a range of therapeutic treatments that are in development. In addition, our competitors may succeed in developing, acquiring or licensing technologies and drug products that are more effective or less costly than KarXT or any other product candidates that we may develop, which could render our product candidates obsolete and noncompetitive.

If we obtain approval for KarXT or any other future product candidate, we may face competition based on many different factors, including the efficacy, safety and tolerability of our products, the ease with which our products can be administered, the timing and scope of regulatory approvals for these products, the availability and cost of manufacturing, marketing and sales capabilities, price, reimbursement coverage and patent position. Existing and future competing products could present superior treatment alternatives, including being more effective, safer, less expensive or marketed and sold more effectively than any products we may develop. Competitive products may make any products we develop obsolete or noncompetitive before we recover the expense of developing and commercializing our product candidates. Such competitors could also recruit our employees, which could negatively impact our level of expertise and our ability to execute our business plan. Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a small number of competitors.

In addition, our competitors may obtain patent protection, regulatory exclusivities or FDA approval and commercialize products more rapidly than we do, which may impact future approvals or sales of any of our product candidates that receive regulatory approval. If the FDA approves the commercial sale of KarXT or any other product candidate, we will also be competing with respect to marketing capabilities and manufacturing efficiency. We expect competition among products will be based on product efficacy and safety, the timing and scope of regulatory approvals, availability of supply, marketing and sales capabilities, product price, reimbursement coverage by government and private third-party payers, regulatory exclusivities and patent position. Our profitability and financial position will suffer if our product candidates receive regulatory approval, but cannot compete effectively in the marketplace.

Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites, as well as in acquiring technologies complementary to, or necessary for, our programs.

KarXT is a patented combination of xanomeline and trospium, an FDA-approved generic drug, which exposes us to additional risks.

We are developing KarXT as a combination of xanomeline and trospium, which is currently approved by the FDA for the treatment of overactive bladder. Even if KarXT were to receive marketing approval or be commercialized, we would continue to be subject to the risks that the FDA or similar regulatory authorities could revoke approval of trospium or that safety, efficacy, manufacturing or supply issues could arise with trospium. This could result in our own products being removed from the market or being less commercially successful.
We may be unable to prevent third parties from selling, making, promoting, manufacturing, or distributing alternative combination therapies with xanomeline, or xanomeline as a single therapeutic.

We currently have an issued patent directed to an oral medicament comprising certain doses of xanomeline in combination with certain doses of trospium chloride and an issued patent directed to methods for treating central nervous system disorders using combinations of certain oral doses of xanomeline and certain oral doses of trospium. These patents would not prevent a third-party from creating, making and marketing alternative combination therapies that fall outside the scope of the patent claims. There can be no assurance that any such alternative combination therapies with xanomeline, or xanomeline as a single therapeutic, will not be therapeutically equivalent or commercially feasible. In the event an alternative combination with xanomeline, or xanomeline as a single therapeutic, is developed and approved for use in indications that we may seek approval for, the marketability and commercial success of KarXT, if approved, could be materially harmed.

If the FDA or comparable foreign regulatory authorities approve generic versions of KarXT or any other product candidate of ours that receives regulatory approval, or such authorities do not grant our products appropriate periods of non-patent exclusivity before approving generic versions of such products, the sales of such products could be adversely affected.

Once an NDA is approved, the product covered thereby becomes a “listed drug” in the FDA’s publication, “Approved Drug Products with Therapeutic Equivalence Evaluations,” or the Orange Book. Manufacturers may seek approval of generic versions of reference listed drugs through submission of abbreviated new drug applications, or ANDAs, in the United States. In support of an ANDA, a generic manufacturer generally must show that its product has the same active ingredient(s), dosage form, strength, route of administration, conditions of use and labeling as the reference listed drug and that the generic version is bioequivalent to the reference listed drug, meaning, in part, that it is absorbed in the body at the same rate and to the same extent. Generic products may be significantly less costly to bring to market than the reference listed drug and companies that produce generic products are generally able to offer them at lower prices. Moreover, many states allow or require substitution of therapeutically equivalent generic drugs at the pharmacy level even if the branded drug is prescribed. Thus, following the introduction of a generic drug, a significant percentage of the sales of any branded product or reference listed drug may be lost to the generic product.

The FDA may not approve an ANDA for a generic product until any applicable period of non-patent exclusivity for the reference listed drug has expired. The Federal Food, Drug, and Cosmetic Act, or FDCA, provides a period of five years of non-patent exclusivity for a new drug containing a new chemical entity, or NCE. Specifically, in cases where such exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification that a patent covering the listed drug is invalid, unenforceable or will not be infringed by the generic product, in which case the applicant may submit its application four years following approval of the listed drug. It is unclear whether the FDA will treat the xanomeline in our product candidates as an NCE and, therefore, afford them five years of NCE data exclusivity if approved. If any product we develop does not receive five years of NCE exclusivity, the FDA may approve generic versions of such product three years after its date of approval, subject to the requirement that the ANDA applicant certifies to any patents listed for our products in the Orange Book. Three-year exclusivity is given to a drug if it contains an active moiety that has previously been approved, and the NDA includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the NDA. If approved, manufacturers may seek to launch these generic products following the expiration of the applicable marketing exclusivity period, even if we still have patent protection for our product.
Competition that our products, if approved, may face from generic versions of our products could negatively impact our future revenue, profitability and cash flows and substantially limit our ability to obtain a return on our investments in those product candidates.

We currently have no marketing, sales or distribution infrastructure. If we are unable to develop our sales, marketing and distribution capability on our own or through collaborations with marketing partners, we will not be successful in commercializing our product candidates.

We currently have no marketing, sales or distribution capabilities. If KarXT is approved for the treatment of psychosis in patients with schizophrenia and AD, we intend to establish a sales and marketing organization, either on our own or in collaboration with third parties, with technical expertise and supporting distribution capabilities to commercialize the approved product in key territories, which will require substantial additional resources. Some or all of these costs may be incurred in advance of any approval of KarXT. Any failure or delay in the development of our or third parties' internal sales, marketing and distribution capabilities would adversely impact the commercialization of KarXT and other future product candidates.

Factors that may inhibit our efforts to commercialize our products on our own include:

• our inability to recruit and retain adequate numbers of effective sales and marketing personnel;
• the inability of sales personnel to obtain access to or persuade adequate numbers of physicians to prescribe any future products;
• the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
• unforeseen costs and expenses associated with creating an independent sales and marketing organization.

With respect to our existing and future product candidates, we may choose to collaborate with third parties that have direct sales forces and established distribution systems to serve as an alternative to our own sales force and distribution systems. Our product revenue may be lower than if we directly marketed or sold our products, if approved. In addition, any revenue we receive will depend in whole or in part upon the efforts of these third parties, which may not be successful and are generally not within our control. If we are not successful in commercializing any approved products, our future product revenue will suffer and we may incur significant additional losses.

If we do not establish sales and marketing capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

Any of our current and future product candidates for which we, or any future collaborators, obtain regulatory approval in the future will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. If approved, our product candidates could be subject to post-marketing restrictions or withdrawal from the market and we, or any future collaborators, may be subject to substantial penalties if we, or they, fail to comply with regulatory requirements or if we, or they, experience unanticipated problems with our products following approval.

Any of our product candidates for which we, or any future collaborators, obtain regulatory approval, as well as the manufacturing processes, post-approval studies, labeling, advertising and promotional activities for such product, among other things, will be subject to ongoing requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements,
requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements relating to the distribution of samples to physicians and recordkeeping. We and our contract manufacturers will also be subject to user fees and periodic inspection by the FDA and other regulatory authorities to monitor compliance with these requirements and the terms of any product approval we may obtain. Even if regulatory approval of a product candidate is granted, the approval may be subject to limitations on the indications or uses for which the product may be marketed or to the conditions of approval, including the requirement to implement a Risk Evaluation and Mitigation Strategy, or REMS.

The FDA and other regulatory authorities may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of a product. The FDA and other agencies, including the Department of Justice, closely regulate and monitor the post-approval marketing and promotion of products to ensure that they are manufactured, marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers’ communications regarding off-label use. However, companies may share truthful and not misleading information that is otherwise consistent with a product’s FDA approved labeling. If we, or any future collaborators, do not market any of our product candidates for which we, or they, receive regulatory approval for only their approved indications, we, or they, may be subject to warnings or enforcement action for off-label marketing if it is alleged that we are doing so. Violation of the FDCA and other statutes relating to the promotion and advertising of prescription drugs may lead to investigations or allegations of violations of federal and state health care fraud and abuse laws and state consumer protection laws, including the False Claims Act.

In addition, later discovery of previously unknown adverse events or other problems with our products or their manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on the manufacturing of such products;
- restrictions on the labeling or marketing of such products;
- restrictions on product distribution or use;
- requirements to conduct post-marketing studies or clinical trials;
- warning letters or untitled letters;
- withdrawal of the products from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of products;
- restrictions on coverage by third-party payors;
- fines, restitution or disgorgement of profits or revenues;
- exclusion from federal health care programs such as Medicare and Medicaid;
- suspension or withdrawal of regulatory approvals;
- refusal to permit the import or export of products;
- product seizure; or
- injunctions or the imposition of civil or criminal penalties.
Obtaining and maintaining marketing approval of our product candidates in one jurisdiction does not mean that we will be successful in obtaining marketing approval of our product candidates in other jurisdictions. Our failure to obtain regulatory approval in foreign jurisdictions would prevent our product candidates from being marketed abroad, and any approval we are granted for KarXT or any of our other product candidates in the United States would not assure approval of product candidates in foreign jurisdictions.

In order to market any products outside of the United States, we must establish and comply with numerous and varying regulatory requirements of other countries regarding clinical trial design, safety and efficacy. Clinical trials conducted in one country may not be accepted by regulatory authorities in other countries, and regulatory approval in one country does not mean that regulatory approval will be obtained in any other country. Approval procedures vary among countries and can involve additional product testing and validation and additional administrative review periods. Seeking foreign regulatory approvals could result in significant delays, difficulties and costs for us and may require additional preclinical studies or clinical trials which would be costly and time consuming and could delay or prevent introduction of KarXT or any of our other product candidates in those countries. We do not have experience in obtaining regulatory approval in international markets. If we or our partners fail to comply with regulatory requirements or to obtain and maintain required approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed.

Additionally, on June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the European Union, commonly referred to as Brexit. On March 29, 2017, the country formally notified the European Union of its intention to withdraw pursuant to Article 50 of the Lisbon Treaty, scheduled to be effective March 29, 2019. To date, no formal withdrawal agreement has been reached between the United Kingdom and the European Union, despite the passage of the date on which it was expected that the United Kingdom’s membership in the European Union would terminate. Since a significant proportion of the regulatory framework in the United Kingdom is derived from European Union directives and regulations, the referendum could materially impact the regulatory regime with respect to the approval of our product candidates in the United Kingdom or the European Union. Any delay in obtaining, or an inability to obtain, any regulatory approvals, as a result of Brexit or otherwise, would prevent us from commercializing our product candidates in the United Kingdom and/or the European Union and restrict our ability to generate revenue and achieve and sustain profitability. If any of these outcomes occur, we may be forced to restrict or delay efforts to seek regulatory approval in the United Kingdom and/or European Union for our product candidates, which could significantly and materially harm our business.

Even if we, or any future collaborators, are able to commercialize any product candidate that we, or they, develop, the product may become subject to unfavorable pricing regulations or third-party payor coverage and reimbursement policies, any of which could harm our business.

Patients who are provided medical treatment for their conditions generally rely on third party payors to reimburse all or part of the costs associated with their treatment. Therefore, our ability, and the ability of any future collaborators to commercialize any of our product candidates will depend in part on the extent to which coverage and reimbursement for these products and related treatments will be available from third-party payors including government health administration authorities and private health coverage insurers. Third-party payors decide which medications they will cover and establish reimbursement levels. We cannot be certain that coverage will be available and reimbursement will be adequate for KarXT for our initial or potential additional indications or for any other potential product candidates. Also, we cannot be certain that reimbursement policies will not reduce the demand for, or the price paid for, our products.

If coverage and reimbursement are not available, or reimbursement is available only to limited levels, we, or any future collaborators, may be limited in our ability to successfully commercialize our product candidates. Even if coverage is provided, the approved reimbursement amount may not be
high enough to allow us, or any future collaborators, to establish or maintain pricing sufficient to realize a sufficient return on our or their investment. In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors and coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance.

There is significant uncertainty related to third-party payor coverage and reimbursement of newly approved drugs. Regulatory approvals, pricing and reimbursement for new drug products vary widely from country to country. In the United States, the principal decisions about reimbursement for new medicines are typically made by the Centers for Medicare & Medicaid Services, or CMS, an agency within the U.S. Department of Health and Human Services, as CMS decides whether and to what extent a new medicine will be covered and reimbursed under Medicare. Private payors tend to follow CMS to a substantial degree. It is difficult to predict what CMS will decide with respect to reimbursement for novel products such as ours. Reimbursement agencies in Europe may be more conservative than CMS, but ultimately make their own coverage determinations. Outside the United States, certain countries, including a number of member states of the European Union, set prices and reimbursement for pharmaceutical products, or medicinal products, as they are commonly referred to in the European Union, with limited participation from the marketing authorization holders. We cannot be sure that such prices and reimbursement will be acceptable to us or our collaborators. If the regulatory authorities in these foreign jurisdictions set prices or reimbursement levels that are not commercially attractive for us or our collaborators, our revenues from sales by us or our collaborators, and the potential profitability of our drug products, in those countries would be negatively affected. An increasing number of countries are taking initiatives to attempt to reduce large budget deficits by focusing cost-cutting efforts on pharmaceuticals for their state-run health care systems. These international price control efforts have impacted all regions of the world, but have been most drastic in the European Union. Additionally, some countries require approval of the sale price of a product before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. As a result, we might obtain marketing approval for a product in a particular country, but then may experience delays in the reimbursement approval of our product or be subject to price regulations that would delay our commercial launch of the product, possibly for lengthy time periods, which could negatively impact the revenues we are able to generate from the sale of the product in that particular country.

The healthcare industry is acutely focused on cost containment, both in the United States and elsewhere. Government authorities and other third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for certain medications, which could affect our ability or that of any future collaborators to sell our product candidates profitably. For example, the Trump administration recently released a “Blueprint,” to reduce the cost of drugs. The Trump administration’s Blueprint contains certain measures that the U.S. Department of Health and Human Services is already working to implement. At the state level, legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. Payors may not view our products, if any, as cost-effective, and coverage and reimbursement may not be available to our customers, or those of any future collaborators, or may not be sufficient to allow our products, if any, to be marketed on a competitive basis. Cost-control initiatives could cause us, or any future collaborators, to decrease the price we, or they, might establish for products, which could result in lower than anticipated product revenues. If the prices for our products, if any, decrease or if governmental and other third-party
payors do not provide coverage or adequate reimbursement, our prospects for revenue and profitability will suffer.

There may also be delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the indications for which the drug is approved by the FDA or comparable foreign regulatory authorities. Moreover, eligibility for reimbursement does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Reimbursement rates may vary, by way of example, according to the use of the product and the clinical setting in which it is used. Reimbursement rates may also be based on reimbursement levels already set for lower cost drugs or may be incorporated into existing payments for other services.

In addition, increasingly, third-party payors are requiring higher levels of evidence of the benefits and clinical outcomes of new technologies and are challenging prices. We cannot be sure that coverage will be available for any product candidate that we, or any future collaborator, commercialize and, if available, that the reimbursement rates will be adequate. Further, the net reimbursement for drug products may be subject to additional reductions if there are changes to laws that presently restrict imports of drugs from one country to another. An inability to promptly obtain coverage and adequate payment rates from both government-funded and private payors for any of our product candidates for which we, or any future collaborator, obtain regulatory approval could significantly harm our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

We may seek Breakthrough Therapy Designation by the FDA for a product candidate that we develop, and we may be unsuccessful. If we are successful, the designation may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.

We may seek Breakthrough Therapy Designation for any product candidate that we develop. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over currently approved therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA are also eligible for accelerated approval and priority review.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe a product candidate we develop meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of Breakthrough Therapy Designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if the product candidates we develop qualify as breakthrough therapies, the FDA may later decide that the drugs no longer meet the conditions for qualification and rescind the designation.
We may seek Fast Track Designation by the FDA for a product candidate that we develop, and we may be unsuccessful. If we are successful, the designation may not actually lead to a faster development or regulatory review or approval process.

We may seek Fast Track Designation for the product candidates we develop. If a product is intended for the treatment of a serious or life-threatening condition and preclinical or clinical data demonstrate the potential to address an unmet medical need for this condition, the product sponsor may apply for Fast Track Designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular product candidate is eligible for this designation, we cannot assure you that the FDA would decide to grant it. Even if we do receive Fast Track Designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may rescind the Fast Track Designation if it believes that the designation is no longer supported by data from our clinical development program.

Product liability lawsuits against us or any of our future collaborators could divert our resources and attention, cause us to incur substantial liabilities and limit commercialization of our product candidates.

We are exposed to potential product liability and professional indemnity risks that are inherent in the research, development, manufacturing, marketing and use of pharmaceutical products. Currently, we have no products that have been approved for commercial sale; however, the use of our product candidates by us and any collaborators in clinical trials, and the sale of these product candidates, if approved, in the future, may expose us to liability claims. We face an inherent risk of product liability lawsuits related to the use of our product candidates in elderly patients and will face an even greater risk if product candidates are approved by regulatory authorities and introduced commercially. Product liability claims may be brought against us or our partners by participants enrolled in our clinical trials, patients, health care providers, pharmaceutical companies, our collaborators or others using, administering or selling any of our future approved products. If we cannot successfully defend ourselves against any such claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for any of our future approved products;
- injury to our reputation;
- withdrawal of clinical trial participants;
- termination of clinical trial sites or entire trial programs;
- significant litigation costs;
- substantial monetary awards to, or costly settlements with, patients or other claimants;
- product recalls or a change in the indications for which they may be used;
- loss of revenue;
- diversion of management and scientific resources from our business operations; and
- the inability to commercialize our product candidates.

Although the clinical trial process is designed to identify and assess potential side effects, clinical development does not always fully characterize the safety and efficacy profile of a new medicine, and it is always possible that a drug, even after regulatory approval, may exhibit unforeseen side effects. If our product candidates were to cause adverse side effects during clinical trials or after approval, we may be exposed to substantial liabilities. Physicians and patients may not comply with any warnings.
that identify known potential adverse effects and patients who should not use our product candidates. If any of our product candidates are approved for commercial sale, we will be highly dependent upon consumer perceptions of us and the safety and quality of our products. We could be adversely affected if we are subject to negative publicity associated with illness or other adverse effects resulting from patients’ use or misuse of our products or any similar products distributed by other companies.

Although we maintain product liability insurance coverage in the amount of up to $10.0 million in the aggregate, including clinical trial liability, this insurance may not fully cover potential liabilities that we may incur. The cost of any product liability litigation or other proceeding, even if resolved in our favor, could be substantial. We will need to increase our insurance coverage if we commercialize any product that receives regulatory approval. In addition, insurance coverage is becoming increasingly expensive. If we are unable to maintain sufficient insurance coverage at an acceptable cost or to otherwise protect against potential product liability claims, it could prevent or inhibit the development and commercial production and sale of our product candidates, which could harm our business, financial condition, results of operations and prospects.

Even if we, or any future collaborators, obtain regulatory approvals for our product candidates, the terms of approvals and ongoing regulation of our products may limit how we manufacture and market our products, which could impair our ability to generate revenue.

Once regulatory approval has been granted, an approved product and its manufacturer and marketer are subject to ongoing review and extensive regulation. We, and any future collaborators, must therefore comply with requirements concerning advertising and promotion for any of our product candidates for which we or they obtain regulatory approval. Promotional communications with respect to prescription drugs are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the product's approved labeling. Thus, we and any future collaborators will not be able to promote any products we develop for indications or uses for which they are not approved.

In addition, manufacturers of approved products and those manufacturers’ facilities are required to comply with extensive FDA requirements, including ensuring that quality control and manufacturing procedures conform to current Good Manufacturing Practices, or cGMPs, which include requirements relating to quality control and quality assurance as well as the corresponding maintenance of records and documentation and reporting requirements. We, our contract manufacturers, any future collaborators and their contract manufacturers could be subject to periodic unannounced inspections by the FDA to monitor and ensure compliance with cGMPs. Despite our efforts to inspect and verify regulatory compliance, one or more of our third-party manufacturing vendors may be found on regulatory inspection by FDA or other authorities to be not in compliance with cGMP regulations, which may result in shutdown of the third-party vendor or invalidation of drug product lots or processes. In some cases, a product recall may be warranted or required, which would materially affect our ability to supply and market our drug products.

Accordingly, assuming we, or any future collaborators, receive regulatory approval for one or more of our product candidates, we, and any future collaborators, and our and their contract manufacturers will continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production, product surveillance and quality control.

If we, and any future collaborators, are not able to comply with post-approval regulatory requirements, we, and any future collaborators, could have the regulatory approvals for our products withdrawn by regulatory authorities and our, or any future collaborators’, ability to market any future products could be limited, which could adversely affect our ability to achieve or sustain profitability. Further, the cost of compliance with post-approval regulations may have a negative effect on our operating results and financial condition.
Our relationships with healthcare providers, physicians and third-party payors will be subject to applicable anti-kickback, fraud and abuse, privacy and transparency and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, exclusion from government healthcare programs, contractual damages, reputational harm and diminished profits and future earnings.

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any products for which we obtain regulatory approval. Our arrangements with third party payors, healthcare providers and physicians may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute any products for which we obtain regulatory approval. These include the following:

- **Anti-Kickback Statute**—The federal Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, paying, receiving or providing remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for, or the purchase, order or recommendation or arranging of, any good or service, for which payment may be made under a federal healthcare program such as Medicare and Medicaid. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand, and prescribers, purchasers and formulary managers, among others, on the other. A person or entity can be found guilty of violating the federal Anti-Kickback Statute without actual knowledge of the statute or specific intent to violate it. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act or federal civil money penalties statute;

- **Federal civil and criminal false claims laws and civil monetary penalty laws, including False Claims Laws**—The federal civil and criminal false claims laws, including the federal civil False Claims Act, and federal civil monetary penalties laws, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false, fictitious or fraudulent; knowingly making or causing a false statement or record material to a false or fraudulent claim or obligation to pay or transmit money or property to the federal government; or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government A claim that includes items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim under the federal civil False Claims Act. Manufacturers can be held liable under the False Claims Act even when they do not submit claims directly to government payors if they are deemed to “cause” the submission of false or fraudulent claims. The False Claims Act also permits a private individual acting as a “whistleblower” to bring *qui tam* actions on behalf of the federal government alleging violations of the False Claims Act and to share in any monetary recovery. When an entity is determined to have violated the federal civil False Claims Act, the government may impose civil fines and penalties for each false claim, plus treble damages, and exclude the entity from participation in Medicare, Medicaid and other federal healthcare programs;

- **HIPAA**—The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created additional federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private) and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statements.
in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters. Similar to the federal Anti-Kickback Statute, a person or entity can be found guilty of violating HIPAA without actual knowledge of the statute or specific intent to violate it. HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information. HITECH also created new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys’ fees and costs associated with pursuing federal civil actions;

- **Transparency Requirements**—The federal Physician Payments Sunshine Act, created under the ACA, and its implementing regulations, require manufacturers of drugs, devices, biologicals and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program to report annually to the U.S. Department of Health and Human Services under the Open Payments Program, information related to payments or other transfers of value made to physicians, certain other healthcare professionals, and teaching hospitals, as well as ownership and investment interests held by physicians, certain other healthcare professional and their immediate family members; and

- **Analogous State and Foreign Laws**—Analogous state and foreign fraud and abuse laws and regulations, such as state anti-kickback and false claims laws, which may be broader in scope and apply regardless of payor. These laws are enforced by various state agencies and through private actions. Some state laws require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant federal government compliance guidance, require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers, and restrict marketing practices or require disclosure of marketing expenditures or drug pricing. Some state and local laws require the registration of pharmaceutical sales and medical representatives. State and foreign laws also govern the privacy and security of health information in some circumstances. These data privacy and security laws may differ from each other in significant ways and often are not pre-empted by HIPAA, which may complicate compliance efforts.

Efforts to ensure that our business arrangements with third parties, and our business generally, will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, imprisonment, disgorgement, integrity oversight and reporting obligations, exclusion from government funded healthcare programs, such as Medicare and Medicaid, integrity and oversight agreements to resolve allegations of non-compliance, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired. If any of the physicians or other healthcare providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to significant criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.
The provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is generally not permitted in the countries that form part of the European Union. Some European Union Member States, like the United Kingdom, through the United Kingdom Bribery Act 2010, have enacted laws explicitly prohibiting the provision of these types of benefits and advantages. Infringements of these laws can result in substantial fines and imprisonment.

Payments made to physicians in certain European Union Member States (e.g., France or Belgium) must be publicly disclosed. Moreover, agreements with physicians often must be the subject of prior notification and approval by the physician's employer, his or her competent professional organization and/or the regulatory authorities of the individual European Union Member States. These requirements are provided in the European Union Member State national laws, industry codes (e.g. the European Federation of Pharmaceutical Industries and Associations Disclosure and Healthcare Professionals Codes) or professional codes of conduct. Failure to comply with these requirements could result in reputational risk, public reprimands, administrative penalties, fines or imprisonment.

The collection and processing of personal data—including health data—is governed by the European Union-wide General Data Protection Regulation, or GDPR, which became applicable on May 25, 2018, replacing the current data protection laws of each European Union Member State. GDPR applies to any business, regardless of its location, that provides goods or services to residents in the EU. This expansion includes our clinical trial activities in European Union Member States. The GDPR imposes more stringent operational requirements for processors and controllers of personal data, including, for example, special protections for “sensitive information” which includes health and genetic information of data subjects residing in the EU, expanded disclosures about how personal information is to be used, limitations on retention of information, increased requirements pertaining to health data and pseudonymised (i.e., key-coded) data, mandatory data breach notification requirements and higher standards for controllers to demonstrate that they have obtained valid consent for certain data processing activities. GDPR grants individuals the opportunity to object to the processing of their personal information, allows them to request deletion of personal information in certain circumstances, and provides the individual with an express right to seek legal remedies in the event the individual believes his or her rights have been violated. Further, the GDPR imposes strict rules on the transfer of personal data out of the European Union to the United States or other regions that have not been deemed to offer “adequate” privacy protections. The GDPR provides that European Union Member States may make their own further laws and regulations in relation to the processing of genetic, biometric or health data, which could result in differences between Member States, limit our ability to use and share personal data or could cause our costs to increase, and harm our business and financial condition. We are also subject to evolving and strict rules on the transfer of personal data out of the European Union to the United States. Failure to comply with European Union data protection laws may result in fines (for example, of up to €20,000,000 or up to 4% of the total worldwide annual turnover of the preceding financial year (whichever is higher) under the GDPR) and other administrative penalties, which may be onerous and adversely affect our business, financial condition, results of operations and prospects. As a result of the implementation of the GDPR, we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. There is significant uncertainty related to the manner in which data protection authorities will seek to enforce compliance with GDPR is not yet clear. For example, it is not clear if the authorities will conduct random audits of companies doing business in the EU, or if the authorities will wait for complaints to be filed by individuals who claim their rights have been violated. Enforcement uncertainty and the costs associated with ensuring GDPR compliance be onerous and adversely affect our business, financial condition, results of operations and prospects.
Current and future legislation may increase the difficulty and cost for us and any collaborators to obtain regulatory approval of and commercialize our product candidates and affect the prices we, or they, may obtain.

In the United States and foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay regulatory approval of our product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain regulatory approval. We expect that current laws, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and in additional downward pressure on the price that we, or any collaborators, may receive for any approved products.

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA. Among the provisions of the ACA of potential importance to our business and our product candidates are the following:

- an annual, non-deductible fee on any entity that manufactures or imports specified branded prescription products and biologic products;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for products that are inhaled, infused, instilled, implanted or injected;
- expansion of healthcare fraud and abuse laws, including the civil False Claims Act and the federal Anti-Kickback Statute, new government investigative powers and enhanced penalties for noncompliance;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% (increased to 70% as of January 1, 2019) point-of-sale discounts off negotiated prices of applicable brand products to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient products to be covered under Medicare Part D;
- extension of manufacturers' Medicaid rebate liability to individuals enrolled in Medicaid managed care organizations;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- new requirements to report certain financial arrangements with physicians and teaching hospitals;
- a new requirement to annually report product samples that manufacturers and distributors provide to physicians;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research; and
- established the Center for Medicare and Medicaid Innovation within CMS to test innovative payment and service delivery models.

Some of the provisions of the ACA have yet to be implemented, and there have been judicial and Congressional challenges to certain aspects of the ACA, as well as recent efforts by the Trump administration to repeal or replace certain aspects of the ACA. Since January 2017, President Trump has signed two executive orders and other directives designed to delay the implementation of certain
provisions of the ACA. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA. The Tax Cuts and Jobs Act of 2017, or Tax Act, includes a provision that repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the “individual mandate.” On December 14, 2018, a U.S. District Court Judge in the Northern District of Texas, or the Texas District Court Judge, ruled that the individual mandate is a critical and inseverable feature of the ACA, and therefore, because it was repealed as part of the Tax Act, the remaining provisions of the ACA are invalid as well. While the Texas U.S. District Court Judge, as well as the Trump administration and CMS, have stated that the ruling will have no immediate effect, and on December 30, 2018 the Texas District Court Judge issued an order staying the judgment pending appeal, it is unclear how this decision, subsequent appeals, and other efforts to repeal and replace the ACA will impact the ACA and our business.

On January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal burden on states or a cost, fee, tax, penalty or regulatory burden on individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On October 13, 2017, President Trump signed an Executive Order terminating the cost-sharing subsidies that reimburse insurers under the ACA. Several state Attorneys General filed suit to stop the administration from terminating the subsidies, but their request for a restraining order was denied by a federal judge in California on October 25, 2017. On June 14, 2018, U.S. Court of Appeals for the Federal Circuit ruled that the federal government was not required to pay more than $12 billion in ACA risk corridor payments to third-party payors who argued were owed to them. The effects of this gap in reimbursement on third-party payors, the viability of the ACA marketplace, providers, and potentially our business, are not yet known.

Moreover, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain ACA-mandated fees, including the so called “Cadillac” tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. The Bipartisan Budget Act of 2018, also amended the ACA, effective January 1, 2019, by increasing the point-of-sale discount that is owed by pharmaceutical manufacturers who participate in Medicare Part D and closing the coverage gap in most Medicare drug plans, commonly referred to as the “donut hole.” In July 2018, CMS published a final rule permitting further collections and payments to and from certain ACA qualified health plans and health insurance issuers under the ACA risk adjustment program in response to the outcome of federal district court litigation regarding the method CMS uses to determine this risk adjustment. In addition, CMS has recently published a final rule that would give states greater flexibility, starting in 2020, in setting benchmarks for insurers in the individual and small group marketplaces, which may have the effect of relaxing the essential health benefits required under the ACA for plans sold through such marketplaces. In addition, other legislative changes have been proposed and adopted since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, included aggregate reductions to Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2027 unless additional Congressional action is taken. The American Taxpayer Relief Act of 2012, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Finally, on January 31, 2019, the Department of Health and Human Services (HHS) and HHS Office of Inspector General (OIG) proposed an amendment to one of the existing Anti-Kickback safe harbors (42 C.F.R. 1001.952(h)) which would prohibit certain pharmaceutical manufacturers from offering rebates.
to pharmacy benefit managers, or PBMs, in the Medicare Part D and Medicaid managed care programs. The proposed amendment would remove protection for “discounts” from Anti-Kickback enforcement action, and would include criminal and civil penalties for knowingly and willfully offering, paying, soliciting, or receiving remuneration to induce or reward the referral of business reimbursable under federal health care programs. At the same time, HHS also proposed to create a new safe harbor to protect point-of-sale discounts that drug manufacturers provide directly to patients, and adds another safe harbor to protect certain administrative fees paid by manufacturers to PBMs. If this proposal is adopted, in whole or in part, it could affect the pricing and reimbursement for any products for which we receive approval in the future. These new laws and regulations may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used.

There has been increasing legislative and enforcement interest in the United States with respect to drug pricing practices. Specifically, there have been several recent U.S. Congressional inquiries and proposed federal and state legislation designed to, among other things, bring more transparency to drug pricing, reduce the cost of prescription drugs under Medicare, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drugs. At the federal level, the Trump administration’s budget proposal for fiscal year 2019 contains further drug price control measures that could be enacted during the 2019 budget process or in other future legislation, including, for example, measures to permit Medicare Part D plans to negotiate the price of certain drugs under Medicare Part B, to allow some states to negotiate drug prices under Medicaid, and to eliminate cost sharing for generic drugs for low-income patients.

Additionally, the Trump administration released a “Blueprint” to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase drug manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products, and reduce the out of pocket costs of drug products paid by consumers. HHS has already started the process of soliciting feedback on some of these measures and, at the same time, is immediately implementing others under its existing authority. For example, in September 2018, CMS announced that it will allow Medicare Advantage Plans the option to use step therapy for Part B drugs beginning January 1, 2019, and in October 2018, CMS proposed a new rule that would require direct-to-consumer television advertisements of prescription drugs and biological products, for which payment is available through or under Medicare or Medicaid, to include in the advertisement the Wholesale Acquisition Cost, or list price, of that drug or biological product. Although a number of these, and other proposed measures will require additional authorization to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs.

In addition, individual states have also become increasingly active in passing legislation and implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, to encourage importation from other countries and bulk purchasing.

The pricing of prescription pharmaceuticals is also subject to governmental control outside the United States. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of regulatory approval for a product. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidates to other available therapies. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our ability to generate revenues and become profitable could be impaired.

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There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at containing or lowering the cost of healthcare. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our product. Such reforms could have an adverse effect on anticipated revenue from product candidates that we may successfully develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our product candidates, if approved;
- our ability to receive or set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability;
- the amount of taxes that we are required to pay; and
- the availability of capital.

We expect that the ACA, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, lower reimbursement, and new payment methodologies. This could lower the price that we receive for any approved product. Any denial in coverage or reduction in reimbursement from Medicare or other government-funded programs may result in a similar denial or reduction in payments from private payors, which may prevent us from being able to generate sufficient revenue, attain profitability or commercialize our product candidates, if approved.

Governments outside the United States may impose strict price controls, which may adversely affect our revenues, if any. In some countries, including Member States of the European Union, the pricing of prescription drugs is subject to governmental control. Additional countries may adopt similar approaches to the pricing of prescription drugs. In such countries, pricing negotiations with governmental authorities can take considerable time after receipt of regulatory approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after coverage and reimbursement have been obtained. Reference pricing used by various countries and parallel distribution, or arbitrage between low-priced and high-priced countries, can further reduce prices. In some countries, we may be required to conduct a clinical study or other studies that compare the cost-effectiveness of any of our product candidates to other available therapies in order to obtain or maintain reimbursement or pricing approval, which is time-consuming and costly. We cannot be sure that such prices and reimbursement will be acceptable to us or our strategic partners. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. If pricing is set at unsatisfactory levels or if reimbursement of our products is unavailable or limited in scope or amount, our revenues from sales by us or our strategic partners and the potential profitability of any of our product candidates in those countries would be negatively affected.
Laws and regulations governing any international operations we may have in the future may preclude us from developing, manufacturing and selling certain products outside of the United States and require us to develop and implement costly compliance programs.

If we engage in operations outside of the United States, we must dedicate additional resources to comply with numerous laws and regulations in each jurisdiction in which we plan to operate. The Foreign Corrupt Practices Act, or FCPA, prohibits any U.S. individual or business from paying, offering, authorizing payment or offering of anything of value, directly or indirectly, to any foreign official, political party or candidate for the purpose of influencing any act or decision of the foreign entity in order to assist the individual or business in obtaining or retaining business. The FCPA also obligates companies whose securities are listed in the United States to comply with certain accounting provisions requiring us to maintain books and records that accurately and fairly reflect all transactions of the corporation, including international subsidiaries, and to devise and maintain an adequate system of internal accounting controls for international operations.

Compliance with the FCPA is expensive and difficult, particularly in countries in which corruption is a recognized problem. In addition, the FCPA presents particular challenges in the pharmaceutical industry, because, in many countries, hospitals are operated by the government, and doctors and other hospital employees are considered foreign officials. Certain payments to hospitals in connection with clinical trials and other work have been deemed to be improper payments to government officials and have led to FCPA enforcement actions.

Various laws, regulations and executive orders, including export control and trade sanctions laws, also restrict the use and dissemination outside of the United States, or the sharing with certain non-U.S. nationals, of information classified for national security purposes, as well as certain products and technical data relating to those products. If we expand our presence outside of the United States, it will require us to dedicate additional resources to comply with these laws, and these laws may preclude us from developing, manufacturing, or selling certain products and product candidates outside of the United States, which could limit our growth potential and increase our development costs.

The failure to comply with laws governing international business practices may result in substantial civil and criminal penalties and suspension or debarment from government contracting. The Securities and Exchange Commission, or SEC, also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the FCPA's accounting provisions.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could harm our business.

We are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. From time to time and in the future, our operations may involve the use of hazardous and flammable materials, including chemicals and biological materials, and may also produce hazardous waste products. Even if we contract with third parties for the disposal of these materials and waste products, we cannot completely eliminate the risk of contamination or injury resulting from these materials. In the event of contamination or injury resulting from the use or disposal of our hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties for failure to comply with such laws and regulations.

We maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees, but this insurance may not provide adequate coverage against potential liabilities. However, we do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us.
In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. Environmental laws and regulations may impair our research, development or production efforts. In addition, failure to comply with these laws and regulations may result in substantial fines, penalties or other sanctions.

**Risks Related to Our Dependence on Third Parties**

We may seek to establish collaborations and, if we are not able to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.

The advancement of our product candidates and development programs and the potential commercialization of our current and future product candidates will require substantial additional cash to fund expenses. For some of our programs, we may decide to collaborate with additional pharmaceutical and biotechnology companies with respect to development and potential commercialization. Likely collaborators may include large and mid-size pharmaceutical companies, regional and national pharmaceutical companies and biotechnology companies. In addition, if we are able to obtain regulatory approval for product candidates from foreign regulatory authorities, we may enter into collaborations with international biotechnology or pharmaceutical companies for the commercialization of such product candidates.

We face significant competition in seeking appropriate collaborators. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator’s resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator’s evaluation of a number of factors. Those factors may include the potential differentiation of our product candidate from competing product candidates, design or results of clinical trials, the likelihood of approval by the FDA or comparable foreign regulatory authorities and the regulatory pathway for any such approval, the potential market for the product candidate, the costs and complexities of manufacturing and delivering the product to patients and the potential of competing products. The collaborator may also consider alternative product candidates or technologies for similar indications that may be available for collaboration and whether such a collaboration could be more attractive than the one with us for our product candidate. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our product candidates or bring them to market and generate product revenue.

Collaborations are complex and time-consuming to negotiate and document. Further, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators. Any collaboration agreements that we enter into in the future may contain restrictions on our ability to enter into potential collaborations or to otherwise develop specified product candidates. We may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. If we are unable to do so, we may have to curtail the development of the product candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense.

If we enter into collaborations with third parties for the development and commercialization of our product candidates, our prospects with respect to those product candidates will depend in significant part on the success of those collaborations.

We may enter into collaborations for the development and commercialization of certain of our product candidates. If we enter into such collaborations, we will have limited control over the amount
Collaborations involving our product candidates pose a number of risks, including the following:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not perform their obligations as expected;
- collaborators may not pursue development and commercialization of our product candidates or may elect not to continue or renew development or commercialization programs, based on clinical trial results, changes in the collaborators' strategic focus or available funding or external factors, such as an acquisition, that divert resources or create competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates;
- a collaborator with marketing and distribution rights to one or more products may not commit sufficient resources to the marketing and distribution of such product or products;
- disagreements with collaborators, including disagreements over proprietary rights, including trade secrets and intellectual property rights, contract interpretation, or the preferred course of development might cause delays or termination of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability; and
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates.

Collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner or at all. If any future collaborator of ours is involved in a business combination, it could decide to delay, diminish or terminate the development or commercialization of any product candidate licensed to it by us.

We have historically relied on an affiliated third party to provide certain business services and the replacement of such services could adversely affect our business operations.

One of our shareholders, PureTech Health, previously provided us with strategic medical, clinical and scientific advice pursuant to a business services, personnel and information management agreement. In addition, we currently share administrative resources with PureTech Health, including
human resources support, and we partake in various insurance and benefit plans maintained by PureTech Health. As we continue to
transition to operate as a standalone entity, we intend to hire additional qualified personnel to provide certain of these functions internally
in the future. Upon the termination of the shared resources provided under the services agreement, such services will be provided
internally or by unaffiliated third parties, and we expect that in some instances, we will incur higher costs to obtain such services than we
incurred under the terms of such agreement.

We rely on third parties to assist in conducting our clinical trials. If they do not perform satisfactorily, we may not be able to
obtain regulatory approval or commercialize our product candidates, or such approval or commercialization may be delayed,
and our business could be substantially harmed.

We have relied upon and plan to continue to rely on third parties, such as contract research organizations, clinical data
management organizations, medical institutions and clinical investigators, to conduct our clinical trials and expect to rely on these third
parties to conduct clinical trials of any other product candidate that we develop. Any of these third parties may terminate their
engagements with us under certain circumstances. We may not be able to enter into alternative arrangements or do so on commercially
reasonable terms. In addition, there is a natural transition period when a new CRO begins work. As a result, delays may occur, which
could negatively impact our ability to meet our expected clinical development timelines and harm our business, financial condition and
prospects.

Further, although our reliance on these third parties for clinical development activities limits our control over these activities, we
remain responsible for ensuring that each of our trials is conducted in accordance with the applicable protocol, legal and regulatory
requirements and scientific standards. Moreover, the FDA requires us to comply with Good Clinical Practices, or GCPs, for conducting,
recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights,
integrity and confidentiality of trial participants are protected. The FDA enforces these GCPs through periodic inspections of trial sponsors,
principal investigators, clinical trial sites and IRBs. If we or our third-party contractors fail to comply with applicable GCPs, the clinical data
generated in our clinical trials may be deemed unreliable and the FDA may require us to perform additional clinical trials before approving
our product candidates, which would delay the regulatory approval process. We cannot be certain that, upon inspection, the FDA will
determine that any of our clinical trials comply with GCPs. We are also required to register certain clinical trials and post the results of
completed clinical trials on a government-sponsored database, ClinicalTrials.gov, within certain timeframes. Failure to do so can result in
fines, adverse publicity and civil and criminal sanctions.

Furthermore, the third parties conducting clinical trials on our behalf are not our employees, and except for remedies available to us
under our agreements with such contractors, we cannot control whether or not they devote sufficient time, skill and resources to our
ongoing development programs. These contractors may also have relationships with other commercial entities, including our competitors,
for whom they may also be conducting clinical trials or other drug development activities, which could impede their ability to devote
appropriate time to our clinical programs. If these third parties, including clinical investigators, do not successfully carry out their
contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated
protocols, we may not be able to obtain, or may be delayed in obtaining, regulatory approvals for our product candidates. If that occurs, we
will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates. In such an event, our financial
results and the commercial prospects for any product candidates that we seek to develop could be harmed, our costs could increase and
our ability to generate revenues could be delayed, impaired or foreclosed.

We also rely on other third parties to store and distribute drug supplies for our clinical trials. Any performance failure on the part of
our distributors could delay clinical development or regulatory
approval of our product candidates or commercialization of any resulting products, producing additional losses and depriving us of potential product revenue.

**Our use of third parties to manufacture our product candidates may increase the risk that we will not have sufficient quantities of our product candidates, products, or necessary quantities of such materials on time or at an acceptable cost.**

We do not own or operate manufacturing facilities for the production of clinical or commercial quantities of our product candidates, and we lack the resources and the capabilities to do so. As a result, we currently rely on third parties for the manufacture and supply of the active pharmaceutical ingredients, or APIs, in our product candidates. Our current strategy is to outsource all manufacturing of our product candidates to third parties.

We currently engage third-party manufacturers to provide the APIs of KarXT and for the final drug product formulation of KarXT that is being used in our clinical trials. Although we believe that there are several potential alternative manufacturers who could manufacture KarXT, we may incur added costs and delays in identifying and qualifying any such replacement. In addition, we typically order raw materials and services on a purchase order basis and do not enter into long-term dedicated capacity or minimum supply arrangements with any commercial manufacturer. There is no assurance that we will be able to timely secure needed supply arrangements on satisfactory terms, or at all. Our failure to secure these arrangements as needed could have a material adverse effect on our ability to complete the development of our product candidates or, to commercialize them, if approved. We may be unable to conclude agreements for commercial supply with third-party manufacturers, or may be unable to do so on acceptable terms. There may be difficulties in scaling up to commercial quantities and formulation of KarXT, and the costs of manufacturing could be prohibitive.

Even if we are able to establish and maintain arrangements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- the failure of the third-party manufacturer to comply with applicable regulatory requirements and reliance on third-parties for manufacturing process development, regulatory compliance and quality assurance;
- manufacturing delays if our third-party manufacturers give greater priority to the supply of other products over our product candidates or otherwise do not satisfactorily perform according to the terms of the agreement between us;
- limitations on supply availability resulting from capacity and scheduling constraints of third-parties;
- the possible breach of manufacturing agreements by third-parties because of factors beyond our control;
- the possible termination or non-renewal of the manufacturing agreements by the third-party, at a time that is costly or inconvenient to us; and
- the possible misappropriation of our proprietary information, including our trade secrets and know-how.

If we do not maintain our key manufacturing relationships, we may fail to find replacement manufacturers or develop our own manufacturing capabilities, which could delay or impair our ability to obtain regulatory approval for our products. If we do find replacement manufacturers, we may not be able to enter into agreements with them on terms and conditions favorable to us and there could be a substantial delay before new facilities could be qualified and registered with the FDA and other foreign regulatory authorities.
If KarXT for any of our initial or potential additional indications or any other product candidate is approved by any regulatory agency, we intend to utilize arrangements with third-party contract manufacturers for the commercial production of those products. This process is difficult and time consuming and we may face competition for access to manufacturing facilities as there are a limited number of contract manufacturers operating under cGMPs that are capable of manufacturing our product candidates. Consequently, we may not be able to reach agreement with third-party manufacturers on satisfactory terms, which could delay our commercialization.

Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, seizures or voluntary recalls of product candidates, operating restrictions and criminal prosecutions, any of which could significantly affect supplies of our product candidates. The facilities used by our contract manufacturers to manufacture our product candidates must be evaluated by the FDA. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturing partners for compliance with cGMPs. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, we may not be able to secure and/or maintain regulatory approval for our product manufactured at these facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA finds deficiencies or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved. Contract manufacturers may face manufacturing or quality control problems causing drug substance production and shipment delays or a situation where the contractor may not be able to maintain compliance with the applicable cGMP requirements. Any failure to comply with cGMP requirements or other FDA, EMA and comparable foreign regulatory requirements could adversely affect our clinical research activities and our ability to develop our product candidates and market our products, if approved.

The FDA and other foreign regulatory authorities require manufacturers to register manufacturing facilities. The FDA and corresponding foreign regulators also inspect these facilities to confirm compliance with cGMPs. Contract manufacturers may face manufacturing or quality control problems causing drug substance production and shipment delays or a situation where the contractor may not be able to maintain compliance with the applicable cGMP requirements. Any failure to comply with cGMP requirements or other FDA, EMA and comparable foreign regulatory requirements could adversely affect our clinical research activities and our ability to develop our product candidates and market our products following approval.

If any third-party manufacturer of our product candidates is unable to increase the scale of its production of our product candidates, and/or increase the product yield of its manufacturing, then our costs to manufacture the product may increase and commercialization may be delayed.

In order to produce sufficient quantities to meet the demand for clinical trials and, if approved, subsequent commercialization of KarXT, or any other product candidates that we may develop, our third-party manufacturers will be required to increase their production and optimize their manufacturing processes while maintaining the quality of the product. The transition to larger scale production could prove difficult. In addition, if our third party manufacturers are not able to optimize their manufacturing processes to increase the product yield for our product candidates, or if they are unable to produce increased amounts of our product candidates while maintaining the quality of the product, then we may not be able to meet the demands of clinical trials or market demands, which could decrease our ability to generate profits and have a material adverse impact on our business and results of operation.
We may need to maintain licenses for active ingredients from third parties to develop and commercialize some of our product candidates, which could increase our development costs and delay our ability to commercialize those product candidates.

Should we decide to use API in any of our product candidates that are proprietary to one or more third parties, we would need to maintain licenses to those active ingredients from those third parties. If we are unable to gain or continue to access rights to these active ingredients prior to conducting preclinical toxicology studies intended to support clinical trials, we may need to develop alternate product candidates from these programs by either accessing or developing alternate active ingredients, resulting in increased development costs and delays in commercialization of these product candidates. If we are unable to gain or maintain continued access rights to the desired active ingredients on commercially reasonable terms or develop suitable alternate active ingredients, we may not be able to commercialize product candidates from these programs.

Use of third parties to conduct testing of our product candidates in tissues or animals may increase the risk that we will have unsuitable or invalidated data for regulatory submissions and approval.

We currently do not own or operate laboratory facilities in which to conduct preclinical testing of our product candidates in tissues or animals. Preclinical studies regulated by FDA, EMA and most other health authorities are governed by Good Laboratory Practices, or GLP. Additionally, studies involving animals may be subject to further regulation by institutional, private or government animal welfare authorities that may vary by territory. Studies involving human tissues may also be subject to institutional and government human subject privacy policies that may vary by territory. Third party vendors conducting tissue and/or animal studies on our behalf may be found to be in violation of one or more of these regulations or policies and may be subject to closure, censure or other penalties. In some cases, these penalties could materially impact the performance, availability, or validity of studies conducted on our behalf. Even in the absence of violations resulting in penalties, regulatory and other authorities may refuse to authorize the conduct or to accept the results of studies for regulatory or ethical reasons.

Cyber-attacks or other failures in our telecommunications or information technology systems, or those of our collaborators, contract research organizations, third-party logistics providers, distributors or other contractors or consultants, could result in information theft, data corruption and significant disruption of our business operations.

We, our collaborators, our CROs, third-party logistics providers, distributors and other contractors and consultants utilize information technology, or IT, systems and networks to process, transmit and store electronic information in connection with our business activities. As use of digital technologies has increased, cyber incidents, including third parties gaining access to employee accounts using stolen or inferred credentials, computer malware, viruses, spamming, phishing attacks or other means, and deliberate attacks and attempts to gain unauthorized access to computer systems and networks, have increased in frequency and sophistication. These threats pose a risk to the security of our, our collaborators', our CROs', third-party logistics providers', distributors' and other contractors' and consultants' systems and networks, and the confidentiality, availability and integrity of our data. There can be no assurance that we will be successful in preventing cyber-attacks or successfully mitigating their effects. Similarly, there can be no assurance that our collaborators, CROs, third-party logistics providers, distributors and other contractors and consultants will be successful in protecting our clinical and other data that is stored on their systems. Any cyber-attack, data breach or destruction or loss of data could result in a violation of applicable U.S. and international privacy, data protection and other laws, and subject us to litigation and governmental investigations and proceedings by federal, state and local regulatory entities in the United States and by international regulatory entities, resulting in
exposure to material civil and/or criminal liability. Further, our general liability insurance and corporate risk program may not cover all potential claims to which we are exposed and may not be adequate to indemnify us for all liability that maybe imposed; and could have a material adverse effect on our business and prospects. For example, the loss of clinical trial data from completed or ongoing clinical trials for any of our product candidates could result in delays in our development and regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, we may suffer reputational harm or face litigation or adverse regulatory action as a result of cyber-attacks or other data security breaches and may incur significant additional expense to implement further data protection measures.

Risks Related to Our Intellectual Property

Our commercial success depends on our ability to protect our intellectual property and proprietary technology. Our commercial success depends in large part on our ability to obtain and maintain intellectual property rights protection through patents, trademarks, and trade secrets in the United States and other countries with respect to our proprietary product candidates. If we do not adequately protect our intellectual property rights, competitors may be able to erode, negate or preempt any competitive advantage we may have, which could harm our business and ability to achieve profitability. To protect our proprietary position, we have patent applications and may file other patent applications in the United States or abroad related to our product candidates that are important to our business; we may also license or purchase patent applications filed by others. The patent application and approval process is expensive and time-consuming. We may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner.

Agreements through which we license patent rights may not give us control over patent prosecution or maintenance, so that we may not be able to control which claims or arguments are presented, how claims are amended, and may not be able to secure, maintain, or successfully enforce necessary or desirable patent protection from those patent rights. We may not have primary control over patent prosecution and maintenance for certain of the patents and patent applications we may license in the future, and therefore cannot guarantee that these patents and applications will be prosecuted or maintained in a manner consistent with the best interests of our business. We cannot be certain that patent prosecution and maintenance activities by our licensor or future licensor have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents.

If the scope of the patent protection we or our future licensors obtain is not sufficiently broad, we may not be able to prevent others from developing and commercializing technology and products similar or identical to ours. The degree of patent protection we require to successfully compete in the marketplace may be unavailable or severely limited in some cases and may not adequately protect our rights or permit us to gain or keep any competitive advantage. We cannot provide any assurances that any of our licensed patents have, or that any of our pending owned or licensed patent applications that mature into issued patents will include, claims with a scope sufficient to protect our proprietary platform or otherwise provide any competitive advantage, nor can we assure you that our licenses are or will remain in force. Other parties have developed or may develop technologies that may be related or competitive with our approach, and may have filed or may file patent applications and may have been issued or may be issued patents with claims that overlap or conflict with our patent applications, either by claiming the same compounds, formulations or methods or by claiming subject matter that could dominate our patent position. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. Furthermore, patents have a limited lifespan. In the United States, the natural expiration of a patent is generally twenty years after it is filed. Various
extensions may be available; however, the life of a patent, and the protection it affords, is limited. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our patent portfolio may not provide us with adequate and continuing patent protection sufficient to exclude others from commercializing products similar to our product candidates.

Even if they are unchallenged, our owned and licensed patent and pending patent applications, if issued, may not provide us with any meaningful protection or prevent competitors from designing around our patent claims to circumvent our patents by developing similar or alternative technologies or therapeutics in a non-infringing manner. For example, a third party may develop a competitive therapy that provides benefits similar to our product candidate but falls outside the scope of our patent protection or license rights. If the patent protection provided by the patent and patent applications we hold or pursue with respect to our product candidates is not sufficiently broad to impede such competition, our ability to successfully commercialize our product candidate could be negatively affected, which would harm our business. Currently, a significant portion of our patents and patent applications are in-licensed, though similar risks would apply to any patents or patent applications that we now own or may own or in-license in the future.

We, or any future partners, collaborators, or licensees, may fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Therefore, we may miss potential opportunities to strengthen our patent position.

It is possible that defects of form in the preparation or filing of our patent or patent applications may exist, or may arise in the future, for example with respect to proper priority claims, inventorship, claim scope, or requests for patent term adjustments. If we or our partners, collaborators, licensees, or licensors, whether current or future, fail to establish, maintain or protect such patents and other intellectual property rights, such rights may be reduced or eliminated. If our partners, collaborators, licensees, or licensors, are not fully cooperative or disagree with us as to the prosecution, maintenance or enforcement of any patent rights, such patent rights could be compromised. If there are material defects in the form, preparation, prosecution, or enforcement of our patents or patent applications, such patents may be invalid and/or unenforceable, and such applications may never result in valid, enforceable patents. Any of these outcomes could impair our ability to prevent competition from third parties, which may have an adverse impact on our business.

The patent position of biotechnology and pharmaceutical companies carries uncertainty. In addition, the determination of patent rights with respect to pharmaceutical compounds commonly involves complex legal and factual questions, which are dependent upon the current legal and intellectual property context, extant legal precedent and interpretations of the law by individuals. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are characterized by uncertainty.

Pending patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications. Assuming the other requirements for patentability are met, currently, the first to file a patent application is generally entitled to the patent. However, prior to March 16, 2013, in the United States, the first to invent was entitled to the patent. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we were the first to make the inventions claimed in our patent or pending patent applications, or that we were the first to file for patent protection of such inventions. Similarly, we cannot be certain that parties from...
whom we do or may license or purchase patent rights were the first to make relevant claimed inventions, or were the first to file for patent protection for them. If third parties have filed prior patent applications on inventions claimed in our patents or applications that were filed on or before March 15, 2013, an interference proceeding in the United States can be initiated by such third parties to determine who was the first to invent any of the subject matter covered by the patent claims of our applications. If third parties have filed such prior applications after March 15, 2013, a derivation proceeding in the United States can be initiated by such third parties to determine whether our invention was derived from theirs.

Moreover, because the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, our patents or pending patent applications may be challenged in the courts or patent offices in the United States and abroad. There is no assurance that all of the potentially relevant prior art relating to our patents and patent applications has been found. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing or, in some cases, not at all. Therefore, we cannot know with certainty whether we were the first to make the inventions claimed in our patents or pending patent applications, or that we were the first to file for patent protection of such inventions. If such prior art exists, it may be used to invalidate a patent, or may prevent a patent from issuing from a pending patent application. For example, such patent filings may be subject to a third-party submission of prior art to the U.S. Patent and Trademark Office, or USPTO, or to other patent offices around the world. Alternately or additionally, we may become involved in post-grant review procedures, oppositions, derivation proceedings, ex parte reexaminations, inter partes review, supplemental examinations, or interference proceedings or challenges in district court, in the United States or in various foreign patent offices, including both national and regional, challenging patents or patent applications in which we have rights, including patents on which we rely to protect our business. An adverse determination in any such challenges may result in loss of the patent or in patent or patent application claims being narrowed, invalidated or held unenforceable, in whole or in part, or in denial of the patent application or loss or reduction in the scope of one or more claims of the patent or patent application, any of which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. In addition, given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized.

Pending and future patent applications may not result in patents being issued that protect our business, in whole or in part, or which effectively prevent others from commercializing competitive products. Competitors may also be able to design around our patents. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents or narrow the scope of our patent protection. In addition, the laws of foreign countries may not protect our rights to the same extent or in the same manner as the laws of the United States. For example, patent laws in various jurisdictions, including significant commercial markets such as Europe, restrict the patentability of methods of treatment of the human body more than United States law does. If these developments were to occur, they could have a material adverse effect on our ability to generate revenue.

The patent application process is subject to numerous risks and uncertainties, and there can be no assurance that we or any of our future development partners will be successful in protecting our product candidates by obtaining and defending patents. These risks and uncertainties include the following:

- the USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent
There are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case;

- patent applications may not result in any patents being issued;
- patents that may be issued or in-licensed may be challenged, invalidated, modified, revoked, circumvented, found to be unenforceable or otherwise may not provide any competitive advantage;
- our competitors, many of whom have substantially greater resources and many of whom have made significant investments in competing technologies, may seek or may have already obtained patents that will limit, interfere with or eliminate our ability to make, use, and sell our product candidates;
- there may be significant pressure on the U.S. government and international governmental bodies to limit the scope of patent protection both inside and outside the United States for disease treatments that prove successful, as a matter of public policy regarding worldwide health concerns; and
- countries other than the United States may have patent laws less favorable to patentees than those upheld by U.S. courts, allowing foreign competitors a better opportunity to create, develop and market competing product candidates.

Issued patents that we have or may obtain or license may not provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our patents by developing similar or alternative technologies or products in a non-infringing manner. Our competitors may also seek approval to market their own products similar to or otherwise competitive with our products. Alternatively, our competitors may seek to market generic versions of any approved products by submitting ANDAs to the FDA in which they claim that patents owned or licensed by us are invalid, unenforceable or not infringed. In these circumstances, we may need to defend or assert our patents, or both, including by filing lawsuits alleging patent infringement. In any of these types of proceedings, a court or other agency with jurisdiction may find our patents invalid or unenforceable, or that our competitors are competing in a non-infringing manner. Thus, even if we have valid and enforceable patents, these patents still may not provide protection against competing products or processes sufficient to achieve our business objectives.

In addition, we rely on the protection of our trade secrets and proprietary, unpatented know-how. Although we have taken steps to protect our trade secrets and unpatented know-how, including entering into confidentiality agreements with third parties, and confidential information and invention assignment agreements with employees, consultants, collaborators, vendors, and advisors, we cannot provide any assurances that all such agreements have been duly executed, and third parties may still obtain this information or may come upon this or similar information independently. It is possible that technology relevant to our business will be independently developed by a person who is not a party to such a confidentiality or invention assignment agreement. We may not be able to prevent the unauthorized disclosure or use of our technical knowledge or trade secrets by consultants, collaborators, vendors, advisors, former employees and current employees. Furthermore, if the parties to our confidentiality agreements breach or violate the terms of these agreements, we may not have adequate remedies for any such breach or violation, and we could lose our trade secrets as a consequence of such breaches or violations. Our trade secrets could otherwise become known or be independently discovered by our competitors. Additionally, if the steps taken to maintain our trade secrets are deemed inadequate, we may have insufficient recourse against third parties for
misappropriating our trade secrets. If any of these events occurs or if we otherwise lose protection for our trade secrets or proprietary
know-how, our business may be harmed.

If we fail to comply with our obligations in our current and future intellectual property licenses with third parties, we could lose
rights that are important to our business.

We are party to a patent license agreement with PureTech Health that provides us with intellectual property rights relating to KarXT.
This license agreement imposes milestone payment, royalty and other obligations on us. If we fail to comply with our obligations, including
achieving specified milestone events. PureTech Health may have the right to terminate this license, in which event we might not be able to
develop, manufacture or market any product that is covered by the intellectual property we in-license from PureTech Health and may face
other penalties. Such an occurrence would materially adversely affect our business prospects. For a variety of purposes, we will likely
enter into additional licensing and funding arrangements with third parties that may also impose similar obligations on us.

Termination of any of our current or future in-licenses would reduce or eliminate our rights under these agreements and may result
in our having to negotiate new or reinstated agreements with less favorable terms or cause us to lose our rights under these agreements,
including our rights to important intellectual property or technology. Any of the foregoing could prevent us from commercializing our
product candidate, which could have a material adverse effect on our operating results and overall financial condition.

In addition to the above risks, intellectual property rights that we license in the future may include sublicenses under intellectual
property owned by third parties, in some cases through multiple tiers. The actions of our future licensors may therefore affect our rights to
use our sublicensed intellectual property, even if we are in compliance with all of the obligations under our license agreements. Should our
licensor or any of the upstream licensors fail to comply with their obligations under the agreements pursuant to which they obtain the rights
that are sublicensed to us, or should such agreements be terminated or amended, our ability to develop and commercialize our product
candidates may be materially harmed.

Moreover, disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our product candidates, technology and processes infringe on intellectual property of the licensor that is not
  subject to the licensing agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our
  licensors and us and our partners; and
- the priority of invention of patented technology.

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and
certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation
disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology,
or increase what we believe to be our financial or other obligations under the relevant agreement,
either of which could have a material adverse effect on our business, financial condition, results of operations, and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates, which could have a material adverse effect on our business, financial conditions, results of operations, and prospects.

It is difficult and costly to protect our intellectual property and our proprietary technologies, and we may not be able to ensure their protection.

Our commercial success will depend in part on obtaining and maintaining patent protection and trade secret protection for the use, formulation and structure of our product candidate, and associated methods of treatment as well as on successfully defending these patents against potential third-party challenges. Our ability to protect our product candidate from unauthorized making, using, selling, offering to sell or importing by third parties is dependent on the extent to which we have rights under valid and enforceable patents that cover these activities.

The patent positions of pharmaceutical, biotechnology and other life sciences companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved and have in recent years been the subject of much litigation. Changes in either the patent laws or in interpretations of patent laws in the United States and other countries may diminish the value of our intellectual property. Further, the determination that a patent application or patent claim meets all of the requirements for patentability is a subjective determination based on the application of law and jurisprudence. The ultimate determination by the USPTO or by a court or other trier of fact in the United States, or corresponding foreign national patent offices or courts, on whether a claim meets all requirements of patentability cannot be assured. Although we have conducted searches for third-party publications, patents and other information that may affect the patentability of claims in our various patent applications and patents, we cannot be certain that all relevant information has been identified. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our owned patents or patent applications, in our licensed patents or patent applications or in third-party patents.

We cannot provide assurances that any of our patent applications will be found to be patentable, including over our own or our licensors’ prior art publications or patent literature, or will issue as patents. Neither can we make assurances as to the scope of any claims that may issue from our pending and future patent applications nor to the outcome of any proceedings by any potential third parties that could challenge the patentability, validity or enforceability of our patents and patent applications in the United States or foreign jurisdictions. Any such challenge, if successful, could limit patent protection for our products and product candidates and/or materially harm our business.

The degree of future protection for our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep our competitive advantage. For example:

- we may not be able to generate sufficient data to support full patent applications that protect the entire breadth of developments in one or more of our programs;
- it is possible that one or more of our pending patent applications will not become an issued patent or, if issued, that the patent(s) claims will have sufficient scope to protect our technology, provide us with a basis for commercially viable products or provide us with any competitive advantages;
- if our pending applications issue as patents, they may be challenged by third parties as not infringed, invalid or unenforceable under United States or foreign laws;

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if issued, the patents under which we hold rights may not be valid or enforceable;

we may not successfully commercialize KarXT, if approved, before our relevant patents expire;

we may not be the first to make the inventions covered by each of our patents and pending patent applications; or

we may not develop additional proprietary technologies or product candidates that are separately patentable.

In addition, to the extent that we are unable to obtain and maintain patent protection for one of our products or product candidates or in the event that such patent protection expires, it may no longer be cost-effective to extend our portfolio by pursuing additional development of a product or product candidate for follow-on indications.

If we are unable to protect the confidentiality of our trade secrets, the value of our technology could be materially adversely affected and our business would be harmed.

In addition to patents, we also may rely on trade secrets to protect our technologies or products, especially where we do not believe patent protection is appropriate or obtainable. Also, we cannot provide any assurances that any of our licensed patents have claims with a scope sufficient to protect our technology or otherwise provide any competitive advantage, nor can we assure you that our licenses are or will remain in full force or effect, in which case we would similarly rely on trade secrets. However, trade secrets are difficult to protect. We seek to protect our confidential proprietary information, in part, by confidentiality agreements and invention assignment agreements with our employees, consultants, scientific advisors, contractors and collaborators. These agreements are designed to protect our proprietary information. However, we cannot be certain that such agreements have been entered into with all relevant parties, and we cannot be certain that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. For example, our employees, consultants, contractors, outside scientific collaborators and other advisers may unintentionally or willfully disclose our information to competitors. Enforcing a claim that a third-party entity illegally obtained and is using any of our trade secrets is expensive and time-consuming, and the outcome is unpredictable, and we may not be able to obtain adequate remedies for such breaches. We also seek to preserve the integrity and confidentiality of our confidential proprietary information by maintaining physical security of our premises and physical and electronic security of our information technology systems, but it is possible that these security measures could be breached. In addition, courts outside the United States are sometimes less willing to protect trade secrets. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how. Notably, proprietary technology protected by a trade secret does not preempt the patenting of independently developed equivalent technology, even if such equivalent technology is invented subsequent to the technology protected by a trade secret. If any of our confidential proprietary information were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position.

Obtaining and maintaining patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and applications are required to be paid to the USPTO and various governmental patent
agencies outside of the United States in several stages over the lifetime of the patents and applications. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process and after a patent has issued. There are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such a circumstance, competitors may be able to enter the market earlier than otherwise would be the case. Under the terms of some of our current and future licenses, we may not have the ability to maintain patents or prosecute patent applications in the portfolio, and may therefore have to rely on third parties to comply with these requirements.

**Patent terms may be inadequate to protect our competitive position on our products for an adequate amount of time.**

Patents have a limited lifespan. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions may be available, but the life of a patent, and the protection it affords, is limited. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. We expect to seek extensions of patent terms in the United States and, if available, in other countries where we are prosecuting patents. In the United States, the Drug Price Competition and Patent Term Restoration Act of 1984 permits a patent term extension of up to seven and a half years beyond the normal expiration of the patent, which is limited to the approved indication (or any additional indications approved during the period of extension). We might not be granted an extension because of, for example, failure to apply within applicable periods, failure to apply prior to the expiration of relevant patents or otherwise failure to satisfy any of the numerous applicable requirements. Moreover, the applicable authorities, including the FDA and the USPTO, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. If this occurs, our competitors may be able to obtain approval of competing products following our patent expiration by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case. If this were to occur, it could have a material adverse effect on our ability to generate revenue.

**Changes to patent law in the United States and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our products.**

As is the case with other biopharmaceutical companies, our commercial success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involves both technological and legal complexity and is therefore costly, time consuming and inherently uncertain. Wide-ranging patent reform legislation in the United States, including the Leahy-Smith America Invents Act, or the America Invents Act, could increase those uncertainties and costs. The America Invents Act was signed into law on September 16, 2011, and many of the substantive changes became effective on March 16, 2013. The America Invents Act reforms United States patent law in part by changing the U.S. patent system from a “first to invent” system to a “first inventor to file” system, expanding the definition of prior art, and developing a post-grant review system. This legislation changes United States patent law in a way that may weaken our ability to obtain patent protection in the United States for those applications filed after March 16, 2013.

Further, the America Invents Act created new procedures to challenge the validity of issued patents in the United States, including post-grant review and inter partes review proceedings, which some third parties have been using to cause the cancellation of selected or all claims of issued patents of competitors. For a patent filed March 16, 2013 or later, a petition for post-grant review can be filed
by a third party in a nine-month window from issuance of the patent. A petition for *inter partes* review can be filed immediately following the issuance of a patent if the patent has an effective filing date prior to March 16, 2013. A petition for *inter partes* review can be filed after the nine-month period for filing a post-grant review petition has expired for a patent with an effective filing date of March 16, 2013 or later. Post-grant review proceedings can be brought on any ground of invalidity, whereas *inter partes* review proceedings can only raise an invalidity challenge based on published prior art and patents. These adversarial actions at the USPTO review patent claims without the presumption of validity afforded to U.S. patents in lawsuits in U.S. federal courts, and use a lower burden of proof than used in litigation in U.S. federal courts. Therefore, it is generally considered easier for a competitor or third party to have a U.S. patent invalidated in a USPTO post-grant review or *inter partes* review proceeding than invalidated in a litigation in a U.S. federal court. If any of our patents are challenged by a third party in such a USPTO proceeding, there is no guarantee that we or our licensors or collaborators will be successful in defending the patent, which may result in a loss of the challenged patent right to us.

In addition, recent court rulings in cases such as *Association for Molecular Pathology v. Myriad Genetics, Inc.*, *BRCA1- & BRCA2-Based Hereditary Cancer Test Patent Litigation, and Promega Corp. v. Life Technologies Corp.* have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents once obtained. Depending on future actions by the U.S. Congress, the U.S. courts, the USPTO and the relevant law-making bodies in other countries, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

**We may not be able to enforce our intellectual property rights throughout the world.**

Filing, prosecuting, enforcing and defending patents on our product candidate in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. The requirements for patentability may differ in certain countries, particularly in developing countries; thus, even in countries where we do pursue patent protection, there can be no assurance that any patents will issue with claims that cover our products.

Moreover, our ability to protect and enforce our intellectual property rights may be adversely affected by unforeseen changes in foreign intellectual property laws. Additionally, laws of some countries outside of the United States and Europe do not afford intellectual property protection to the same extent as the laws of the United States and Europe. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions. The legal systems of some countries, including India, China and other developing countries, do not favor the enforcement of patents and other intellectual property rights. This could make it difficult for us to stop the infringement of our patents or the misappropriation of our other intellectual property rights. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties. Consequently, we may not be able to prevent third parties from practicing our inventions in certain countries outside the United States and Europe or from selling or importing products made from our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop and market their own products and, further, may export otherwise infringing products to territories where we have patent protection, if our ability to enforce our patents to stop infringing activities is inadequate. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.
Agreements through which we license patent rights may not give us sufficient rights to permit us to pursue enforcement of our licensed patents or defense of any claims asserting the invalidity of these patents (or control of such enforcement or defense) of such patent rights in all relevant jurisdictions as requirements may vary.

Proceedings to enforce our patent rights, whether or not successful, could result in substantial costs and divert our efforts and resources from other aspects of our business. Moreover, such proceedings could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Furthermore, while we intend to protect our intellectual property rights in major markets for our products, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our products, if approved. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate.

Others may challenge inventorship or claim an ownership interest in our intellectual property which could expose it to litigation and have a significant adverse effect on its prospects.

A third party or former employee or collaborator may claim an inventorship or ownership interest in one or more of our or our licensors' patents or other proprietary or intellectual property rights. A third party could bring legal actions against us and seek monetary damages and/or enjoin clinical testing, manufacturing and marketing of the affected product or products. While we are presently unaware of any claims or assertions by third-parties with respect to our patents or other intellectual property, we cannot guarantee that a third party will not assert a claim or an interest in any of such patents or intellectual property. If we or our licensors fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, intellectual property that is important to our product candidates. Further, regardless of the outcome, if we become involved in any litigation, it could consume a substantial portion of our resources, and cause a significant diversion of effort by our technical and management personnel.

If we are sued for infringing intellectual property rights of third parties, such litigation could be costly and time consuming and could prevent or delay us from developing or commercializing our product candidates.

Our commercial success depends, in part, on our ability to develop, manufacture, market and sell our product candidate without infringing the intellectual property and other proprietary rights of third parties. However, our research, development and commercialization activities may be subject to claims that we infringe or otherwise violate patents or other intellectual property rights owned or controlled by third parties. Third parties may have U.S. and non-U.S. issued patents and pending patent applications relating to compounds, methods of manufacturing compounds and/or methods of use for the treatment of the disease indications for which we are developing our product candidates. If any third-party patents or patent applications are found to cover our product candidates or their methods of use or manufacture, we may not be free to manufacture or market our product candidates as planned without obtaining a license, which may not be available on commercially reasonable terms, or at all.

There is a substantial amount of intellectual property litigation in the biotechnology and pharmaceutical industries, and we may become party to, or threatened with, litigation or other adversarial proceedings regarding intellectual property rights with respect to our products candidates, including patent infringement lawsuits in the US or abroad, as well as interference, derivation, inter partes review, and post-grant proceedings before the USPTO and opposition or other proceedings before corresponding foreign patent offices. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the
composition, use or manufacture of our product candidates. We cannot guarantee that any of our patent searches or analyses including, but not limited to, the identification of relevant patents, the scope of patent claims or the expiration of relevant patents are complete or thorough, nor can we be certain that we have identified each and every patent and pending application in the United States and abroad that is relevant to or necessary for the commercialization of our product candidates in any jurisdiction. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our product candidates may be accused of infringing. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. Accordingly, third parties may assert infringement claims against us based on intellectual property rights that exist now or arise in the future. The outcome of intellectual property litigation is subject to uncertainties that cannot be adequately quantified in advance. The pharmaceutical and biotechnology industries have produced a significant number of patents, and it may not always be clear to industry participants, including us, which patents cover various types of products or methods of use or manufacture. The scope of protection afforded by a patent is subject to interpretation by the courts, and the interpretation is not always uniform. If we were sued for patent infringement, we would need to demonstrate that our product candidates, products or methods either do not infringe the patent claims of the relevant patent or that the patent claims are invalid or unenforceable, and we may not be able to do this. Proving invalidity is difficult. For example, in the United States, proving invalidity requires a showing of clear and convincing evidence to overcome the presumption of validity enjoyed by issued patents. Even if we are successful in these proceedings, we may incur substantial costs and the time and attention of our management and scientific personnel could be diverted in pursuing these proceedings, which could significantly harm our business and operating results. In addition, parties making claims against us may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources, and we may not have sufficient resources to bring these actions to a successful conclusion.

If we are found to infringe a third party's intellectual property rights, we could be forced, including by court order, to cease developing, manufacturing or commercializing the infringing product candidate or product. Alternatively, we may be required to obtain a license from such third party in order to use the infringing technology and continue developing, manufacturing or marketing the infringing product candidate or product. If we were required to obtain a license to continue to manufacture or market the affected product, we may be required to pay substantial royalties or grant cross-licenses to our patents. We cannot, however, assure you that any such license will be available on acceptable terms, if at all. Ultimately, we could be prevented from commercializing a product, or be forced to cease some aspect of our business operations as a result of claims of patent infringement or violation of other intellectual property rights. Further, the outcome of intellectual property litigation is subject to uncertainties that cannot be adequately quantified in advance, including the demeanor and credibility of witnesses and the identity of any adverse party. This is especially true in intellectual property cases that may turn on the testimony of experts as to technical facts upon which experts may reasonably disagree. Furthermore, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us; alternatively or additionally it could include terms that impede or destroy our ability to compete successfully in the commercial marketplace. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation or administrative proceedings, there is a risk that some of our confidential information could be compromised by disclosure. In addition, any uncertainties resulting from the initiation and continuation
of any litigation could have material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operations, financial condition and prospects.

We may be subject to claims by third parties asserting that our employees or we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.

Many of our current and former employees and our licensors' current and former employees, including our senior management, were previously employed at universities or at other biotechnology or pharmaceutical companies, including some which may be competitors or potential competitors. Some of these employees, including members of our senior management, may have executed proprietary rights, non-disclosure and non-competition agreements, or similar agreements, in connection with such previous employment. Although we try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such third party. Litigation may be necessary to defend against such claims. If we fail in defending any such claims, in addition to paying monetary damages, we may sustain damages or lose key personnel, valuable intellectual property rights or the personnel’s work product, which could hamper or prevent commercialization of our technology, which could materially affect our commercial development efforts. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to commercialize our technology or products. Such a license may not be available on commercially reasonable terms or at all. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

In addition, while we typically require our employees, consultants and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own, which may result in claims by or against us related to the ownership of such intellectual property. If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our senior management and scientific personnel.

We may become involved in lawsuits to protect or enforce our patent or other intellectual property, which could be expensive, time consuming and unsuccessful.

Competitors may infringe our patent, trademarks, copyrights or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming and divert the time and attention of our management and scientific personnel. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents, in addition to counterclaims asserting that our patents are invalid or unenforceable, or both. In any patent infringement proceeding, there is a risk that a court will decide that a patent of ours is invalid or unenforceable, in whole or in part, and that we do not have the right to stop the other party from using the invention at issue. There is also a risk that, even if the validity of such patents is upheld, the court will construe the patent’s claims narrowly or decide that we do not have the right to stop the other party from using the invention at issue on the grounds that our patent claims do not cover the invention. An adverse outcome in a litigation or proceeding involving our patent could limit our ability to assert those patents against those parties or other competitors, and may curtail or preclude our ability to exclude third parties from making and selling similar or competitive products. Similarly, if we assert trademark infringement claims, a court
may determine that the marks we have asserted are invalid or unenforceable, or that the party against whom we have asserted trademark infringement has superior rights to the trademarks in question. In this case, we could ultimately be forced to cease use of such trademarks.

Even if we establish infringement, the court may decide not to grant an injunction against further infringing activity and instead award only monetary damages, which may or may not be an adequate remedy. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could adversely affect the price of shares of our common stock. Moreover, there can be no assurance that we will have sufficient financial or other resources to file and pursue such infringement claims, which typically last for years before they are concluded. Even if we ultimately prevail in such claims, the monetary cost of such litigation and the diversion of the attention of our management and scientific personnel could outweigh any benefit we receive as a result of the proceedings.

Additionally, for certain of our existing and future in-licensed patent rights, we may not have the right to bring suit for infringement and may have to rely on third parties to enforce these rights for us. If we cannot or choose not to take action against those we believe infringe our intellectual property rights, we may have difficulty competing in certain markets where such potential infringers conduct their business, and our commercialization efforts may suffer as a result.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our trademarks of interest and our business may be adversely affected.

Our trademarks or trade names may be challenged, infringed, circumvented or declared generic or determined to be infringing on other marks. We rely on both registration and common law protection for our trademarks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. Moreover, any name we propose to use for our products in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed product names, we may be required to expend significant additional resources in an effort to identify a usable substitute name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

Risks Related to Employee Matters and Managing Growth

We depend heavily on our executive officers, principal consultants and others, and the loss of their services would materially harm our business.

Our success depends, and will likely continue to depend, upon our ability to hire, retain the services of our current executive officers, principal consultants and others, including Steven Paul, our
President and Chief Executive Officer, Andrew Miller, our Chief Operating Officer, Stephen Brannan, our Chief Medical Officer, and Troy Ignelzi, our Chief Financial Officer. We have entered into employment agreements with Dr. Paul, Dr. Miller, Dr. Brannan and Mr. Ignelzi, but they may terminate their employment with us at any time. The loss of their services might impede the achievement of our research, development and commercialization objectives.

Our ability to compete in the biotechnology and pharmaceuticals industries depends upon our ability to attract and retain highly qualified managerial, scientific and medical personnel. Our industry has experienced a high rate of turnover of management personnel in recent years. Replacing executive officers or other key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to develop, gain regulatory approval of and commercialize products successfully.

Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these additional key employees on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions.

We rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by other entities and may have commitments under consulting or advisory contracts with those entities that may limit their availability to us. If we are unable to continue to attract and retain highly qualified personnel, our ability to develop and commercialize our product candidates will be limited.

We only have a limited number of employees to manage and operate our business.

As of May 30, 2019, we had 16 full-time employees. Our focus on the development of KarXT requires us to optimize cash utilization and to manage and operate our business in a highly efficient manner. We cannot assure you that we will be able to hire and/or retain adequate staffing levels to develop KarXT or run our operations and/or to accomplish all of the objectives that we otherwise would seek to accomplish.

Our employees, independent contractors, consultants, collaborators and contract research organizations may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk that our employees, independent contractors, consultants, collaborators and contract research organizations may engage in fraudulent conduct or other illegal activity. Misconduct by those parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violates:

- FDA regulations or similar regulations of comparable non-U.S. regulatory authorities, including those laws requiring the reporting of true, complete and accurate information to such authorities;
- manufacturing standards;
- federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable non-U.S. regulatory authorities; and
- laws that require the reporting of financial information or data accurately.
Activities subject to these laws also involve the improper use or misrepresentation of information obtained in the course of clinical trials, creating fraudulent data in our preclinical studies or clinical trials or illegal misappropriation of product materials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws, standards or regulations. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and results of operations, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, disgorgement, integrity oversight and reporting obligations, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could have a material adverse effect on our ability to operate our business and our results of operations.

We expect to expand our organization, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of regulatory affairs and sales, marketing and distribution, as well as to support our public company operations. To manage these growth activities, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Our management may need to devote a significant amount of its attention to managing these growth activities. Moreover, our expected growth could require us to relocate to a different geographic area of the country. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion or relocation of our operations, retain key employees, or identify, recruit and train additional qualified personnel. Our inability to manage the expansion or relocation of our operations effectively may result in weaknesses in our infrastructure, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Our expected growth could also require significant capital expenditures and may divert financial resources from other projects, such as the development of additional product candidates. If we are unable to effectively manage our expected growth, our expenses may increase more than expected, our ability to generate revenues could be reduced and we may not be able to implement our business strategy, including the successful commercialization of our product candidates.

Risks Related to Our Common Stock and this Offering

If you purchase shares of common stock in this offering, you will suffer immediate dilution in the net tangible book value of your investment.

The initial public offering price of our common stock is substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our net tangible book value per share after this offering. Based on the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, you will experience immediate dilution of $ per share, representing the difference between our pro forma net tangible book value per share after giving effect to this offering and the assumed initial public offering price. Purchasers of common stock in this offering will have contributed approximately % of the aggregate
price paid by all purchasers of our capital stock and will own approximately % of our common stock outstanding after this offering, excluding any shares of our common stock that they may have acquired prior to this offering. Furthermore, if the underwriters exercise their over-allotment option or our previously issued options, warrant and other rights to acquire common stock at prices below the assumed initial public offering price are exercised, you will experience further dilution. For additional information on the dilution that you will experience immediately after this offering, see the section titled “Dilution.”

An active trading market for our common stock may not develop or be sustainable. If an active trading market does not develop, investors may not be able to resell their shares at or above the initial public offering price and our ability to raise capital in the future may be impaired.

Prior to this offering, there has been no public market for our common stock. The initial public offering price for our common stock will be determined through negotiations with the underwriters. This price may not reflect the price at which investors in the market will be willing to buy and sell our shares following this offering. Although we intend to list our common stock on The Nasdaq Global Market, an active trading market for our shares may never develop or, if developed, be maintained following this offering. If an active market for our common stock does not develop or is not maintained, it may be difficult for you to sell shares you purchase in this offering without depressing the market price for the shares or at all. An inactive trading market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to acquire other companies or technologies by using our shares as consideration.

The trading price of our common stock is likely to be highly volatile, which could result in substantial losses for purchasers of our common stock in this offering. Securities class action or other litigation involving our company or members of our management team could also substantially harm our business, financial condition and results of operations.

Our stock price is likely to be highly volatile. The stock market in general and the market for smaller pharmaceutical and biotechnology companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, you may not be able to sell your common stock at or above the initial public offering price and you may lose some or all of your investment. The market price for our common stock may be influenced by many factors, including:

- the success of existing or new competitive products or technologies;
- regulatory actions with respect to our product candidates or our competitors’ products and product candidates;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, collaborations or capital commitments;
- the timing and results of clinical trials of KarXT and any other product candidates;
- commencement or termination of collaborations for our development programs;
- failure or discontinuation of any of our development programs;
- results of clinical trials of product candidates of our competitors;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
• the level of expenses related to any of our product candidates or clinical development programs;
• the results of our efforts to develop additional product candidates or products;
• actual or anticipated changes in estimates as to financial results or development timelines;
• announcement or expectation of additional financing efforts;
• sales of our common stock by us, our insiders or other stockholders;
• variations in our financial results or those of companies that are perceived to be similar to us;
• changes in estimates or recommendations by securities analysts, if any, that cover us;
• changes in the structure of healthcare payment systems;
• market conditions in the pharmaceutical and biotechnology sectors;
• general economic, industry and market conditions; and
• the other factors described in this “Risk Factors” section.

In the past, securities class action litigation has often been brought against a company following a decline in the market price of its securities. This risk is especially relevant for biopharmaceutical companies, which have experienced significant stock price volatility in recent years.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our share price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. We do not currently have and may never obtain research coverage by securities and industry analysts. If no or few securities or industry analysts commence coverage of us, or one or more of the analysts who cover us issues an adverse opinion about our company, our stock price would likely decline. If one or more of these analysts ceases research coverage of us or fails to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

We have broad discretion in the use of the net proceeds from this offering and may invest or spend the proceeds in ways with which you do not agree and in ways that may not yield a return on your investment.

Although we currently intend to use the net proceeds from this offering in the manner described in the section titled “Use of Proceeds” in this prospectus, our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. You will not have the opportunity to influence our decisions on how to use the net proceeds from this offering. The failure by our management to apply these funds effectively could result in financial losses that could harm our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value.

We are an “emerging growth company,” and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an emerging growth company, and, for as long as we continue to be an emerging growth company, we may choose to take advantage of exemptions from various reporting requirements
We could remain an “emerging growth company” for up to five years, or until the earliest of (1) the last day of the first fiscal year in which our annual gross revenue exceeds $1.07 billion, (2) the date that we become a “large accelerated filer” as defined in Rule 12b-2 under the Securities Exchange Act of 1934, which would occur if the market value of our common stock that is held by non-affiliates exceeds $700.0 million as of the last business day of our most recently completed second fiscal quarter or (3) the date on which we have issued more than $1.0 billion in non-convertible debt during the preceding three-year period. So long as we remain an “emerging growth company,” we expect to avail ourselves of the exemption from the requirement that our independent registered public accounting firm attest to the effectiveness of our internal control over financial reporting under Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404. When our independent registered public accounting firm is required to undertake an assessment of our internal control over financial reporting, the cost of our compliance with Section 404 will correspondingly increase. Moreover, if we are not able to comply with the requirements of Section 404 applicable to us in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, and particularly after we are no longer an “emerging growth company,” we will incur significant legal, accounting and other expenses that we did not incur as a private company, including costs associated with public company reporting requirements. We also anticipate that we will incur costs associated with relatively recently adopted corporate governance requirements, including requirements of the SEC and The Nasdaq Global Market. We expect these rules and regulations to increase our legal and financial compliance costs and to make some activities more time-consuming and costly. We also expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors or as executive officers.

We are currently evaluating and monitoring developments with respect to these rules, and we cannot predict or estimate the amount of additional costs we may incur or the timing of such costs. These rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

Pursuant to Section 404, we will be required to furnish a report by our management on our internal control over financial reporting beginning with our second filing of an Annual Report on Form 10-K with the SEC after we become a public company. However, while we remain an emerging growth company, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting,
continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite our efforts, there is a risk that we will not be able to conclude, within the prescribed timeframe or at all, that our internal control over financial reporting is effective as required by Section 404. If we identify one or more material weaknesses, it could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements.

A significant portion of our total outstanding shares is restricted from immediate resale but may be sold into the market in the near future, which could cause the market price of our common stock to decline significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares of common stock intend to sell shares, could reduce the market price of our common stock. Following this offering, we will have shares of common stock outstanding based on the shares of our common stock outstanding as of and after giving effect to the conversion of all outstanding shares of our preferred stock into 12,962,045 shares of our common stock upon the closing of this offering. Of these shares, the shares sold by us in this offering may be resold in the public market immediately, unless purchased by our affiliates. The remaining shares are currently restricted under securities laws or as a result of lock-up or other agreements, but will be able to be sold after this offering as described in the “Shares Eligible for Future Sale” section of this prospectus. The representatives of the underwriters may release these stockholders from their lock-up agreements with the underwriters at any time and without notice, which would allow for earlier sales of shares in the public market.

Moreover, after this offering, holders of an aggregate of 12,962,045 shares of our common stock will have rights, subject to conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. We also plan to register all shares of common stock that we may issue under our equity compensation plans. Once we register these shares, they can be freely sold in the public market upon issuance and once vested, subject to volume limitations applicable to affiliates and the lock-up agreements. If these additional shares are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

We do not anticipate paying any cash dividends on our capital stock in the foreseeable future. Accordingly, stockholders must rely on capital appreciation, if any, for any return on their investment.

We have never declared nor paid cash dividends on our capital stock. We currently plan to retain all of our future earnings, if any, to finance the operation, development and growth of our business. In addition, the terms of any future debt or credit agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

Concentration of ownership of our common stock among our existing executive officers, directors and principal stockholders may prevent new investors from influencing significant corporate decisions.

Based upon shares outstanding as of , 2019, and after giving effect to the conversion of all outstanding shares of preferred stock into shares of our common stock, upon the closing of this offering, our executive officers and directors, combined with our stockholders who owned more than
5% of our outstanding common stock before this offering and their affiliates, will, in the aggregate, beneficially own shares representing approximately % of our common stock. In particular, PureTech Health will own approximately % of our common stock following this offering and be our largest stockholder following this offering. As a result, if PureTech Health along with stockholders who own more than 5% of our outstanding common stock after this offering were to choose to act together, they would be able to control all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would control the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. This concentration of ownership control may:

- delay, defer or prevent a change in control;
- entrench our management or the board of directors; or
- impede a merger, consolidation, takeover or other business combination involving us that other stockholders may desire.

Some of these persons or entities may have interests different than yours. For example, because many of these stockholders purchased their shares at prices substantially below the price at which shares are being sold in this offering and have held their shares for a longer period, they may be more interested in selling our company to an acquirer than other investors or they may want us to pursue strategies that deviate from the interests of other stockholders.

Provisions in our corporate charter documents and under Delaware law may prevent or frustrate attempts by our stockholders to change our management or hinder efforts to acquire a controlling interest in us.

Provisions in our corporate charter and our bylaws that will become effective upon the closing of this offering may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions:

- establish a classified board of directors such that all members of the board are not elected at one time;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from the board;
- establish advance notice requirements for nominations for election to the board of directors or for proposing matters that can be acted on at stockholder meetings;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call a special meeting of stockholders;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a “poison pill” that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or
repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the General Corporation
Law of the State of Delaware, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or
combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our
outstanding voting stock, unless the merger or combination is approved in a prescribed manner. This could discourage, delay or prevent
someone from acquiring us or merging with us, whether or not it is desired by, or beneficial to, our stockholders. This could also have the
effect of discouraging others from making tender offers for our common stock, including transactions that may be in your best interests.
These provisions may also prevent changes in our management or limit the price that investors are willing to pay for our stock.

Prior to this offering, we operated as a private company and therefore, have no experience operating as a public company and
complying with public company obligations. Complying with these requirements will increase our costs, require additional
management resources and qualified accounting and financial personnel, and we may fail to meet all of these obligations.

We will face increased legal, accounting, administrative and other costs and expenses as a public company. Compliance with the
Sarbanes-Oxley Act of 2002, the Dodd-Frank Act of 2010 and the rules promulgated thereunder, as well as rules of the SEC and Nasdaq,
for example, will result in significant initial cost to us as well as ongoing increases in our legal, audit and financial compliance costs,
particularly after we are no longer an “emerging growth company.” The Securities Exchange Act of 1934, as amended, or the Exchange
Act, requires, among other things, that we file certain periodic reports with respect to our business and financial condition. Our executive
officers and other personnel need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and
regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance, and require us to incur
substantial costs to maintain the same or similar coverage. We expect to incur significant expense and devote substantial management
effort toward ensuring compliance with Section 404 of the Sarbanes-Oxley Act of 2002 once we lose our status as an “emerging growth
compny.” We currently do not have an internal audit group, and we will need to hire additional accounting and financial staff with
appropriate public company experience and technical accounting knowledge, and it may be difficult to recruit and maintain such
personnel. Implementing any appropriate changes to our internal controls may require specific compliance training for our directors,
officers and employees, entail substantial costs to modify our existing accounting systems, and take a significant period of time to
complete. Such changes may not, however, be effective in maintaining the adequacy of our internal controls, and any failure to maintain
that adequacy, or consequent inability to produce accurate financial statements or other reports on a timely basis, could increase our
operating costs and could materially impair our ability to operate our business.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our
financial results or prevent fraud. As a result, stockholders could lose confidence in our financial and other public reporting,
which would harm our business and the trading price of our common stock.

Effective internal controls over financial reporting are necessary for us to provide reliable financial reports and, together with
adequate disclosure controls and procedures, are designed to prevent fraud. Any failure to implement required new or improved controls,
or difficulties encountered in their implementation could cause us to fail to meet our reporting obligations. In addition, any testing by us
conducted in connection with Section 404 of the Sarbanes-Oxley Act of 2002, or any subsequent testing by our independent registered
public accounting firm, may reveal deficiencies in our internal
controls over financial reporting that are deemed to be material weaknesses or that may require prospective or retroactive changes to our financial statements or identify other areas for further attention or improvement. Inferior internal controls could also cause investors to lose confidence in the reliability of our financial information, which could have a negative effect on the trading price of our stock.

We will be required to disclose changes made in our internal controls and procedures on a quarterly basis and our management will be required to assess the effectiveness of these controls annually. However, for as long as we are an “emerging growth company” under the JOBS Act, our independent registered public accounting firm will not be required to attest to the effectiveness of our internal controls over financial reporting pursuant to Section 404. We could be an “emerging growth company” for up to five years. An independent assessment of the effectiveness of our internal controls over financial reporting could detect problems that our management’s assessment might not. Undetected material weaknesses in our internal controls over financial reporting could lead to financial statement restatements and require us to incur the expense of remediation.

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

Upon completion of this offering, we will become subject to certain reporting requirements of the Exchange Act. Our disclosure controls and procedures are designed to reasonably assure that information required to be disclosed by us in reports we file or submit under the Exchange Act is accumulated and communicated to management, recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements or insufficient disclosures due to error or fraud may occur and not be detected.

Our restated certificate of incorporation will provide that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for most legal actions between us and our stockholders, which could limit our stockholders’ ability to obtain a favorable judicial forum for disputes with us or our directors, officers, employees or agents.

Our restated certificate of incorporation, which will become effective upon the closing of this offering, specifies that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for most legal actions involving state law claims brought against us by stockholders. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our restated certificate of incorporation described above.

We believe this provision benefits us by providing increased consistency in the application of Delaware law by chancellors particularly experienced in resolving corporate disputes, efficient administration of cases on a more expedited schedule relative to other forums and protection against the burdens of multi-forum litigation. However, the provision may have the effect of discouraging lawsuits against our directors, officers, employees and agents as it may limit any stockholder’s ability to bring a claim in a judicial forum that such stockholder finds favorable for disputes with us or our directors, officers, employees or agents. The enforceability of similar choice of forum provisions in other companies’ certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with any applicable action brought against us, a court could find the choice
of forum provisions contained in our restated certificate of incorporation to be inapplicable or unenforceable in such action. If a court were to find the choice of forum provision contained in our restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business, financial condition or results of operations.
SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this prospectus, including statements regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management and expected market growth are forward-looking statements. The words “anticipate,” “believe,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “target,” “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

These forward-looking statements include, among other things, statements about:

- the timing, progress and results of preclinical studies and clinical trials for KarXT in our current indications and other product candidates we may develop, including statements regarding the timing of initiation and completion of studies or trials and related preparatory work and the period during which the results of the trials will become available;
- our research and development plans, including our plans to explore the therapeutic potential of KarXT in additional indications;
- our plans to develop and commercialize KarXT and other product candidates;
- the timing of and our ability to obtain and maintain marketing approvals for our product candidates;
- the rate and degree of market acceptance and clinical utility of any product candidates for which we receive marketing approval;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our intellectual property position and strategy;
- our ability to identify additional product candidates with significant commercial potential;
- our plans to enter into collaborations for the development and commercialization of product candidates;
- the potential benefits of any future collaboration;
- our expectations related to the use of proceeds from this offering;
- our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
- our ability to retain the continued service of our key professionals and to identify, hire and retain additional qualified professionals;
- developments relating to our competitors and our industry; and
- the impact of government laws and regulations.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this prospectus, particularly in the “Risk Factors” section, that could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, collaborations, joint ventures or investments that we may make or enter into.
In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

You should read this prospectus and the documents that we have filed as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results may be materially different from what we expect. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. We are responsible for all of the disclosure contained in this prospectus, and we believe these industry publications and third-party research, surveys and studies are reliable.
USE OF PROCEEDS

We estimate that the net proceeds from our issuance and sale of shares of our common stock in this offering will be approximately $ million, assuming an initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise in full their option to purchase additional shares, we estimate that the net proceeds from this offering will be approximately $ million, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

Each $1.00 increase or decrease in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase or decrease our net proceeds from this offering by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase or decrease of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase or decrease our net proceeds from this offering by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

We currently estimate that we will use the net proceeds from this offering, together with our existing cash, cash equivalents and short-term investments, as follows:

- approximately $ million to fund the completion of our ongoing Phase 2 clinical trial and completion of a planned Phase 3 clinical trial for the treatment of psychosis in schizophrenia;
- approximately $ million to fund the completion of our planned Phase 1b clinical trial and completion of a planned Phase 2 clinical trial for the treatment of psychosis in AD;
- approximately $ million to fund the completion of our planned Phase 1b clinical trials for the cognitive and negative symptoms in schizophrenia;
- approximately $ million to fund the completion of our planned Phase 1b clinical trial and completion of a planned Phase 2 clinical trial for the treatment of pain;
- approximately $ million to further develop and expand our pipeline, including other muscarinic candidates, formulations and derivatives; and
- the remainder to fund working capital and other general corporate activities.

This expected use of the net proceeds from this offering along with our existing cash, cash equivalents and short-term investments represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. For example, we may use a portion of the net proceeds for the acquisition of businesses or technologies to continue to build our pipeline, our research and development capabilities and our intellectual property position, although we currently have no agreements, commitments or understandings with respect to any such transaction. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including the progress of our development and commercialization efforts, the status of and results from clinical trials, any collaborations that we may enter into with third parties for our product candidates and any unforeseen cash needs. Moreover, our estimates of the costs to fund our trials are based on the current designs of the trials. If we were to modify the design of any of these trials, for instance, to increase the number of patients in the trials, our costs to fund the trials could increase. As a result, our management will retain broad discretion over the allocation of the net proceeds from this offering.
Based on our current plans, we believe that our existing cash, cash equivalents and short-term investments, together with the net proceeds from this offering, will be sufficient to enable us to fund our operating expenses and capital expenditure requirements at least through . We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. We do not have any committed external source of funds.

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.
DIVIDEND POLICY

We have never declared nor paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. We do not intend to pay cash dividends in respect of our capital stock in the foreseeable future.
The following table sets forth our cash, cash equivalents and short-term investments and our capitalization as of March 31, 2019:

- on an actual basis;
- on a pro forma basis to give effect to (i) the sale and issuance of 137,743 shares of our Series B preferred stock in April 2019, (ii) the issuance of 30,000 shares of common stock upon exercise of an outstanding option in April 2019, (iii) the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of common stock upon the closing of this offering, (iv) the future issuance of 80,976 shares of common stock underlying fully vested restricted stock units we issued in May 2019, which we are obligated to deliver no later than March 15, 2020, and (v) the filing and effectiveness of our restated certificate of incorporation upon the closing of this offering; and
- on a pro forma as adjusted basis to give further effect to our issuance and sale of shares of our common stock in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.
Our capitalization following the closing of this offering will depend on the actual initial public offering price and other terms of this offering determined at pricing. You should read this table together with our financial statements and the related notes appearing at the end of this prospectus and the sections of this prospectus titled “Selected Financial Data”, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Description of Capital Stock” sections of this prospectus.

<table>
<thead>
<tr>
<th>As of March 31, 2019</th>
<th>Actual</th>
<th>Pro Forma</th>
<th>Pro Forma As Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in thousands, except share and per share data)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cash, cash equivalents and short-term investments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$84,275</td>
<td>$85,843</td>
<td>$84,609</td>
<td></td>
</tr>
<tr>
<td><strong>Series Seed Convertible preferred stock, $0.0001 par value; 4,412,500 shares authorized, issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted</strong></td>
<td>$1</td>
<td>-</td>
<td>$</td>
</tr>
<tr>
<td><strong>Series A Convertible preferred stock, $0.0001 par value; 3,126,700 shares authorized, issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted</strong></td>
<td>41,964</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Series B Convertible preferred stock, $0.0001 par value; 5,422,845 shares authorized, 5,285,102 issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted</strong></td>
<td>79,841</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Stockholders’ equity (deficit):</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred stock, $0.0001 par value; no shares authorized, issued or outstanding, actual; 10,000,000 shares authorized and no shares issued or outstanding, pro forma and pro forma as adjusted</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Common stock, $0.0001 par value; 16,000,000 shares authorized, 15,400 shares issued and outstanding, actual; 150,000,000 shares authorized, 13,088,421 shares issued and outstanding, pro forma; 150,000,000 shares authorized, shares issued and outstanding, pro forma as adjusted</td>
<td>-</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Additional paid-in capital</td>
<td>4,795</td>
<td>129,843</td>
<td></td>
</tr>
<tr>
<td>Accumulated deficit</td>
<td>(43,560)</td>
<td>(45,235)</td>
<td></td>
</tr>
<tr>
<td><strong>Total stockholders’ equity (deficit)</strong></td>
<td>(38,765)</td>
<td>84,609</td>
<td></td>
</tr>
<tr>
<td><strong>Total capitalization</strong></td>
<td>$83,041</td>
<td>$84,609</td>
<td>$</td>
</tr>
</tbody>
</table>

Each $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalents, restricted stock and short-term investments, total stockholders’ equity and total capitalization by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. Each increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalent and short-term investments, total stockholders’ equity and total capitalization by $ million, assuming no change in the assumed initial...
public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The table above excludes:

- 2,891,851 shares of our common stock issuable upon the exercise of stock options outstanding as of March 31, 2019, at a weighted average exercise price of $8.52 per share;
- 119,729 shares of our common stock available for future issuance as of March 31, 2019 under our 2009 stock incentive plan;
- shares of our common stock issuable upon the exercise of stock options that we will grant to Dr. Paul upon completion of this offering pursuant to his current employment agreement, based on the assumed number of shares offered set forth on the cover of this prospectus, with an exercise price equal to the initial public offering price per share in this offering;
- shares of our common stock that will become available for future issuance under our 2019 Stock Option and Incentive Plan, which will become effective in connection with the completion of this offering; and
- shares of our common stock that will become available for future issuance under our 2019 Employee Stock Purchase Plan, which will become effective in connection with the completion of this offering.
If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the initial public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock after this offering.

Our historical net tangible book value (deficit) as of March 31, 2019 was $(39.4) million, or $(2,557.86) per share of our common stock. Our historical net tangible book value (deficit) is the amount of our total tangible assets less our total liabilities and convertible preferred stock. Historical net tangible book value (deficit) per share represents our historical net tangible book value (deficit) divided by the 15,400 shares of our common stock outstanding as of March 31, 2019.

Our pro forma net tangible book value as of March 31, 2019 was $84.0 million, or $6.42 per share of our common stock. Pro forma net tangible book value represents the amount of our total tangible assets less our total liabilities, after giving effect to (i) the sale and issuance of 137,743 shares of our Series B preferred stock in April 2019, (ii) the issuance of 30,000 shares of common stock upon exercise of an outstanding option in April 2019, (iii) the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of our common stock upon the closing of this offering and (iv) the future issuance of 80,976 shares of common stock underlying fully vested restricted stock units we issued in May 2019, which we are obligated to deliver no later than March 15, 2020. Pro forma net tangible book value per share represents pro forma net tangible book value divided by the total number of shares outstanding as of March 31, 2019, after giving effect to the foregoing adjustments and the automatic conversion of all outstanding shares of our preferred stock into common stock upon the closing of this offering.

After giving further effect to our issuance and sale of shares of our common stock in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of March 31, 2019 would have been $ million, or $ per share. This represents an immediate increase in pro forma as adjusted net tangible book value per share of $ to existing stockholders and immediate dilution of $ in pro forma as adjusted net tangible book value per share to new investors purchasing common stock in this offering. Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the assumed initial public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis:

<table>
<thead>
<tr>
<th>Assumed initial public offering price per share</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical net tangible book value (deficit) per share as of March 31, 2019</td>
<td>$(2,557.86)</td>
</tr>
<tr>
<td>Increase per share attributable to the pro forma adjustments described above</td>
<td>2,564.28</td>
</tr>
<tr>
<td>Pro forma net tangible book value per share as of March 31, 2019</td>
<td>6.42</td>
</tr>
<tr>
<td>Increase in pro forma as adjusted net tangible book value per share attributable to new investors purchasing shares in this offering</td>
<td></td>
</tr>
<tr>
<td>Pro forma as adjusted net tangible book value per share after this offering</td>
<td></td>
</tr>
<tr>
<td>Dilution per share to new investors purchasing shares in this offering</td>
<td>$</td>
</tr>
</tbody>
</table>

Each $1.00 increase or decrease in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase...
or decrease our pro forma as adjusted net tangible book value per share after this offering by $        per share, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase the pro forma as adjusted net tangible book value per share after this offering by $        per share and decrease the pro forma as adjusted net tangible book value per share after this offering by $        per share, assuming no change in the assumed initial public offering price and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. A decrease of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase the pro forma as adjusted net tangible book value per share after this offering by $        per share and increase the dilution to new investors participating in this offering by $        per share, assuming no change in the assumed initial public offering price and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

If the underwriters exercise their option to purchase additional shares in full, our pro forma as adjusted net tangible book value per share after this offering would be $        per share, representing an immediate increase in pro forma as adjusted net tangible book value per share of $        to existing stockholders and immediate dilution in pro forma as adjusted net tangible book value per share of $        to new investors purchasing common stock in this offering, assuming an initial public offering price of $        per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. If any shares are issued upon exercise of outstanding options, you will experience further dilution.

The following table summarizes, on the pro forma as adjusted basis described above, the differences between the number of shares of common stock purchased from us, the total consideration paid to us and the average price per share paid by existing stockholders and by new investors purchasing shares of common stock in this offering. The calculation below is based on an assumed initial public offering price of $        per share, which is the midpoint of the price range set forth on the cover page of this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

<table>
<thead>
<tr>
<th>Shares Purchased</th>
<th>Total Consideration</th>
<th>Average Price Per Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>Existing stockholders</td>
<td>13,088,421</td>
<td>%</td>
</tr>
<tr>
<td>New investors</td>
<td></td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

The table above assumes no exercise of the underwriters’ option to purchase additional shares in this offering. If the underwriters’ option to purchase additional shares is exercised in full, the number of shares of our common stock held by existing stockholders would be reduced to  % of the total number of shares of our common stock outstanding after this offering, and the number of shares of common stock held by new investors participating in the offering would be increased to  % of the total number of shares of our common stock outstanding after this offering.

The number of shares purchased from us by existing stockholders is based on 13,088,421 shares of our common stock outstanding as of March 31, 2019 after giving effect to (i) the sale and issuance of 137,743 shares of our Series B preferred stock in April 2019, (ii) the issuance of 30,000 shares of common stock upon exercise of an outstanding option in April 2019, (iii) the automatic conversion of
of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of common stock upon the closing of this offering, and (iv) the future issuance of 80,976 shares of common stock underling fully vested restricted stock units we issued in May 2019, which we are obligated to deliver no later than March 15, 2020 and excludes:

- 2,891,851 shares of our common stock issuable upon the exercise of stock options outstanding as of March 31, 2019, at a weighted average exercise price of $8.52 per share;
- 119,729 shares of our common stock available for future issuance as of March 31, 2019 under our 2009 stock incentive plan;
- shares of our common stock issuable upon the exercise of stock options that we will grant to Dr. Paul upon completion of this offering pursuant to his current employment agreement, based on the assumed number of shares offered set forth on the cover of this prospectus, with an exercise price equal to the initial public offering price per share in this offering;
- shares of our common stock that will become available for future issuance under our 2019 Stock Option and Incentive Plan, which will become effective in connection with the completion of this offering; and
- shares of our common stock that will become available for future issuance under our 2019 Employee Stock Purchase Plan, which will become effective in connection with the completion of this offering.
You should read the following selected financial data together with our financial statements and the related notes appearing at the end of this prospectus and the "Management's Discussion and Analysis of Financial Condition and Results of Operations" section of this prospectus. We have derived the statement of operations data for the years ended December 31, 2017 and 2018 and the balance sheet data as of December 31, 2017 and 2018 from our audited financial statements appearing at the end of this prospectus. We have derived the statement of operations data for the three months ended March 31, 2018 and 2019 and the balance sheet data as of March 31, 2019 from our unaudited interim financial statements appearing at the end of this prospectus. The unaudited interim financial statements have been prepared on the same basis as the audited financial statements and reflect, in the opinion of management, all adjustments of a normal, recurring nature that are necessary for a fair statement of the financial information included in those unaudited interim financial statements. Our historical results are not necessarily indicative of the results that may be expected in the future, and the results for the three months ended March 31, 2019 are not necessarily indicative of results to be expected for the full year or any other period.

<table>
<thead>
<tr>
<th>Statement of Operations Data:</th>
<th>Year Ended December 31,</th>
<th>Three Months Ended March 31,</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Revenue</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Operating expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>3,616</td>
<td>11,536</td>
</tr>
<tr>
<td>General and administrative</td>
<td>1,190</td>
<td>2,974</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>4,806</td>
<td>14,510</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(4,806)</td>
<td>(14,510)</td>
</tr>
<tr>
<td>Other income (expense):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest (expense) income</td>
<td>(555)</td>
<td>(407)</td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>(616)</td>
<td>(2,176)</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>(55)</td>
<td>(444)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(1,226)</td>
<td>(3,002)</td>
</tr>
<tr>
<td>Net loss before income taxes</td>
<td>$ (6,032)</td>
<td>$ (17,512)</td>
</tr>
<tr>
<td>Net loss per share—basic and diluted</td>
<td>$ (4,378,000)</td>
<td>$ (5,822)</td>
</tr>
<tr>
<td>Weighted-average number of common shares used in net loss per share—basic and diluted</td>
<td>4</td>
<td>2,062</td>
</tr>
<tr>
<td>Pro forma net loss per share—basic and diluted (unaudited)(1)</td>
<td>$(3.06)</td>
<td>$ (1.43)</td>
</tr>
<tr>
<td>Weighted-average number of common shares used in pro forma net loss per share—basic and diluted (unaudited)(1)</td>
<td>5,714,378</td>
<td>8,366,349</td>
</tr>
</tbody>
</table>

(1) See Note 2 in the notes to our financial statements appearing at the end of this prospectus for a description of the method used to calculate basic and diluted net loss per share and unaudited pro forma basic and diluted net loss per share.
Table of Contents

Balance Sheet Data:

<table>
<thead>
<tr>
<th></th>
<th>As of December 31, 2017</th>
<th>As of March 31, 2018</th>
<th>As of March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash, cash equivalents and short-term investments</td>
<td>$1,942</td>
<td>$13,887</td>
<td>$84,275</td>
</tr>
<tr>
<td>Working capital(1)</td>
<td>(9,394)</td>
<td>14,400</td>
<td>82,967</td>
</tr>
<tr>
<td>Total assets</td>
<td>2,129</td>
<td>15,857</td>
<td>85,400</td>
</tr>
<tr>
<td>Redeemable convertible preferred stock</td>
<td>1</td>
<td>41,965</td>
<td>121,806</td>
</tr>
<tr>
<td>Total stockholders’ deficit</td>
<td>(13,368)</td>
<td>(29,922)</td>
<td>(38,765)</td>
</tr>
</tbody>
</table>

(1) We define working capital as current assets less current liabilities. Included in current liabilities as of December 31, 2017, December 31, 2018 and March 31, 2019 are $10.3 million, $0.4 million, and zero, respectively, related to the current portion of convertible notes and associated derivative liability.
You should read the following discussion and analysis of our financial condition and results of operations together with the “Selected Financial Data” section of this prospectus and our financial statements and the related notes included at the end of this prospectus. This discussion and other parts of this prospectus contain forward-looking statements that involve risks and uncertainties, such as statements of our plans, objectives, expectations and intentions. As a result of many factors, including those factors set forth in the “Risk Factors” section of this prospectus, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are an innovative clinical-stage biopharmaceutical company primarily focused on developing novel therapies to address disabling neuropsychiatric conditions characterized by significant unmet medical need. Our pipeline is built on the broad therapeutic potential of our lead product candidate, KarXT, an oral modulator of muscarinic receptors that are located both in the central nervous system, or CNS, and various peripheral tissues. KarXT is our proprietary product candidate that combines xanomeline, a novel muscarinic agonist, with trospium, an approved muscarinic antagonist, to preferentially stimulate muscarinic receptors in the CNS. We are currently conducting a Phase 2 clinical trial of KarXT for the treatment of acute psychosis in patients with schizophrenia and expect preliminary results in late 2019. We also plan to initiate clinical trials of KarXT to evaluate its potential therapeutic benefit in other CNS disorders, including psychosis in Alzheimer’s disease, or AD, as well as pain. We have assembled a team whose members have extensive expertise in the research, development and commercialization of numerous CNS agents, as well as deep familiarity with the biology of neuropsychiatric disorders, such as schizophrenia and AD, including the role of muscarinic receptors in their potential treatment. We plan to leverage this expertise to develop a pipeline of product candidates targeting a broad range of psychiatric and neurological conditions.

Since our inception in 2009, we have focused substantially all of our efforts and financial resources on organizing and staffing our company, acquiring and developing our technology, raising capital, building our intellectual property portfolio, undertaking preclinical studies and clinical trials and providing general and administrative support for these activities. To date, we have funded our operations primarily with gross proceeds of $91.0 million from the sales of redeemable convertible preferred stock and $24.1 million from the issuance of convertible notes.

We have never generated revenue and have incurred significant net losses since inception. Our net losses were $6.0 million and $17.5 million for the years ended December 31, 2017 and 2018, respectively, and for the three months ended March 31, 2019, our net loss was $12.0 million. As of March 31, 2019, we had an accumulated deficit of $43.6 million. Our net losses may fluctuate significantly from quarter to quarter and year to year. We expect to incur significant expenses and increasing operating losses for the foreseeable future. We anticipate that our operating expenses and capital expenditures will increase substantially, particularly as we:

- invest significantly to further develop KarXT for our current and future indications;
- advance additional product candidates into preclinical and clinical development;
- seek regulatory approvals for any product candidates that successfully complete clinical trials;
- require the manufacture of larger quantities of our product candidates for clinical development and potential commercialization;
- hire additional clinical, scientific, management and administrative personnel;
• maintain, expand and protect our intellectual property portfolio;
• acquire or in-license other assets and technologies; and
• add additional operational, financial and management information systems and processes to support our ongoing development efforts, any future manufacturing or commercialization efforts and our transition to operating as a public company.

We do not expect to generate revenue from product sales unless and until we successfully complete development and obtain regulatory approval for a product candidate or enter into collaborative agreements with third parties, which we expect will take a number of years, if ever, and the outcome of which is subject to significant uncertainty. Additionally, we currently use third parties such as contract research organizations, or CROs, and contract manufacturing organizations, or CMOs, to carry out our preclinical and clinical development activities, and we do not yet have a sales organization. If we obtain regulatory approval for any product candidates, we expect to incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution.

As a result, we will need substantial additional funding to support our continuing operations and pursue our growth strategy. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our operations through a combination of private and public equity offerings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements with third parties. We may be unable to raise additional funds or enter into such agreements or arrangements when needed on favorable terms, or at all. If we fail to raise capital or enter into such agreements as, and when, needed, we may have to significantly delay, scale back or discontinue the development and commercialization of one or more of our product candidates.

As of March 31, 2019, we had cash, cash equivalents and short-term investments of $84.3 million. In April 2019, we received $1.6 million from the issuance of convertible notes, which were subsequently converted into 137,743 shares of Series B redeemable convertible preferred stock. We believe that our existing cash, cash equivalents and short-term investments will be sufficient to meet our anticipated operating and capital expenditure requirements for at least the next 12 months from the issuance date of our financial statements. We have based this estimate on assumptions that may prove to be wrong, and we could exhaust our available capital resources sooner than we expect. See “—Liquidity and Capital Resources.”

Components of Our Results of Operations

Revenue

To date, we have not generated any revenue and do not expect to generate any revenue in the foreseeable future, if at all. If our development efforts for our product candidates are successful and result in regulatory approval, we may generate revenue in the future from product sales. If we enter into license or collaboration agreements for any of our product candidates or intellectual property, we may generate revenue in the future from payments as a result of such license or collaboration agreements. We cannot predict if, when, or to what extent we will generate revenue from the commercialization and sale of our product candidates. We may never succeed in obtaining regulatory approval for any of our product candidates.
Operating Expenses

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for the development of our product candidates and our drug discovery efforts, which include:

- personnel costs, including salaries and the related costs, and stock-based compensation expense, for employees engaged in research and development functions;
- expenses incurred in connection with the preclinical and clinical development of our product candidates, including under agreements with CROs;
- expenses incurred in connection with CMOs that manufacture drug products for use in our preclinical and clinical trials;
- formulation costs and chemistry, manufacturing and controls, or CMC, costs; and
- expenses incurred under agreements with consultants who supplement our internal capabilities.

We expense all research and development costs in the periods in which they are incurred. Costs for certain development activities are recognized based on an evaluation of the progress to completion of specific tasks using information and data provided to us by our vendors and third-party service providers.

We do not track our internal research and development expenses on an indication-by-indication basis as they primarily relate to personnel, early research and consumable costs, which are deployed across multiple projects under development. These costs are included in unallocated research and development expenses in the table below. A portion of our research and development costs are external costs, such as fees paid to consultants, central laboratories, contractors, CMOs and CROs in connection with our clinical development activities, which costs we do track on an indication-by-indication basis. Substantially all of our allocable expenses made to date have been for the development of KarXT for the treatment of psychosis in patients with schizophrenia, and accordingly, we do not show expenses allocated to any other indication in the table below. Formulation costs and CMC costs and preclinical expenses consist of external costs associated with activities to support our current and future clinical programs, but are not allocated on an indication-by-indication basis due to the overlap of the potential benefit of those efforts across multiple indications that utilize KarXT. The following table summarizes our research and development expenses:

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31</th>
<th>Three Months Ended March 31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td></td>
<td>(in thousands)</td>
<td>(in thousands)</td>
</tr>
<tr>
<td>Schizophrenia clinical trials</td>
<td>$1,138</td>
<td>$8,160</td>
</tr>
<tr>
<td>Formulation and CMC</td>
<td>510</td>
<td>1,130</td>
</tr>
<tr>
<td>Preclinical</td>
<td>731</td>
<td>540</td>
</tr>
<tr>
<td>Unallocated expenses</td>
<td>1,237</td>
<td>1,706</td>
</tr>
<tr>
<td>Total research and development expense</td>
<td>$3,616</td>
<td>$11,536</td>
</tr>
</tbody>
</table>

We expect our research and development expenses to increase substantially for the foreseeable future as we continue to invest in research and development activities related to developing our product candidates, including investments in manufacturing, as our programs advance into later stages of development and we continue to conduct clinical trials. The process of conducting the necessary clinical research to obtain regulatory approval is costly and time-consuming, and the successful development of our product candidates is highly uncertain.
Because of the numerous risks and uncertainties associated with conducting product development, we cannot determine with certainty the duration and completion costs of our current or future preclinical studies and clinical trials or if, when, or to what extent we will generate revenues from the commercialization and sale of our product candidates. We may never succeed in achieving regulatory approval for our product candidates. The duration, costs and timing of preclinical studies and clinical trials and development of our product candidates will depend on a variety of factors, if and as we:

- continue to develop and conduct clinical trials for KarXT for our current and future indications;
- initiate and continue research, preclinical and clinical development efforts for future product candidates;
- seek to identify additional product candidates;
- seek regulatory approvals for KarXT for our current and future indications as well as any other product candidates that successfully complete clinical development;
- add operational, financial and management information systems and personnel, including personnel to support our product development and help us comply with our obligations as a public company;
- hire and retain additional personnel, such as clinical, quality control, scientific, commercial and administrative personnel;
- maintain, expand and protect our intellectual property portfolio;
- establish sales, marketing, distribution, manufacturing, supply chain and other commercial infrastructure in the future to commercialize various products for which we may obtain regulatory approval, if any;
- add equipment and physical infrastructure to support our research and development; and
- acquire or in-license other product candidates and technologies.

A change in the outcome of any of these variables with respect to the development of any of our product candidates would significantly change the costs and timing associated with the development of that product candidate. We may never succeed in obtaining regulatory approval for any of our product candidates.

We do not believe that it is possible at this time to accurately project total indication-specific expenses through commercialization. There are numerous factors associated with the successful commercialization of any of our product candidates, including future trial design and various regulatory requirements, many of which cannot be determined with accuracy at this time based on our stage of development. Additionally, future commercial and regulatory factors beyond our control will impact our clinical development programs and plans.

**General and Administrative Expenses**

General and administrative expenses consist primarily of employee-related costs for personnel in executive, finance and administrative functions, costs related to maintenance and filing of intellectual property, facility-related costs, and other expenses for outside professional services, including legal, human resources, data management, audit and accounting services. Personnel costs consist of salaries, benefits, travel expense and stock-based compensation expense.

We anticipate that our general and administrative expenses will increase in the future as we increase our headcount to support our continued research activities and development of our product.
candidates. We also anticipate that we will incur increased accounting, audit, legal, regulatory, compliance and director and officer insurance costs as well as investor and public relations expenses associated with operating as a public company.

Other Income (Expense)

Interest (Expense) Income. Interest (expense) income consists of interest accrued on the principal balance of convertible notes that had been issued as of May 1, 2019, all of which were converted into redeemable convertible preferred stock in August 2018, March 2019, and April 2019. A portion of the accrued interest was forgiven with respect to certain of the convertible notes upon their conversion into redeemable convertible preferred stock in August 2018, and the forgiven interest was recorded as a reduction to interest expense in the year ended December 31, 2018.

Interest Income. Interest income consists of interest income from our short-term investments.

Accretion of Debt Discount. Upon issuance of our convertible notes, each note was recorded at cost, net of the derivative liability (see “—Critical Accounting Polices and Estimates”). This discount on each outstanding note, if any, was amortized as interest expense to the date such note was expected to convert using the effective interest rate method and is reflected in the statements of operations as accretion of debt discount.

All outstanding principal under our convertible notes, totaling $19.8 million of principal, converted into shares of our Series A redeemable convertible preferred stock in our Series A financing in August 2018. With the exception of the 2018 Wellcome Trust Note, as defined and further described below, all outstanding convertible note agreements were cancelled upon such conversion. In March and April 2019, the $5.8 million outstanding principal drawn down following August 2018 under the 2018 Wellcome Trust Note converted into shares of our Series B redeemable convertible preferred stock. In April 2019, an additional $1.6 million was drawn down under the Wellcome Trust Note, which was subsequently converted into shares of our Series B redeemable convertible preferred stock.

Change in Fair Value of Derivatives. Our convertible notes contained conversion options at a significant premium that were deemed to be embedded derivatives that are required to be bifurcated and accounted for separately from the convertible note. We remeasure the derivative liability to fair value at each reporting date, and we recognize changes in the fair value of the derivative liabilities in our statements of operations.

Results of Operations

Comparison of the Three Months Ended March 31, 2018 and 2019

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31, 2018 (in thousands)</th>
<th>Three Months Ended March 31, 2019 (in thousands)</th>
<th>Change (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$ -</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Operating expenses:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>1,224</td>
<td>6,967</td>
<td>5,743</td>
</tr>
<tr>
<td>General and administrative</td>
<td>236</td>
<td>4,606</td>
<td>4,370</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>1,460</td>
<td>11,573</td>
<td>10,113</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(1,460)</td>
<td>(11,573)</td>
<td>(10,113)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(948)</td>
<td>(432)</td>
<td>516</td>
</tr>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$ (2,408)</td>
<td>$ (12,005)</td>
<td>$ (9,597)</td>
</tr>
</tbody>
</table>
### Research and Development Expenses

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31,</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
<td>2019</td>
<td>Change</td>
<td></td>
</tr>
<tr>
<td>(in thousands)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Direct research and development expenses:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia clinical studies</td>
<td>$556</td>
<td>$4,798</td>
<td>$4,242</td>
<td></td>
</tr>
<tr>
<td>Formulation and CMC</td>
<td>153</td>
<td>590</td>
<td>437</td>
<td></td>
</tr>
<tr>
<td>Preclinical</td>
<td>142</td>
<td>791</td>
<td>649</td>
<td></td>
</tr>
<tr>
<td><strong>Unallocated expenses:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel related (including stock-based compensation)</td>
<td>225</td>
<td>421</td>
<td>196</td>
<td></td>
</tr>
<tr>
<td>Consultant fees and other expenses</td>
<td>148</td>
<td>367</td>
<td>219</td>
<td></td>
</tr>
<tr>
<td><strong>Total research and development expense</strong></td>
<td>$1,224</td>
<td>$6,967</td>
<td>$5,743</td>
<td></td>
</tr>
</tbody>
</table>

Expenses related to our schizophrenia clinical trials increased by $4.2 million due to the initiation and commencement of enrollment of our Phase 2 clinical trial. Formulation and CMC expenses increased by $0.4 million due to an increase in formulation development activities. Preclinical expenses increased by $0.6 million due to the timing of toxicology studies. The increase of $0.2 million in personnel-related costs was primarily a result of an increase in headcount. The increase of $0.2 million in consultant fees and other expenses was due to a combination of increase in consulting activities as well as costs associated with our discovery programs.

### General and Administrative Expenses

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31,</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
<td>2019</td>
<td>Change</td>
<td></td>
</tr>
<tr>
<td>(in thousands)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Person-related (including stock-based compensation)</td>
<td>$76</td>
<td>$3,727</td>
<td>$3,651</td>
<td></td>
</tr>
<tr>
<td>Professional and consultant fees</td>
<td>118</td>
<td>514</td>
<td>396</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>42</td>
<td>365</td>
<td>323</td>
<td></td>
</tr>
<tr>
<td><strong>Total general and administrative expense</strong></td>
<td>$236</td>
<td>$4,606</td>
<td>$4,370</td>
<td></td>
</tr>
</tbody>
</table>

The increase of $3.7 million in personnel-related costs was primarily the result of an increase in stock-based compensation expense of $3.0 million, as well as an increase in headcount. The increase of $0.4 million in professional and consultant fees was primarily due to an increase in audit fees and legal costs related to our ongoing business activities and preparations to operate as a public company. The increase of $0.3 million in other costs was primarily due to data management services and our facility lease in Boston, Massachusetts.

### Other Income (Expense), Net

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31,</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2018</td>
<td>2019</td>
<td>Change</td>
<td></td>
</tr>
<tr>
<td>(in thousands)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest (expense) income</td>
<td>$(281)</td>
<td>$11</td>
<td>$292</td>
<td></td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
<td>115</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>$(587)</td>
<td>$(423)</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>$(80)</td>
<td>$(135)</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td><strong>Total other income (expense), net</strong></td>
<td>$(948)</td>
<td>$(432)</td>
<td>$(516)</td>
<td></td>
</tr>
</tbody>
</table>
The decrease in other income (expense), net was primarily attributable to non-cash expenses associated with our convertible notes. Interest (expense) income improved by $0.3 million as a result of the lower balance of convertible notes outstanding in 2019 as well as the forgiveness of interest of certain convertible notes upon their conversion as contractually agreed upon. Interest income was attributable to interest earned on our short-term investments. The decrease of $0.2 million in the accretion of debt discount was attributable to the lower balance of convertible notes outstanding in 2019.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2018

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31,</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Revenue</td>
<td>$ -</td>
<td>$ -</td>
</tr>
<tr>
<td>Operating expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>3,616</td>
<td>11,536</td>
</tr>
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<td>2,974</td>
</tr>
<tr>
<td>Total operating expenses</td>
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<td>14,510</td>
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<td>Loss from operations</td>
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<td>(14,510)</td>
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<td>(3,002)</td>
</tr>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$(6,032)</td>
<td>$(17,512)</td>
</tr>
</tbody>
</table>

Research and Development Expenses

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31,</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Direct research and development expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia clinical trials</td>
<td>$1,138</td>
<td>$8,160</td>
</tr>
<tr>
<td>Formulation and CMC</td>
<td>510</td>
<td>1,130</td>
</tr>
<tr>
<td>Preclinical</td>
<td>731</td>
<td>540</td>
</tr>
<tr>
<td>Unallocated expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel related (including stock-based compensation)</td>
<td>505</td>
<td>947</td>
</tr>
<tr>
<td>Consultant fees and other expenses</td>
<td>732</td>
<td>759</td>
</tr>
<tr>
<td>Total research and development expense</td>
<td>$3,616</td>
<td>$11,536</td>
</tr>
</tbody>
</table>

Expenses related to our schizophrenia clinical trials increased by $7.0 million due to the initiation and enrollment of our Phase 2 clinical trial. Formulation and CMC expenses increased by $0.6 million due to production of clinical trial materials used in our clinical trials and oral formulation development activities. Preclinical expenses decreased by $0.2 million due to the timing of toxicology studies. The increase of $0.4 million in personnel-related costs was primarily a result of an increase in headcount for preclinical and discovery work, in addition to recognizing full year costs for employees that were hired in 2017.
**General and Administrative Expenses**

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31,</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017 (in thousands)</td>
<td>2018</td>
</tr>
<tr>
<td>Personnel-related (including stock-based compensation)</td>
<td>$425</td>
<td>$1,564</td>
</tr>
<tr>
<td>Professional and consultant fees</td>
<td>585</td>
<td>999</td>
</tr>
<tr>
<td>Other</td>
<td>180</td>
<td>411</td>
</tr>
<tr>
<td><strong>Total general and administrative expense</strong></td>
<td><strong>$1,190</strong></td>
<td><strong>$2,974</strong></td>
</tr>
</tbody>
</table>

The increase of $1.1 million in personnel-related costs was primarily the result of an increase in headcount. The increase of $0.4 million in professional and consultant fees was primarily due to an increase in audit fees and legal costs related to our ongoing business activities and preparations to operate as a public company. The increase of $0.2 million in other costs was primarily due to data management services and our facility lease in Boston, Massachusetts.

**Other Income (Expense), Net**

|                                | Year Ended December 31, | Change |
|                                | 2017 (in thousands) | 2018 |        |
| Interest expense                | $ (555) | $(407) | $ 148 |
| Interest income                 | - | 25 | 25 |
| Accretion of debt discount      | (616) | (2,176) | (1,560) |
| Change in fair value of derivative | (55) | (444) | (389) |
| **Total other income (expense), net** | **$ (1,226)** | **$ (3,002)** | **$ (1,776)** |

The increase in other expense, net was primarily attributable to non-cash expenses associated with our convertible notes. Interest expense decreased by $0.1 million as a result of the forgiveness of interest on certain convertible notes upon their conversion, as contractually agreed upon, which was partially offset by additional interest accrued while the convertible notes were outstanding. The increase of $1.6 million in the accretion of debt discount and increase of $0.4 million in the change in fair value of derivative were primarily due to the settlement of the derivative liabilities and the conversion of the outstanding convertible notes into shares of our Series A redeemable convertible preferred stock in conjunction with our Series A redeemable convertible preferred stock financing on August 1, 2018. Interest income was attributable to interest earned on our short-term investments.

**Income Taxes**

We have not recorded any income tax benefits for the net losses we incurred or for the research and development tax credits we generated during the years ended December 31, 2017 and 2018 as we believed, based upon the weight of available evidence, that it was more likely than not that all of the net operating loss carryforwards and tax credits will not be realized. At December 31, 2018, we had federal net operating loss carryforwards totaling $23.0 million, of which $9.7 million begin to expire in 2029 and $13.3 million can be carried forward indefinitely. At December 31, 2018, we had state net operating loss carryforwards totaling $22.9 million which begin to expire in 2029. The federal and state operating loss carryforwards may be available to offset future income tax liabilities. As of December 31, 2018, we also had federal and state research and development tax credit carryforwards of $0.5 million and less than $0.1 million, respectively, which begin to expire in 2038 and 2033, respectively. Through December 31, 2018, we had recorded a full valuation allowance against our net deferred tax assets at each balance sheet date.
We filed federal and state taxes as part of a controlled group with PureTech Health LLC, or PureTech Health, a related party, until the closing of our Series A financing in August 2018. Following the financing, we no longer met the requirements to be included in the controlled group filing, as PureTech Health no longer held 80% of our outstanding voting securities, thereby requiring us to file a separate U.S. federal income tax return for the period beginning on that date going forward. We are still required to file tax returns on a combined basis with PureTech Health in certain state jurisdictions.

While we did not record any deferred tax assets for research and development tax credits for from our inception through August 1, 2018, at which time we exited the controlled group, we believe that some of our activities during that period qualify for the credit. We may recognize these deferred tax assets at the point when PureTech Health completes a formal study and allocates the tax credits to us.

**Liquidity and Capital Resources**

Since our inception, we have incurred significant operating losses. We have not yet commercialized any of our product candidates and we do not expect to generate revenue from sales of any product candidates for several years, if at all. To date, we have funded our operations primarily with proceeds from the sale of redeemable convertible preferred stock and issuance of convertible notes. Through March 31, 2019, our operations have been financed by gross proceeds of $24.1 million from the issuance of convertible notes and $91.0 million from the sale of shares of our redeemable convertible preferred stock. As of March 31, 2019, we had $84.3 million in cash, cash equivalents and short-term investments, and an accumulated deficit of $43.6 million. In April 2019, we received $1.6 million from the issuance of convertible notes, which were subsequently converted into 137,743 shares of our Series B redeemable convertible preferred stock.

Our primary use of cash has been to fund operating expenses, which consist of research and development and general and administrative expenditures. Cash used to fund operating expenses is impacted by the timing of when we pay these expenses, as reflected in the change in our outstanding accounts payable and accrued expenses.

**Cash Flows**

The following table summarizes our sources and uses of cash for each of the periods presented:

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31</th>
<th>Three Months Ended March 31</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Net cash used in operating activities</td>
<td>$(4,027)</td>
<td>$(15,377)</td>
</tr>
<tr>
<td>Net cash used in investing activities</td>
<td>(13)</td>
<td>(5,115)</td>
</tr>
<tr>
<td>Net cash provided by financing activities</td>
<td>4,250</td>
<td>27,577</td>
</tr>
<tr>
<td>Net increase in cash, cash equivalents and restricted cash</td>
<td>$210</td>
<td>$7,085</td>
</tr>
</tbody>
</table>

**Cash Flows from Operating Activities**

Cash used in operating activities for the three months ended March 31, 2018 was $0.7 million, consisting of a net loss of $2.4 million partially offset by noncash items, including the accretion of debt discount related to the convertible notes of $0.6 million, non-cash interest expense of $0.3 million, stock-based compensation expense of $0.1 million and $0.1 million resulting from the change in fair value of the convertible note derivative liabilities. The change in our net operating assets and liabilities was due primarily to an increase in accounts payable of $0.9 million primarily due to payment timing, which was partially offset by a decrease in accrued expenses of $0.2 million.

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Cash used in operating activities for the three months ended March 31, 2019 was $6.1 million, consisting of a net loss of $12.0 million partially offset by noncash items, including stock-based compensation expense of $3.1 million, the accretion of debt discount related to the convertible notes of $0.4 million, and $0.1 million resulting from the change in fair value of the convertible note derivative liabilities. The change in our net operating assets and liabilities was due primarily to an decrease of $1.5 million in prepaid expenses primarily due to timing of invoice payments related to our Phase 2 clinical trial and an increase in accounts payable of $0.6 million primarily driven by timing of payments to CROs and CMOs, and $0.1 million related to an increase in deferred lease obligation.

Cash used in operating activities for the year ended December 31, 2017 was $4.0 million, consisting of a net loss of $6.0 million partially offset by noncash items, including the accretion of debt discount related to the convertible notes of $0.6 million, non-cash interest expense of $0.2 million, stock-based compensation expense of $0.1 million and $0.1 million resulting from the change in fair value of the convertible note derivative liabilities. The change in our net operating assets and liabilities was due primarily to an increase in accounts payable of $0.5 million and an increase in accrued expense of $0.2 million, both primarily due to payment timing, which was partially offset by an increase in prepaid expenses of $0.2 million due to timing of payment of general and administrative expenses.

Cash used in operating activities for the year ended December 31, 2018 was $15.4 million, consisting of a net loss of $17.5 million partially offset by noncash items, including the accretion of debt discount related to the convertible notes of $2.2 million, stock-based compensation expense of $1.0 million, $0.4 million resulting from the change in fair value of the convertible note derivative liabilities and non-cash interest expense of $0.4 million. The cash used in our net operating assets and liabilities was due primarily to an increase in prepaid expenses of $1.5 million as a result of increased clinical activities and a decrease in accounts payable of $0.5 million primarily due to payment timing, which was partially offset by an increase in accrued expenses of $0.1 million due to timing of payment of general and administrative expenses and an increase in deferred lease obligation of $0.1 million.

Cash Flows from Investing Activities

During the three months ended March 31, 2018, there was no cash flow from investing activities.

Cash provided from investing activities for the three months ended March 31, 2019 was $5.0 million, attributable to the maturity of short-term investments during the period.

Cash used in investing activities for the year ended December 31, 2017 was less than $0.1 million, attributable to the purchases of property and equipment.

Cash used in investing activities for the year ended December 31, 2018 was approximately $5.1 million and consisted of $5.0 million for the purchases of short-term investments with a duration of under one year, and $0.1 million for the purchase of property and equipment.

Cash Flows from Financing Activities

Cash provided by financing activities for the three months ended March 31, 2018 was $3.0 million and was related to the proceeds from the issuance of convertible notes.

Cash provided by financing activities for the three months ended March 31, 2019 was $76.5 million and was related primarily to the $75.0 million of proceeds from the issuance of redeemable convertible preferred stock as well as $1.6 million related to proceeds from the issuance of convertible notes.
Cash provided by financing activities for the year ended December 31, 2017 was $4.3 million and was related to the proceeds from the issuance of convertible notes.

Cash provided by financing activities for the year ended December 31, 2018 was $27.6 million and was related to the $15.9 million of proceeds from the issuance of redeemable convertible preferred stock, net of issuance costs and $11.7 million of proceeds from the issuance of convertible notes.

Future Funding Requirements

We expect our expenses to increase substantially in connection with our ongoing activities, in particular as we continue to advance our product candidates through clinical trials. In addition, upon the completion of this offering, we expect to incur additional costs associated with operating as a public company.

As of March 31, 2019, we had cash and cash equivalents of $84.3 million. Based on our current plans, we believe that our existing cash, cash equivalents and short-term investments, as well as the April 2019 proceeds of $1.6 million from the issuance of convertible notes, together with the net proceeds from this offering, will be sufficient to meet our anticipated operating and capital expenditure requirements for at least the next 18 months.

We have based this estimate on assumptions that may prove to be wrong, and we could utilize our available capital resources sooner than we currently expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of pharmaceutical product candidates, we are unable to estimate the exact amount of our working capital requirements. Our future funding requirements will depend on and could increase significantly as a result of many factors, including:

- the scope, progress, results and costs of researching and developing KarXT for our current and future indications as well as other product candidates we may develop;
- the timing of, and the costs involved in, obtaining marketing approvals for KarXT for our current and future indications as well as future product candidates we may develop and pursue;
- the number of future indications and product candidates that we pursue and their development requirements;
- if approved, the costs of commercialization activities for KarXT for the approved indication, or any other product candidate that receives regulatory approval to the extent such costs are not the responsibility of any future collaborators, including the costs and timing of establishing product sales, marketing, distribution and manufacturing capabilities;
- subject to receipt of regulatory approval, revenue, if any, received from commercial sales of KarXT for any program or revenues received from any future product candidates;
- the extent to which we in-license or acquire rights to other products, product candidates or technologies;
- our headcount growth and associated costs as we expand our research and development and establish a commercial infrastructure;
- the costs of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights including enforcing and defending intellectual property related claims; and
- the costs of operating as a public company.
A change in the outcome of any of these or other variables with respect to the development of any of our product candidates could significantly change the costs and timing associated with the development of that product candidate. Further, our operating plans may change in the future, and we may need additional funds to meet operational needs and capital requirements associated with such operating plans.

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our operations through a combination of equity financings, debt financings, collaborations with other companies or other strategic transactions. We do not currently have any committed external source of funds. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making acquisitions or capital expenditures or declaring dividends. If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings or other arrangements when needed, we may be required to delay, limit, reduce or terminate our research, product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Further, our operating plans may change, and we may need additional funds to meet operational needs and capital requirements for clinical trials and other research and development activities. We currently have no credit facility or committed sources of capital. Because of the numerous risks and uncertainties associated with the development and commercialization of our product candidates, we are unable to estimate the amounts of increased capital outlays and operating expenditures associated with our current and anticipated product development programs.

### Contractual Obligations and Other Commitments

The following table summarizes our outstanding contractual obligations as of payment due date by period at December 31, 2018.

<table>
<thead>
<tr>
<th>Payments Due by Period</th>
<th>Total</th>
<th>Less Than 1 Year (in thousands)</th>
<th>1 to 3 Years</th>
<th>3 to 5 Years</th>
<th>More than 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating lease commitments(1)</td>
<td>$1,940</td>
<td>$335</td>
<td>$1,006</td>
<td>$599</td>
<td>$-</td>
</tr>
<tr>
<td>Total</td>
<td>$1,940</td>
<td>$335</td>
<td>$1,006</td>
<td>$599</td>
<td>$-</td>
</tr>
</tbody>
</table>

(1) Reflects payments due for our lease of office space in Boston, Massachusetts under an operating lease agreement that expires in February 2023.

We enter into contracts in the normal course of business with CROs, CMOs and other third parties for clinical trials, preclinical research studies and testing and manufacturing services. These contracts are cancelable by us upon prior written notice. Payments due upon cancellation consist only of payments for services provided or expenses incurred, including noncancelable obligations of our service providers, up to the date of cancellation. These payments are not included in the preceding table as the amount and timing of such payments are not known.
We are also party to certain license and collaboration agreements with PureTech Health and Eli Lilly and Company. We have not included future payments under these agreements in the table of contractual obligations above since obligations under these agreements are contingent upon future events such as our achievement of specified development, regulatory and commercial milestones, or royalties on net product sales. As of December 31, 2018, we were unable to estimate the timing or likelihood of achieving these milestones or generating future product sales.

Critical Accounting Policies and Estimates

Our management’s discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with United States generally accepted accounting principles, or U.S. GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in Note 2 to our financial statements appearing elsewhere in this prospectus, we believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management’s judgments and estimates.

Research and Development Contract Costs and Accruals

As part of the process of preparing our financial statements, we are required to estimate our accrued research and development expenses. We accrue for estimated costs of research and development activities conducted by third-party service providers, which include the conduct of preclinical studies and clinical trials, and contract manufacturing activities. We record the estimated costs of research and development activities based upon the estimated amount of services provided and include these costs in accrued liabilities in the balance sheets and within research and development expense in the statements of operations. When evaluating the adequacy of the accrued liabilities, we analyze progress of the research studies or clinical trials and manufacturing activities, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates may be made in determining the accrued balances at the end of any reporting period. Actual results could differ from our estimates. Our historical accrual estimates have not been materially different from the actual costs.

Convertible Notes and Derivative Liabilities

From February 4, 2011 through December 31, 2018, we issued convertible notes, which we refer to as the Convertible Notes, totaling $14.0 million in principal value. Of this aggregate principal amount, convertible notes in the aggregate principal amount of $13.5 million were issued to PureTech Health.

On July 31, 2015, we entered into a Company Funding Agreement with The Wellcome Trust LLC, or Wellcome Trust, under which we were eligible to receive up to $3.8 million in gross proceeds, which we refer to as the 2015 Wellcome Trust Note. In June 2018, we entered into a second Company Funding Agreement with Wellcome Trust, under which we are eligible to receive up to $8.0 million in gross proceeds, which we refer to as the 2018 Wellcome Trust Note. The 2015 Wellcome Trust Note
and 2018 Wellcome Trust Note are together referred to as the Wellcome Trust Notes, as described in more detail in Note 5 to our financial statements appearing at the end of this prospectus.

The Wellcome Trust Notes and the Convertible Notes contain conversion options at a significant discount that we determined to be embedded derivatives, which were recorded as liabilities on our balance sheet and are remeasured to fair value at each reporting date until each derivative is settled. Changes in the fair value of the derivative liabilities are recognized as change in fair value of derivative in the statement of operations. The fair value of the derivative liabilities is determined at each period by assessing the likelihood and timing of events that would result in either a conversion or change-of-control feature being triggered, as well as changes in market conditions.

Upon issuance of the Wellcome Trust Notes and the Convertible Notes, each note was recorded at cost, net of the derivative liability. The discount on the note, if any, was amortized as interest expense to the date the note was expected to convert using the effective interest rate method and is reflected in the statements of operations as accretion of debt discount.

We classify our derivative liabilities in our balance sheet as current or non-current based on our expectation of when the derivative will be settled, consistent with the assumptions used when determining the fair value of the derivative liabilities.

**Determination of Fair Value of Common Stock**

As there has been no public market for our equity instruments to date, the estimated fair value of our common stock has been determined by our board of directors as of the grant date, with input from management, considering our most recently available third-party valuations of common stock and our board of directors’ assessment of additional objective and subjective factors that it believed were relevant and which may have changed from the date of the most recent valuation through the date of the grant. These third-party valuations were performed in accordance with the guidance outlined in the American Institute of Certified Public Accountants’ Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation, or the Practice Aid. Our common stock valuations were prepared using either a Discounted Cash Flow Analysis, or DCF, an option-pricing method, or OPM, or a probability-weighted expected return method, or PWERM, which use a combination of market approaches and an income approach to estimate our enterprise value. The DCF is based on management’s projection of future revenues and costs. The future cash flows are adjusted for the cost of capital and clinical risk of the program to arrive at a risk-adjusted present-day value of the future cash flows and fair value of equity. The OPM treats common securities and preferred securities as call options on our total equity value, with exercise prices based on the value thresholds at which the allocation among the various holders of our securities changes. Under this method, the common and preferred stock have value only if the funds available for distribution to members are expected to exceed the value of the preferred security liquidation preference at the time of the liquidity event, such as a strategic sale or a merger. The PWERM is a scenario-based methodology that estimates the fair value of common and preferred stock based upon an analysis of future values for the company, assuming various outcomes. The common and preferred stock values are based on the probability-weighted present value of expected future investment returns considering each of the possible outcomes available as well as the rights of each class of common and preferred securities.

We performed common stock valuations, with the assistance of an independent third-party valuation specialist, as of December 31, 2017, August 2, 2018, March 15, 2019 and May 16, 2019, which resulted in valuations of our common stock of $9.14, $9.44, $11.95 and $14.25 per share, respectively. In conducting the valuations, the independent third-party valuation specialist considered all objective and subjective factors that it believed to be relevant for each valuation conducted in accordance with the Practice Aid,
including our best estimate of our business condition, prospects and operating performance at each valuation date. Other significant factors included:

- the prices of our redeemable convertible preferred stock sold to outside investors in arm’s length transactions, and the rights, preferences and privileges of our preferred stock as compared to those of our common stock, including the liquidation preferences of our preferred stock;
- the progress of our research and development programs, including the status of preclinical studies and clinical trials for our product candidates;
- the valuation of publicly traded companies in the life sciences and biotechnology sectors, as well as recently completed mergers and acquisitions of guideline companies;
- our results of operations, including cash on hand, and our historical and forecasted performance and operating results;
- the lack of liquidity of our common stock and redeemable convertible preferred stock;
- any external market conditions affecting the life sciences and biotechnology industry sectors;
- the likelihood of achieving a liquidity event for the holders of our common stock and stock options, such as an initial public offering, or IPO, or a sale of our company, given prevailing market conditions; and
- the state of the IPO market for similarly situated privately held life sciences companies.

The dates of our contemporaneous valuations have not always coincided with the dates of our stock option grants. In determining the exercise prices of the stock options set forth in the table above, our board of directors considered, among other things, the most recent valuation of our common stock and their assessment of additional objective and subjective factors that were relevant as of the grant dates. The additional factors considered when determining whether any changes in the fair value of our common stock had occurred between the most recent valuation and the grant dates included our stage of research and development, our operating and financial performance and current business conditions.

The estimates of fair value of our common stock are highly complex and subjective. There are significant judgments and estimates inherent in the determination of the fair value of our common stock. These judgments and estimates include assumptions regarding our future operating performance, the time to completing an IPO or other liquidity event, the related valuations associated with these events, and the determinations of the appropriate valuation methods at each valuation date. The assumptions underlying these valuations represent management’s best estimates, which involve inherent uncertainties and the application of management judgment. If we had made different assumptions, our stock-based compensation expense, net loss and net loss per share applicable to common stockholders could have been materially different.

For valuations after the completion of this offering, our board of directors will determine the fair value of each share of underlying common stock based on the closing price of our common stock as reported on the Nasdaq Global Market on the date of grant.

Stock-Based Compensation Expense

We measure all stock options and other stock-based awards based at the fair value on the date of the grant using the Black-Scholes option-pricing model and recognize compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. We have primarily issued stock options with service-based vesting conditions and we record
the expense for these awards using the straight-line method. We have also issued stock options with performance-based vesting conditions and record the expense for these awards at the time that the achievement of the performance becomes highly probable or complete.

The Black-Scholes option pricing model requires the input of certain subjective assumptions, including (i) the expected share price volatility, (ii) the calculation of expected term of the award, (iii) the risk-free interest rate and (iv) the expected dividend yield. Due to the lack of a public market for the trading of our common stock and a lack of company-specific historical and implied volatility data, we have based our estimate of expected volatility on the historical volatility of a group of similar companies that are publicly traded. The historical volatility is calculated based on a period of time commensurate with the expected term assumption. The group of representative companies has characteristics similar to us, including stage of product development and focus on the life science industry. We use the simplified method, which is the average of the final vesting tranche date and the contractual term, to calculate the expected term for options granted as we do not have sufficient historical exercise data to provide a reasonable basis upon which to estimate the expected term. The risk-free interest rate is based on a treasury instrument whose term is consistent with the expected term of the stock options. We use an assumed dividend yield of zero as we have never paid dividends and have no current plans to pay any dividends on our common stock.

We do not estimate and apply a forfeiture rate as we have elected to account for forfeitures as they occur.

Grant of Stock-Based Awards

The following table sets forth by grant date the number of shares subject to options and restricted stock units granted since January 1, 2018, the per share exercise price of the options, the fair value of common stock per share on each grant date, and the per share estimated fair value of the award:

<table>
<thead>
<tr>
<th>Grant Date</th>
<th>Type of Award</th>
<th>Number of Shares</th>
<th>Purchase or Exercise Price Per Share</th>
<th>Current Estimate of Common Stock Fair Value per Share on Grant Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/9/2018</td>
<td>Options</td>
<td>744,140</td>
<td>$9.44</td>
<td>$9.44</td>
</tr>
<tr>
<td>9/18/2018</td>
<td>Options</td>
<td>37,774</td>
<td>$9.44</td>
<td>$9.44</td>
</tr>
<tr>
<td>10/1/2018</td>
<td>Options</td>
<td>49,579</td>
<td>$9.44</td>
<td>$9.44</td>
</tr>
<tr>
<td>3/21/2019</td>
<td>Options</td>
<td>1,116,318</td>
<td>$11.95</td>
<td>$11.95</td>
</tr>
<tr>
<td>3/29/2019</td>
<td>Options</td>
<td>78,467</td>
<td>$11.95</td>
<td>$11.95</td>
</tr>
<tr>
<td>4/8/2019</td>
<td>Options</td>
<td>13,637</td>
<td>$11.95</td>
<td>$11.95</td>
</tr>
<tr>
<td>5/16/2019</td>
<td>RSU</td>
<td>80,976</td>
<td>—</td>
<td>$14.25</td>
</tr>
</tbody>
</table>

Off-Balance Sheet Arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined in the rules and regulations of the Securities and Exchange Commission.

Quantitative and Qualitative Disclosures about Market Risk

We are exposed to market risk related to changes in interest rates. Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates, particularly because our cash equivalents and short-term investments are primarily invested in
short-term U.S. Treasuries. However, because of the short-term nature of the investments in our portfolio, an immediate one percentage point change in market interest rates would not have a material impact on the fair market value of our investment portfolio or on our financial position or results of operations.

We are not currently exposed to significant market risk related to changes in foreign currency exchange rates; however, we have contracted with and may continue to contract with vendors that are located outside of the United States. As a result, our operations may be subject to fluctuations in foreign currency exchange rates in the future.

Inflation generally affects us by increasing our cost of labor. We do not believe that inflation had a material effect on our business, financial condition or results of operations during the years ended December 31, 2017 and 2018.

JOBS Act Accounting Election

We are an “emerging growth company,” as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. Under the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. Other exemptions and reduced reporting requirements under the JOBS Act for emerging growth companies include presentation of only two years audited financial statements in a registration statement for an initial public offering, an exemption from the requirement to provide an auditor’s report on internal controls over financial reporting pursuant to the Sarbanes-Oxley Act of 2012, an exemption from any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation, and less extensive disclosure about our executive compensation arrangements. We have elected to use the extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date that (i) we are no longer an emerging growth company or (ii) we affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our financial statements may not be comparable to companies that comply with the new or revised accounting pronouncements as of public company effective dates.

We are also evaluating the benefits of relying on other exemptions and reduced reporting requirements under the JOBS Act. Subject to certain conditions, as an emerging growth company, we may rely on certain of these exemptions, including without limitation, providing an auditor’s attestation report on our system of internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act. We would cease to be an emerging growth company upon the earliest of: (1) the last day of the fiscal year ending after the fifth anniversary of our initial public offering; (2) the last day of the fiscal year in which we have more than $1.07 billion in annual revenue; (3) the last day of the fiscal year in which we qualify as a “large accelerated filer,” with at least $700.0 million of equity securities held by non-affiliates as of the prior June 30th; or (4) the issuance, in any three-year period, by our company of more than $1.0 billion in non-convertible debt securities held by non-affiliates.

Recently Issued and Adopted Accounting Pronouncements

A description of recently issued accounting pronouncements that may potentially impact our financial position and results of operations is disclosed in Note 2 to our financial statements appearing elsewhere in this prospectus.
BUSINESS

Overview

We are an innovative clinical-stage biopharmaceutical company primarily focused on developing novel therapies to address disabling neuropsychiatric conditions characterized by significant unmet medical need. Our pipeline is built on the broad therapeutic potential of our lead product candidate, KarXT, an oral modulator of muscarinic receptors that are located both in the central nervous system, or CNS, and various peripheral tissues. KarXT is our proprietary product candidate that combines xanomeline, a novel muscarinic agonist, with trospium, an approved muscarinic antagonist, to preferentially stimulate muscarinic receptors in the CNS. We are currently conducting a Phase 2 clinical trial of KarXT for the treatment of acute psychosis in patients with schizophrenia and expect topline results in late 2019. We also plan to initiate clinical trials of KarXT to evaluate its potential therapeutic benefit in other CNS disorders, including psychosis in Alzheimer’s disease, or AD, as well as pain. We have assembled a team whose members have extensive expertise in the research, development and commercialization of numerous CNS agents, as well as deep familiarity with the biology of neuropsychiatric disorders, such as schizophrenia and AD, including the role of muscarinic receptors in potential treatment of these diseases. We plan to leverage this expertise to develop a pipeline of product candidates targeting a broad range of psychiatric and neurological conditions.

Psychosis is a prominent and debilitating symptom that occurs in many neuropsychiatric disorders, including schizophrenia, AD, bipolar disorder, Parkinson’s disease, major depressive disorder and inflammatory neurological diseases, such as multiple sclerosis. Patients with schizophrenia experience psychotic symptoms, also known as positive symptoms, such as hallucinations and delusions. Schizophrenia is a chronic disabling disorder that is typically diagnosed in the late teenage years or early adulthood and is characterized by recurring episodes of psychosis requiring long-term treatment with antipsychotic drugs in most patients. The World Health Organization ranks psychosis as the third-most disabling medical condition in the world. In 2017, an estimated 2.7 million Americans, or approximately 0.5% to 1.0% of the United States population, had schizophrenia. Additionally, up to 50% of the estimated 5.7 million patients with AD in the United States experience psychosis at some point during the course of their disease, which often leads to institutional care in a hospital or nursing home.

Worldwide sales of antipsychotic drugs exceeded $11 billion in 2015 and are expected to exceed $14 billion by 2025, despite a highly generic market. Several branded market-leading antipsychotic medicines have each achieved worldwide annual sales in excess of $5 billion. Despite the large number of antipsychotic drugs developed over the last 20 years, current medicines have undergone only modest innovation relative to first generation drugs developed in the 1950s. In many patients, current antipsychotics are hampered by modest efficacy and significant side effects. At least half of patients fail to adequately respond to antipsychotic drugs. Additionally, in many patients, these treatments are associated with severe side effects including sedation, extrapyramidal side effects, such as motor rigidity, tremors and slurred speech, and significant weight gain resulting in the complications of diabetes, hyperlipidemia, hypertension and cardiovascular disease. The clinical benefit of current antipsychotics is further limited by poor adherence. In a 1,493-patient clinical trial funded by the National Institutes of Health, approximately 75% of patients reported discontinuing their antipsychotic medication within 18 months of starting treatment.

Current antipsychotic treatments work primarily by inhibiting D2 dopamine receptors and are often used by physicians to address a wide range of disorders in addition to schizophrenia, including bipolar disorder and psychotic depression, as well as psychosis and agitation in elderly patients with dementia. Muscarinic receptor agonists emerged in the 1990s as a potential alternative approach for
treating psychosis. There are five distinct muscarinic receptors, M1 through M5, which are found in the brain as well as various peripheral tissues. The link between muscarinic receptor stimulation in the CNS, particularly stimulation of M1 and M4 receptors, and the reduction of psychotic symptoms and cognitive impairment, has been well studied and is supported by data from preclinical studies and two third-party clinical trials published in peer reviewed journals. However, the successful development of a therapeutic agent targeting muscarinic receptors has been limited by undesirable side effects that are believed to arise primarily as a result of stimulation of muscarinic receptors in peripheral tissues. We believe a therapeutic agent that can preferentially target and stimulate muscarinic receptors in the CNS, but not in peripheral tissues, has the potential to treat psychosis in schizophrenia and AD, including the associated agitation in patients with AD. We also believe the preferential stimulation of M1 and M4 muscarinic receptors in the CNS may address the negative symptoms of schizophrenia, such as apathy, reduced social drive and loss of motivation, as well as cognitive deficits in working memory and attention, all of which currently lack any approved treatments. This approach has the potential to produce a differentiated therapy relative to current D2 dopamine receptor-based antipsychotic drugs and to beneficially impact the lives of millions of patients with schizophrenia and other psychotic and cognitive disorders.

We are initially developing our lead product candidate, KarXT, for the treatment of acute psychosis in patients with schizophrenia. KarXT combines xanomeline, a muscarinic receptor agonist that preferentially stimulates M1 and M4 muscarinic receptors, and trospium, an approved muscarinic receptor antagonist that does not measurably cross the blood-brain barrier, confining its effects to peripheral tissues. M1 and M4 muscarinic receptors are the receptor subtypes believed to mediate the antipsychotic, procognitive and analgesic effects of xanomeline and other muscarinic agonists. Results from preclinical studies and clinical trials conducted by third parties support the hypothesis that xanomeline can reduce psychosis and improve cognition. Like all muscarinic receptor agonists studied to date, however, xanomeline’s tolerability has been limited by side effects arising from muscarinic receptor stimulation in peripheral tissues, leading to nausea, vomiting, diarrhea and increased salivation and sweating, collectively referred to as cholinergic adverse events. Trospium is a muscarinic receptor antagonist approved in the United States and Europe for the treatment of overactive bladder that inhibits all five muscarinic receptor subtypes in peripheral tissues. We believe that a combination therapy of xanomeline and trospium has the potential to preferentially stimulate M1 and M4 muscarinic receptors in the brain without stimulating muscarinic receptors in peripheral tissues in order to achieve meaningful therapeutic benefit in patients with psychotic and cognitive disorders.

In our initial Phase 1 clinical trial, we observed that in healthy volunteers the combination of xanomeline and trospium was associated with 46% fewer cholinergic adverse events as compared to xanomeline administered with placebo. Additionally, we have completed a randomized, double-blind, placebo-controlled multiple ascending dose Phase 1 clinical trial in healthy volunteers, in which we examined various doses of our proprietary KarXT co-formulation and determined the dosing to be further examined in our ongoing Phase 2 clinical trial. Our ongoing Phase 2 clinical trial is designed to assess the safety and efficacy of KarXT in patients with schizophrenia experiencing acute psychosis and we expect preliminary results from this trial by the end of 2019. Based on our clinical data with KarXT and third-party published clinical data with xanomeline, we believe that KarXT has the potential to have therapeutic benefit in multiple CNS disorders, including the treatment of positive, negative and cognitive symptoms of schizophrenia and psychosis, as well as agitation associated with AD and other forms of dementia. We anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT in the second half of 2019 for the treatment of psychosis in patients with AD. In addition, we believe published third-party preclinical data support the development of KarXT as a novel non-opioid therapeutic for various forms of post-operative, inflammatory and neuropathic pain. We anticipate initiating a Phase 1b clinical trial for the treatment of experimentally induced pain in the second half of 2019.
Our co-founder, Andrew Miller, Ph.D., was responsible for identifying, developing and testing the initial hypothesis supporting a combination of xanomeline and trospium. We have since assembled a team of employees and advisors who have expertise and extensive experience in developing psychiatric and neurological drugs, including several former scientists at Eli Lilly and Company, or Eli Lilly, who were actively involved in xanomeline’s initial development. Steven Paul, M.D., our Chief Executive Officer and Chairman, was formerly the Executive Vice President for Science and Technology and President of the Lilly Research Laboratories at Eli Lilly, where he helped develop the antipsychotic drug Zyprexa and the antidepressant Cymbalta. Dr. Paul was the senior author of the initial publication evaluating xanomeline’s effects in treating psychosis and agitation in patients with AD. Stephen Brannan, M.D., our Chief Medical Officer, was previously the Therapeutic Head of Neuroscience at Takeda Pharmaceutical Company Ltd. Alan Breier, M.D., our Chief Clinical Advisor and Chair of our Scientific Advisory Board, was previously Chief Medical Officer at Eli Lilly.

Pipeline

We are advancing a pipeline of therapeutic programs to address the positive, negative and cognitive symptoms associated with schizophrenia and psychosis associated with AD, as well as various forms of pain. We are leveraging our expertise and experience to explore the development of KarXT for additional CNS disorders, as well as advance other muscarinic-targeted drug candidates.

<table>
<thead>
<tr>
<th>Indication</th>
<th>Discovery</th>
<th>Preclinical</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Upcoming Milestone</th>
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<td>Topline Phase 2 data End of 2019</td>
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<td>Other Muscarinic-Targeted Drug Candidate</td>
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<td>IND-enabling studies 2020</td>
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Strategy

Our goal is to become a leading biopharmaceutical company focused on the development and commercialization of novel therapies for the treatment of CNS disorders. To achieve this, we are focused on the following key strategies:

Advance KarXT in our initial indications of psychosis in patients with schizophrenia and AD, as well as pain. We have an ongoing Phase 2 clinical trial of KarXT for the treatment of acute
psychosis in patients with schizophrenia and we expect topline results from this trial by the end of 2019. The established regulatory pathway for antipsychotic drug development in schizophrenia gives us significant historical precedent for regulatory approval requirements as well as pivotal Phase 3 clinical trial design, which is the same fundamental design as our ongoing Phase 2 clinical trial. Based on the results of our completed Phase 1 clinical trials of KarXT in healthy volunteers and the previous third-party Phase 2 clinical trial in AD, we anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT in the second half of 2019. In addition, we believe that KarXT has clinical and commercial potential in pain and we expect to commence a Phase 1b clinical trial in healthy volunteers for the treatment of experimentally induced pain in the second half of 2019.

**Apply our expertise in muscarinic receptor biology to expand into other indications for KarXT.** Our deep knowledge and expertise of muscarinic receptor biology and CNS drug development, along with data from the ongoing Phase 2 trial in schizophrenia, will guide our future development of KarXT for additional indications. Our ongoing Phase 2 clinical trial is focused on the treatment of acute psychosis, but also includes endpoints that assess the negative and cognitive symptoms of schizophrenia. Data from these endpoints will help us guide KarXT’s future development for negative and cognitive symptoms, for which there are currently no approved treatments. In addition, we believe these data, together with our insights around the novel mechanism of KarXT, will inform further exploration of KarXT as a therapeutic treatment in a broad range of disorders where stimulation of muscarinic receptors in the CNS may be beneficial, including bipolar disorder, Parkinson’s disease, major depressive disorder and inflammatory neurological diseases, such as multiple sclerosis.

**Advance the development of additional KarXT formulations.** We are developing additional formulations of KarXT that could improve its therapeutic window and increase medication adherence by reducing the dosing frequency, as well as to be further optimized for target patient populations. We believe our ongoing work on both next-generation oral and non-oral formulations of KarXT could improve patient outcomes, particularly in patients with schizophrenia and AD, where medication adherence has been problematic.

**Develop and advance our early-stage pipeline.** We have developed a series of novel compounds targeting muscarinic receptors that we are currently evaluating and optimizing for purposes of selecting additional product candidates. We believe our scientific expertise will allow us to build a pipeline of product candidates targeting muscarinic and non-muscarinic receptors for a broad range of disabling and debilitating CNS disorders through differentiated pharmacology.

**Selectively collaborate to realize the potential of our product candidates.** We have retained global commercialization rights to KarXT for all therapeutic uses. If approved, we expect to initially commercialize KarXT for schizophrenia and AD psychosis directly, using a specialized psychiatrist- and neurologist-targeted sales force in the United States. In other markets and indications, we intend to evaluate the merits of entering into development and commercialization agreements with collaborators who have local market or specialized expertise and capabilities.

**Muscarinic Receptor Biology in the Nervous System**

Neurotransmitters are chemical messengers secreted by neurons, or nerve cells, to facilitate information flow and communication with other cells, such as muscle or similar nerve cells, in both the central and peripheral nervous systems. As a result, stimulating or inhibiting neurotransmission can have a profound effect on the overall function of an organism. There are many identified neurotransmitters with a variety of structures and functions. One of the key neurotransmitters in the brain is acetylcholine, for which there are two different receptor classes: ion channel-gated nicotinic receptors, and G protein-coupled muscarinic receptors. Within the muscarinic receptor family, there are five subtypes, M1 through M5, all of which are expressed in the brain and in peripheral tissues.
Muscarinic receptors serve a number of key physiological roles including in cognitive, behavioral, sensory, motor and autonomic processes. Disruption of muscarinic receptor signaling is believed to contribute to psychosis and cognitive impairment in a wide variety of diseases, including schizophrenia and AD. Conversely, third-party preclinical and clinical data suggest that the enhancement of muscarinic receptor signaling leads to improvement in these same symptoms. M1 and M4 muscarinic receptors in particular have been reported to be under-expressed in the brains of patients with schizophrenia. In animal behavioral models, drug candidates that selectively stimulated M1 and M4 muscarinic receptors have demonstrated improvements in psychosis and cognition. Third-party clinical data suggest that stimulation of M1 and M4 muscarinic receptors may similarly be therapeutically beneficial for the treatment of patients with these symptoms. Conversely, inhibition of these receptors has been observed to disrupt memory and cognition, as well as to exacerbate psychosis in patients with schizophrenia.

Muscarinic receptors are also believed to play an important role in processing the sensation of pain. In particular, muscarinic receptors are abundant in pain centers of the brain, and the stimulation of M1, M2 and M4 muscarinic receptors has been associated with analgesia and the suppression of painful stimuli in a variety of acute, inflammatory and neuropathic animal models of pain.

The stimulation of muscarinic receptors in peripheral tissues can have significant physiological consequences. In peripheral tissues, such as the gastrointestinal and genitourinary tracts, and salivary and sweat glands, M2 and M3 muscarinic receptors are prominently expressed and have specialized functions. In the gastrointestinal tract, muscarinic receptors play a significant role in regulating gastrointestinal motility. Dosing with agonists that stimulate these muscarinic receptors can lead to diarrhea and increased motility, while dosing with muscarinic antagonists can lead to constipation and decreased motility. In the bladder, stimulation or inhibition of muscarinic receptors modulates bladder contraction leading to increases or decreases in urinary frequency, respectively. Similarly, stimulation of muscarinic receptors in salivary glands and sweat glands can lead to increased salivation and sweating, respectively.

**Background and Rationale For KarXT**

We have designed our lead product candidate, KarXT, to preferentially stimulate M1 and M4 receptors in the brain, without stimulating muscarinic receptors in peripheral tissues outside the CNS. We assessed the potential of over 7,000 possible combinations of muscarinic receptor agonists and antagonists to find an optimized combination that could preferentially stimulate muscarinic receptors in the CNS to improve the symptoms of psychosis, while avoiding stimulation of muscarinic receptors in the peripheral tissues and the associated side effects. As a result of our research, we identified xanomeline and trospium as the most promising pairing for development. Trospium is a potent and effective muscarinic receptor antagonist that does not measurably cross the blood-brain barrier, confining its effects to peripheral tissues. We believe that the combination of xanomeline, a centrally-acting muscarinic agonist, and trospium, a peripherally-acting muscarinic antagonist, will have the therapeutic benefits of xanomeline but with markedly reduced side effects. Based on our clinical data with KarXT, either co-administered or co-formulated, and clinical data of xanomeline published by third parties, we believe that KarXT has potential therapeutic benefit in multiple CNS disorders, including the treatment of the positive, negative and cognitive symptoms of schizophrenia, psychosis and agitation associated with dementia, including AD, and as a novel non-opioid therapeutic for various forms of post-operative, inflammatory and neuropathic pain.

**Xanomeline Background**

Xanomeline as a treatment for psychosis and related neuropsychiatric disorders has been examined in clinical trials enrolling over 800 subjects or patients conducted by us and third parties.
with 68 patients being dosed for at least one year and a maximum treatment duration of almost four years. We believe that the results from these clinical trials, as well as results from numerous preclinical studies, supports the further development of xanomeline, in the form of KarXT, as an antipsychotic and procognitive therapeutic agent.

**Xanomeline for the Treatment of Psychotic Symptoms and Agitation in AD**

Eli Lilly conducted a 343-patient, randomized, double-blind, placebo-controlled Phase 2 clinical trial of xanomeline in patients with mild to moderate AD, administering up to 225 mg of xanomeline daily (75 mg three times a day, or TID), for 24 weeks. In this clinical trial, 87 patients received placebo, while 85, 83 and 87 patients received 75-150-225 mg xanomeline, respectively. One patient who entered the trial was assigned a group but never received study drug or placebo. As shown in the figure below, patients on xanomeline were observed to have dose-dependent decreases in multiple psychotic symptoms and related behaviors, including hallucinations, delusions and agitation, as compared to patients on placebo. For instance, one of the 17 patients (6%) in the placebo arm who presented with hallucinations at baseline had a remission of symptoms while receiving treatment, compared to nine of the 17 patients (53%) in the high-dose xanomeline arm (p=0.003). These responses were seen as early as two to three weeks after commencement of dosing with xanomeline. Xanomeline was also observed to reduce the emergence of psychotic symptoms over the course of the six-month trial in patients who did not have psychotic symptoms at the initiation of the trial. For example, 32% of patients in the placebo arm developed delusions during the trial compared to only 7% in the high-dose xanomeline treatment arm (p=0.001). A dose-response analysis across the 75-150-225 mg xanomeline dose levels reported increasing effects of xanomeline for several symptoms (P<0.05), suggesting that exploration of xanomeline doses above 75 mg TID has the potential for additional therapeutic benefits.

**Effects of Xanomeline on Psychotic and Related Behavioral Symptoms in AD**

![Graph showing effects of xanomeline on psychotic and related behavioral symptoms in AD](image)

p-value represents the comparison of the 225 mg xanomeline arm compared to placebo and, in the case of the p-value in parenthesis, the dose-response analysis.
Effects of Xanomeline on Emergence of Psychosis and Related Behaviors in AD Over Six Months

In this same trial, cognitive symptoms of patients with AD treated with xanomeline also showed improvements compared to placebo as measured by both the ADAS-Cog and the CIBIC+, suggesting that xanomeline may also improve cognition. The Alzheimer’s Disease Assessment Scale-Cognitive Subscale, or ADAS-Cog, is one of the most frequently used tests to measure cognition while the Clinician Interview-Based Impression of Change plus caregiver interview, or CIBIC+, examines disease severity and changes in behavior, cognition and overall function on a scale of 1 to 7, where 1 means markedly improved and 7 means markedly worse. There were high rates of patient discontinuation in the mid-dose (48%) and high-dose (59%) xanomeline cohorts driven in part by side effects, compared to discontinuation rates of 35% and 19% for the placebo and low-dose xanomeline groups, respectively. This high discontinuation rate led to a substantial reduction of statistical power in this trial. Despite this reduction in statistical power, patients in the mid-dose cohort showed a statistically significant benefit on the CIBIC+ as compared to placebo (p=0.02, 4.11 vs. 4.34, respectively). An analysis of patients who completed the trial identified a mean benefit of 2.84 units on the ADAS-Cog for the 225 mg xanomeline arm over placebo (p<0.05), which is similar to the effect seen with donepezil, an approved treatment for the cognitive impairment associated with AD.

Xanomeline for the Treatment of Psychotic Symptoms in Schizophrenia

A randomized, double-blind, placebo-controlled, small Phase 2 trial of xanomeline was conducted in 20 patients with schizophrenia with acute psychosis, as a collaboration between Eli Lilly and the Indiana University School of Medicine. This monotherapy trial used the Positive and Negative Syndrome Scale, or PANSS, as a primary endpoint. The PANSS is a set of measurements used for evaluating symptom severity in patients with schizophrenia and the change in PANSS score has been used as the primary endpoint in many registrational trials of antipsychotic medicines. As depicted in the figure below, a clinically meaningful and statistically significant 24-point PANSS score difference was observed between xanomeline and placebo after 18 days of treatment, which was the pre-specified analysis time point. By comparison, meta-analyses of published clinical trials of currently approved antipsychotic medicines report an average difference of nine to ten points in PANSS score versus placebo. Historically, changes as small as five points have supported the approval of current antipsychotics. While this xanomeline trial was designed primarily to evaluate changes in positive symptoms, a six point improvement in negative symptoms, as measured by the PANSS-negative subscale, was also observed in patients treated with xanomeline as compared to placebo. Improvements in cognitive symptoms including list learning (p<0.05), story recall (p<0.01), delayed
memory ($p<0.05$) and digit span tests were also observed in patients treated with xanomeline as compared to placebo.

**Effects of Xanomeline on Psychotic Symptoms in Patients with Schizophrenia**

![Graph showing comparison between Placebo and Xanomeline](image)

**Effects of Xanomeline on Cognition in Patients with Schizophrenia**

![Bar graphs showing comparison between Placebo and Xanomeline](image)

**Limitations of Xanomeline**

Despite xanomeline’s promising therapeutic benefit in treating psychosis and related behavioral symptoms in patients with schizophrenia and AD, its potential has been limited by cholinergic side effects, which are believed to result from the stimulation of muscarinic receptors in peripheral tissues.
These side effects led to a 59% dropout rate in the high-dose xanomeline group compared to 35% on placebo in Eli Lilly's six month AD trial. Syncope, which is a temporary loss of consciousness, was observed in the AD trial (12.6% on high dose xanomeline versus 4.6% on placebo), but not in the schizophrenia trial, in which patients are generally much younger than patients in the AD trial and therefore less prone to syncope. Xanomeline treatment was also associated with transient increases in heart rate and liver function tests, both of which returned to baseline with continued treatment. Electrocardiograms showed no meaningful changes in cardiac conductivity, including QTc interval.

Our KarXT Programs

We specifically designed KarXT, a proprietary combination of xanomeline and trospium, to unlock the therapeutic potential of xanomeline by overcoming its limiting side effects resulting from the stimulation of muscarinic receptors in peripheral tissues. We believe that the results of two third-party, randomized, double-blind, placebo-controlled clinical trials of xanomeline, as well as the results of a wide variety of preclinical studies conducted by third parties, support the further development of xanomeline, in the form of KarXT, as an antipsychotic and procognitive therapeutic agent. We selected trospium to counteract xanomeline’s undesirable peripheral side effects for a number of reasons, but importantly because trospium does not measurably cross the blood-brain barrier and therefore would not be expected to negate the therapeutic benefits of xanomeline in the CNS. Trospium is generically available in the United States and European Union for the treatment of overactive bladder and is well-tolerated with limited side effects, that include dry mouth and constipation. Since xanomeline and trospium compete for the same muscarinic receptors in peripheral tissues, but with opposing effects, we believe their combination has the potential to reduce the cholinergic side effects of xanomeline. We believe that there are no overlaps in the drug metabolism pathways of xanomeline and trospium and therefore we do not anticipate any significant adverse drug-drug interactions with the combination. Our Phase 1 clinical trial data suggests that each of xanomeline and trospium do not affect the other’s pharmacokinetics or systemic exposure.

We believe that the novel mechanism of KarXT has the potential to provide meaningfully better outcomes for patients suffering from schizophrenia and other neuropsychiatric conditions without the debilitating side effects of current D2 dopamine receptor-based therapies, including sedation, extrapyramidal side effects, such as motor rigidity, tremors and slurred speech, and significant weight gain resulting in the complications of diabetes, hyperlipidemia, hypertension and cardiovascular disease. We obtained an exclusive license to xanomeline from Eli Lilly along with a large database of preclinical and clinical data generated by Eli Lilly supporting xanomeline’s development. Our team of employees and advisors includes several former scientists at Eli Lilly who were actively involved in xanomeline’s preclinical and clinical development to help us advance the development of KarXT.
Proof of Concept of KarXT

Phase 1 Clinical Trials

We observed KarXT’s ability to ameliorate the side effects of xanomeline in our randomized, double-blind, placebo-controlled, Phase 1 clinical trial in 70 healthy volunteers conducted under our investigational new drug application. In this trial, we compared the tolerability profile and pharmacokinetics of xanomeline administered with placebo against KarXT co-administered as xanomeline in combination with trospium. Volunteers in this trial first received 40 mg (20 mg twice a day, or BID) of either trospium or placebo for two days, and then received 225 mg of xanomeline (75 mg TID) in addition to their existing regimen of trospium or placebo for seven days. We selected the 225-mg (75 mg TID) dose for evaluation in our trial due to the results of this dose in Eli Lilly’s schizophrenia and AD trials of xanomeline. As depicted in the table below, we observed that the addition of trospium to xanomeline was associated with clinically meaningful reductions in the rate of the most common treatment-emergent cholinergic adverse events, or ChAEs, than reported with xanomeline plus placebo, including nausea, vomiting, diarrhea and excess sweating and salivation. The overall ChAE rate was 64% on xanomeline plus placebo compared to 34% on KarXT (p=0.016). The rate of ChAEs for volunteers receiving KarXT (34%) was similar to the rate observed in volunteers receiving placebo during the lead-in period (32%), suggesting that the tolerability of KarXT was more similar to the placebo lead-in period than to treatment with xanomeline plus placebo.

<table>
<thead>
<tr>
<th>ChAE Incidence Rates</th>
<th>Xanomeline+ placebo</th>
<th>KarXT</th>
<th>% Reduction in Incidence Rates</th>
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<tr>
<td></td>
<td>N=33</td>
<td>N=35</td>
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<tr>
<td>Any Cholinergic AE (p=0.016)</td>
<td>64%</td>
<td>34%</td>
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<td>Nausea</td>
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<td>49%</td>
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<tr>
<td>Salivation</td>
<td>36%</td>
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<td>29%</td>
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We observed no meaningful differences between the KarXT and xanomeline plus placebo treatment groups in heart rate, blood pressure or any electrocardiogram parameters. Only one volunteer discontinued treatment due to treatment emergent adverse events in the KarXT arm, and this discontinuation was voluntary, not at the discretion of the investigator. Two episodes of syncope were observed on xanomeline plus placebo while none were observed with KarXT. We did not observe syncope in the KarXT arm of this trial (or in any other subject treated with KarXT in any of our trials, representing over 140 patients). Rates of postural dizziness were reduced by approximately 57% in patients treated with KarXT as compared to patients treated with xanomeline plus placebo. Overall, we considered treatment with xanomeline 225 mg combined with trospium 40 mg administered over seven days to be well-tolerated.

Phase 1 Multiple Ascending Dose Clinical Trial

We have also completed a randomized, double-blind, placebo-controlled multiple ascending dose Phase 1 clinical trial of KarXT. This trial evaluated BID dosing of our proprietary KarXT co-formulation containing fixed ratios of xanomeline and trospium, rather than the TID dosing previously used with xanomeline. We designed our Phase 1 clinical trial based on the improved tolerability of KarXT over xanomeline plus placebo observed in our prior Phase 1 clinical trial and the dose-dependent clinical activity observed in the Eli Lilly AD trial of xanomeline. In particular, Eli Lilly observed that the antipsychotic effect of xanomeline improved when the dose was increased from 25 mg to 50 mg to 75 mg, all administered TID, suggesting that the dose response may extend beyond 75 mg TID and that doses of xanomeline higher than 75 mg TID may lead to additional therapeutic benefit. Based on these
observations, we set out to (i) test our co-formulation using BID dosing, (ii) explore higher doses of xanomeline and (iii) optimize the ratio of xanomeline and trospium. Healthy volunteers enrolled in this trial received 50 mg of xanomeline plus 20 mg of trospium (50/20 mg) both BID, on days one and two. From days three to seven, volunteers received BID doses of xanomeline and trospium in ratios of either 100/20 mg, 125/40 mg, 150/20 mg or 150/40 mg (xanomeline/trospium) in different dosing cohorts. The trial was designed to randomize up to 24 volunteers in each of the four cohorts, with a 3:1 randomization of KarXT to placebo.

In this trial, administration of KarXT co-formulation provided robust xanomeline and trospium exposures as measured by plasma levels. In particular, KarXT containing xanomeline 100 mg BID provided drug exposures equivalent to, or higher than, 75 mg of xanomeline TID when administered alone. KarXT was also well-tolerated in volunteers at dose levels of 100 mg and 125 mg of xanomeline BID when paired with 20 mg and 40 mg of trospium, respectively.

Eighteen volunteers received KarXT in the 100/20 mg cohort. In this group, 16 volunteers experienced either no ChAEs (n=11; 61%) or mild, transient ChAEs (n=5; 28%). The majority of ChAEs were reported for less than one hour over the seven days of treatment and the longest duration reported was a total of 15 hours over the course of treatment. Two volunteers (11%) experienced transient ChAEs that were rated as moderate, with the longest ChAE lasting a total of approximately 11 hours over the course of treatment. Given the transient and generally mild nature of the ChAEs, we considered the 100/20 mg dose level of KarXT well tolerated. Eighteen volunteers were given the 125/40 mg dose level of KarXT, of which 11 volunteers (61%) reported no ChAEs and seven volunteers (39%) reported mild, transient ChAEs. These mild ChAEs lasted less than three hours over the course of the seven day treatment period. The increased dose of trospium (40 mg BID) was associated with reports of mild anticholinergic adverse events, including dry mouth, constipation, blurred vision and urinary hesitancy, suggesting a decreased trospium dose level may be more appropriate to pair with 125 mg BID of xanomeline. Xanomeline doses of 150 mg in KarXT led to increased reporting of moderate ChAEs and were therefore less well-tolerated than either the 100 or 125 mg xanomeline doses.

In this Phase 1 clinical trial, we observed that KarXT doses containing either 100 mg or 125 mg of xanomeline administered BID were well-tolerated when paired with trospium. Importantly, the 100 mg BID dose level administered in our co-formulation provided blood exposures equal to or greater than those observed by us and Eli Lilly with 75 mg TID xanomeline, which was observed to have beneficial effects on psychosis and cognition in both schizophrenia and AD. While a minority of patients still experienced ChAEs, these were predominately mild and transient in nature. We believe this tolerability profile has the potential to provide a substantial improvement over current antipsychotic medicines, which are often not tested at therapeutic doses in healthy volunteers due to their poor tolerability. Based on the results of this trial, we identified 100/20 mg and 125/30 mg BID as the doses and ratios of xanomeline to trospium to evaluate in our Phase 2 clinical trial of KarXT for acute psychosis in patients with schizophrenia.

We submitted an Investigational New Drug application to the U.S. Food and Drug Administration, or the FDA, for KarXT for the treatment of schizophrenia, which went into effect in August 2016.

**KarXT for the Treatment of Acute Psychosis in Patients with Schizophrenia**

We are currently evaluating KarXT in an ongoing Phase 2 clinical trial for the treatment of acute psychosis in patients with schizophrenia. The regulatory requirements, including clinical trial design and primary endpoints, for approval of antipsychotic drugs for this indication are well understood and defined. Similarly, third-party clinical trial operators and contract research organizations have extensive experience conducting drug trials in schizophrenia. Finally, patients with schizophrenia in clinical trials are generally younger than patients suffering psychosis from other CNS disorders such as AD, which reduces the risk of comorbidities, and patients with schizophrenia also tend to have higher drug
tolerability due to their prior treatment with antipsychotic drugs. We believe that these factors will help us to efficiently progress KarXT in this indication.

**Schizophrenia**

Schizophrenia is a chronic, severe and disabling brain disorder. In 2017, an estimated 2.7 million Americans, or approximately 0.5% to 1.0% of the U.S. population, had schizophrenia. Worldwide, it is estimated that schizophrenia affects over 21 million people. People with schizophrenia have a 10 to 15 year reduction in life expectancy compared to the general population, struggle to maintain employment or live independently and are often unable to maintain meaningful interpersonal relationships.

Psychosis is a prominent and debilitating symptom that occurs in schizophrenia. Psychotic symptoms, also known as positive symptoms, include hallucinations and delusions. Patients with schizophrenia also experience negative symptoms, such as apathy, reduced social drive, loss of motivation and lack of social interest. Schizophrenia is also often associated with significant cognitive impairment, which further limits a patient's ability to be gainfully employed and maintain relationships.

Worldwide sales of antipsychotic drugs exceeded $11 billion in 2015 and are expected to exceed $14 billion by 2025, despite a highly generic market. Several branded market leading antipsychotic medicines have each achieved worldwide annual sales in excess of $5 billion. Despite the large number of antipsychotic drugs developed over the last 20 years, current medicines have undergone only modest innovation relative to first generation drugs developed in the 1950s.

Current antipsychotics have modest efficacy in many patients and significant side effects. At least half of patients fail to adequately respond to current antipsychotic drugs. Additionally, current treatments are often associated with severe side effects, including sedation, extrapyramidal side effects such as motor rigidity, tremors and slurred speech, and significant weight gain resulting in the complications of diabetes, hyperlipidemia, hypertension and cardiovascular disease. The clinical benefit of current antipsychotics is further limited by poor adherence. In a 1,493-patient clinical trial funded by the National Institutes of Health, approximately 75% of patients reported discontinuing their antipsychotic medication within 18 months of starting treatment.

Current antipsychotic treatments work primarily by inhibiting D2 dopamine receptors and are often used by physicians to address a wide range of disorders in addition to schizophrenia, including bipolar disorder and psychotic depression, as well as psychosis and agitation in elderly patients with dementia. These treatments are approved for the treatment of positive symptoms of schizophrenia, such as hallucinations and delusions, but there are no approved therapies for the treatment of negative and cognitive symptoms of schizophrenia. We believe there is a substantial need for a new antipsychotic drug that has an improved efficacy and side effect profile, and for a drug that can treat the negative and cognitive symptoms of the disease.

**Previous Trials of Xanomeline and KarXT**

Xanomeline's potential to treat psychosis and cognitive impairment is supported by data from two placebo-controlled third-party trials in psychosis in patients with schizophrenia and AD. Although these trials also revealed associated cholinergic side effects, the potential therapeutic benefit of xanomeline was observed in both trials. The use of trospium to reduce the peripheral cholinergic side effects of xanomeline, observed by the improved tolerability of KarXT in our Phase 1 clinical trials, prompted us to initiate a Phase 2 clinical trial of KarXT for the treatment of acute psychosis in patients with schizophrenia.
Our Ongoing Phase 2 Clinical Trial for the Treatment of Acute Psychosis

In September 2018, we initiated a multi-site, double-blind, placebo-controlled, inpatient Phase 2 clinical trial of KarXT in patients with schizophrenia with acute psychosis. We anticipate enrolling 180 patients in this trial and patients are randomized 1:1 to receive either KarXT or placebo. Patients are washed out of their existing antipsychotic medications before entering the five-week active treatment or placebo phase. After the wash-out period, patients begin with either placebo or KarXT containing 50 mg xanomeline and 20 mg trospium (50/20 mg) BID. Patients receiving KarXT then increase their dose to 100/20 mg BID on day three and then physicians have the option to escalate to 125/30 mg BID on day eight if the 100/20 mg BID dose is well-tolerated. The primary endpoint in this trial is the change from baseline in PANSS total scores for KarXT versus placebo treated patients. Our trial has the same fundamental design and primary endpoint as the previous xanomeline trial in psychosis in schizophrenia, which is also the design that has been used in pivotal trials for several currently approved antipsychotic medicines. Additional endpoints of our trial include changes in PANSS Marder Factor score (including the negative symptom factor), a cognitive battery and the clinical global impression (CGI-S). We expect topline results from this trial in late 2019. An Interim Safety Monitoring Committee, or ISMC, will review the safety data at three prescribed intervals throughout the course of the trial. To date, we have received two blinded reviews from the ISMC with no recommended changes in the protocol. We anticipate the third and final pre-specified review by the ISMC later this year. To date, the early termination rate has been between approximately 20% and 25%, which is below the 30% early termination rate that we had assumed when starting the trial. Our 30% assumed early termination rate took into consideration that patients receiving placebo were likely to drop out due to lack of efficacy. Because the trial remains blinded, we are unable to assess what portion of the early termination group received study drug. The Phase 2 trial protocol allows the physicians conducting the trial to escalate the dose from 100/20 mg BID to 125/30 mg BID based on tolerability, and to date, more than 80% of patients in this trial have received the escalated dose of either KarXT or placebo.

Our Planned Clinical Trials for Acute Psychosis

Assuming successful outcome of our ongoing Phase 2 clinical trial, we plan to initiate a Phase 3 clinical trial assessing KarXT for the treatment of acute psychosis in schizophrenia. We anticipate the design of this trial to be substantially similar to that of our ongoing Phase 2 trial.

Our Planned Clinical Trials for the Negative and Cognitive Symptoms of Schizophrenia

We plan to utilize the data from our Phase 2 clinical trial of KarXT for the treatment of psychosis in schizophrenia to help us guide KarXT's future development for negative and cognitive symptoms of schizophrenia, for which there are currently no approved treatments. We anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT for the treatment of the cognitive symptoms in the first half of 2020 and a Phase 1b clinical trial to assess the safety and tolerability of KarXT for the treatment of the negative symptoms in the first half of 2020.

KarXT for the Treatment of Psychosis in AD

Alzheimer's disease is an irreversible, progressive neurodegenerative brain disorder that slowly destroys memory and cognition and, eventually, the ability to carry out even the simplest of tasks. In the large and growing AD population, up to 50% of patients will experience psychosis and related behavioral symptoms at some point during the course of their disease, which often leads to institutional care in a hospital or nursing home. Based on third-party clinical trials with xanomeline and xanomeline's mechanisms of action, we believe KarXT has therapeutic potential to treat the psychosis and associated behavioral symptoms, including agitation, of patients with AD. We plan to initiate a Phase 1b clinical trial of KarXT in the second half of 2019.
Alzheimer’s Disease

According to the Alzheimer’s Association, 5.7 million people in the United States are living with AD and it is currently the fifth leading cause of death in people 65 years of age or older. Alzheimer’s disease is the most common cause of dementia among older adults and it has been estimated that 50 million people worldwide are living with AD and other forms of dementia. This number is expected to increase to 82 million by 2030 and to 152 million by 2050. While diagnostic criteria for AD mostly focus on the associated cognitive deficits, it is often the psychotic and behavioral symptoms that are most troublesome for caregivers and lead to poor quality of life for patients. Published studies have suggested that approximately 50% of patients with AD develop psychosis at some point during the course of their disease, commonly consisting of hallucinations, delusions and troublesome behavioral symptoms such as agitation. The diagnosis of AD psychosis is also associated with more rapid cognitive and functional decline and often requires institutionalization.

The market for branded AD therapeutics was estimated to be $8.5 billion in 2015 and is expected to grow to over $14 billion by 2022. All of the approved drugs for AD modestly improve cognition in AD, but to date, the FDA has not approved any drug to treat the psychotic or behavioral symptoms of AD. As symptoms progress and become more severe, physicians often resort to off-label use of antipsychotic medications to treat these patients. Current antipsychotic drugs are associated with a number of side effects including potentially irreversible movement disorders, weight gain, metabolic dysfunction and sedation, which can be more problematic in elderly patients with AD. In addition, antipsychotic drugs all have a “boxed warning” for increased mortality in the elderly and may exacerbate the cognitive impairment associated with AD. Accordingly, there remains a large unmet medical need in psychosis and the associated behavioral symptoms of patients with AD.

Our Planned Clinical Trials for AD

Based on Eli Lilly’s Phase 2 clinical trial of xanomeline in patients with AD, and the improved tolerability profile of KarXT as compared to xanomeline, we anticipate initiating a Phase 1b clinical trial to assess the safety and tolerability of KarXT in the second half of 2019. We intend to use the data collected in our Phase 2 clinical trial for the treatment of acute psychosis in schizophrenia to inform our trials in AD and other diseases associated with psychotic and cognitive symptoms.

KarXT for Pain

A substantial body of literature shows that muscarinic receptor agonists inhibit the response to painful stimuli in a diverse set of animal pain models that are designed to be representative of post-operative, inflammatory and neuropathic pain. In several preclinical models of pain, treatment with xanomeline was observed to reduce pain in a dose-dependent manner. Confirmatory experiments demonstrated that the action of xanomeline in these pain models is attributable to its stimulation of M1 and M4 muscarinic receptors in the CNS and not to stimulation of muscarinic receptors in peripheral tissues. Importantly, these studies also showed that opiate receptors do not mediate the analgesic actions of xanomeline and therefore xanomeline and KarXT may be free of the abuse-liability of opioid-based pain medicines.
The figure in the left depicts the effect of increasing doses of xanomeline on the time it takes a mouse to withdraw its tail from a stimulus model of inflammatory pain. The figure on the right depicts the effect of increasing doses of xanomeline on the frequency of withdrawal from a skin stimulus in a model of neuropathic pain. Results are expressed as mean ± SEM. *P ≤ 0.05, ***P ≤ 0.001 (compared with vehicle-treated group).

We believe that these preclinical data of xanomeline in various animal pain models and other published results linking stimulation of muscarinic receptors to analgesia highlight the potential for KarXT to have therapeutic benefit in patients experiencing various types of pain including post-operative, inflammatory and neuropathic pain.

We plan to initiate a Phase 1b randomized, double-blind, placebo-controlled clinical trial in healthy volunteers to evaluate the effect of KarXT on experimentally induced pain in the second half of 2019. This trial will evaluate laser-induced pain in healthy volunteers with data collection to include both self-reported pain and measurement of pain responses via quantitative-EEG. This experimental model of pain has been validated with well-known analgesic drugs and the trial is expected to generate data about the potential analgesic effect of KarXT for post-operative, inflammatory, and neuropathic pain. We plan to use this data to help us refine the optimal pain indication and dose for subsequent Phase 2 clinical trials. We expect initial data from this Phase 1b trial in early 2020.

**Planned Additional Formulations of KarXT**

We believe that additional formulations of KarXT have the potential to further improve the therapeutic window of KarXT and offer patient compliance advantages through decreased dosing frequency. Our ongoing research efforts include the development of advanced oral, long-acting injectable, transdermal and buccal formulations. We plan to have an additional formulation of KarXT in clinical trials in 2020.

**Other Research Programs**

We continue to build our early stage pipeline. We currently have a novel series of compounds focused on muscarinic receptor targets. In particular, we have synthesized lead compounds for further development as potential therapeutic agents in several CNS disorders, including schizophrenia, psychosis associated with AD, as well various forms of pain. We have completed in vitro screening for several compounds and advanced these lead compounds for further preclinical development. In vivo evaluation of these compounds in rodents is ongoing for these indications, and we expect to initiate IND-enabling studies in 2020. We believe we can optimize these compounds and advance their development through preclinical studies and into clinical development, given our expertise in this space. We continue to evaluate other opportunities focused on muscarinic and non-muscarinic targets.
Manufacturing and Supply

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We currently source all of our nonclinical and clinical compound supply through third-party contract manufacturing organizations, or CMOs.

For clinical supply, we use CMOs who act in accordance with the FDA's good laboratory practices, or GLP, and current good manufacturing practices, cGMP, for the manufacture of drug substance and product. Currently, we contract with Regis Technologies, Inc., for the manufacture of xanomeline and source trospium from Procos, S.p.A. We expect to rely on third parties for our manufacturing processes and the production of all clinical supply drug substance and drug product. We use additional contract manufacturers to fill, label, package, store and distribute investigational drug products. It is our intent to identify and qualify additional manufacturers to provide active pharmaceutical ingredient and fill-and-finish services prior to submission of a new drug application to the FDA for any product candidates that complete clinical development.

Competition

The biotechnology and pharmaceutical industries are characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. We face potential competition from many different sources, including pharmaceutical and biotechnology companies, academic institutions and governmental agencies as well as public and private research institutions. Any product candidates that we successfully develop and commercialize, including KarXT, may compete with existing therapies and new therapies that may become available in the future.

Our competitors may have significantly greater financial resources, established presence in the market, expertise in research and development, manufacturing, preclinical and clinical testing, obtaining regulatory approvals and reimbursement and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific, sales, marketing and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

The key competitive factors affecting the success of KarXT, and any other product candidates that we develop to address CNS disorders, if approved, are likely to be efficacy, safety, convenience, price, the level of generic competition and the availability of reimbursement from government and other third-party payors.

Psychosis related to schizophrenia

There are currently no FDA-approved drugs for the negative or cognitive symptoms of schizophrenia. The current standards of care for the psychotic symptoms of patients with schizophrenia are antipsychotic treatments that work primarily by inhibiting D2 dopamine receptors as their primary mechanism of action. These drugs include: Abilify, marketed by Bristol-Myers Squibb Company, Zyprexa, marketed by Eli Lilly, Vraylar, marketed by Allergan, Clozaril, marketed by Mylan Products Ltd., and Latuda, marketed by Sumitomo Dainippon Pharma Co., Ltd. Many of these drugs are prescribed for a variety of neuropsychiatric conditions, including bipolar disorder, depression and Tourette syndrome. Additionally, we are aware of several product candidates in clinical development that are designed to modulate dopamine and/or serotonin receptors including product candidates being developed by Intra-Cellular Therapies, Inc., Alkermes plc and ACADIA Pharmaceuticals Inc.
Psychosis related to AD

There are currently no approved treatments for psychosis related to AD. Patients with AD experiencing psychosis are commonly treated with antipsychotic medications that are indicated and approved for schizophrenia. Available treatments for AD patients are only indicated for enhancing cognition in AD patients, and include acetylcholinesterase inhibitors such as donepezil, galantamine, rivastigmine and memantine. These medications are available generically although specific dosage forms and combinations are proprietary and marketed by large pharmaceutical companies such as, Allergan, Janssen Pharmaceuticals NV, Novartis International AG and Pfizer Inc.

Pain

The current standard of care for neuropathic and inflammatory pain include opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), topical agents, anticonvulsants and antidepressants. We are aware of many FDA-approved drugs for the treatment of neuropathic and inflammatory pain, including Lyrica, marketed by Pfizer Inc., Suboxone, marketed by Reckitt Benckiser Group plc, Oxeota, marketed by Pfizer Inc., and OxyContin, marketed by Purdue Pharma.

Intellectual Property

We strive to protect the proprietary technologies that we believe are important to our business, including pursuing and maintaining patent protection intended to cover our product candidate and their methods of use, as well as other inventions that are important to our business. In addition to patent protection, we also rely on trade secrets to protect aspects of our business that we do not consider appropriate for patent protection.

Our commercial success depends in part upon our ability to obtain and maintain patent and other proprietary protection for commercially important technologies, inventions and know-how related to our business, defend and enforce our intellectual property rights, particularly our patent rights, preserve the confidentiality of our trade secrets and operate without infringing valid and enforceable intellectual property rights of others.

The patent positions for biotechnology companies like us are generally uncertain and can involve complex legal, scientific and factual issues. In addition, the coverage claimed in a patent application can be significantly reduced before a patent is issued, and its scope can be reinterpreted and even challenged after issuance. As a result, we cannot guarantee that any of our platform technologies and product candidates will be protectable or remain protected by enforceable patents. We cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient proprietary protection from competitors. Any patents that we hold may be challenged, circumvented or invalidated by third parties.

Product Candidates

With regard to our KarXT product candidate, we exclusively license from PureTech Health LLC, or PureTech Health, a patent family comprising one issued U.S. patent and one pending U.S. patent application with claims directed to an oral medicament comprising certain doses of xanomeline and certain doses of trospium chloride, one issued U.S. patent and one pending U.S. patent applications with claims directed to methods for treating central nervous system disorders using an oral medicament comprising certain doses of xanomeline and certain doses of trospium chloride, and a total of four foreign patent applications pending, one in each of Europe, Japan, Hong Kong and Canada. The U.S. patents and the pending patent applications, if issued, are expected to expire in 2030 without taking into account a possible Patent Term Extension, or PTE, or any possible patent term adjustments. We also own one
pending U.S. provisional patent application with claims directed to an oral pharmaceutical composition comprising xanomeline beads and trospium beads. Applications claiming priority to and the benefit of this provisional application, if issued, are expected to expire in 2039 without taking into account a possible PTE or any possible patent term adjustments. We also own four U.S. provisional patent applications with claims directed to compounds targeting muscarinic receptors and methods of treatment using such compounds. Applications claiming priority to and the benefit of these provisional applications, if issued, are expected to expire in 2040 without taking into account a possible PTE or any possible patent term adjustments. Our U.S. and foreign patent applications also disclose other muscarinic activators in combination with other muscarinic inhibitors for the treatment of CNS disorders.

License Agreements

License Agreement with Eli Lilly and Company

In May 2012, we entered into an exclusive license agreement, or the Lilly License Agreement, with Eli Lilly, pursuant to which Eli Lilly assigned to us all of its rights to certain patents (now expired), regulatory documentation, data records and materials related to xanomeline. We are also entitled to sublicense or otherwise transfer the rights granted in connection with the Lilly License Agreement.

Under the Lilly License Agreement, we are obligated to use commercially reasonable efforts to develop, manufacture, commercialize and seek and maintain regulatory approval for xanomeline, in any formulation, for use in humans.

We paid Eli Lilly an upfront payment of $100,000 and have agreed to make milestone payments to Eli Lilly of up to an aggregate of $16 million upon the achievement of specified regulatory milestones and up to an aggregate of $54 million in commercial milestones. In addition, we are obligated to pay Eli Lilly tiered royalties, at rates in the low to mid single-digit percentages, on the worldwide net sales of any commercialized product on a country-by-country basis until the expiration of the applicable royalty term, which is the longer of six years from the date of first commercial sale of each licensed product within a country or data exclusivity in such country. During the royalty term, Eli Lilly is prohibited from granting any third party rights to the patents, regulatory documentation, data records and materials that have been licensed to us under the Lilly License Agreement.

The Lilly License Agreement will expire on the later of (i) the expiration of the last-to-expire royalty term on a licensed product-by-licensed product basis or (ii) the date on which we have made all milestone payments pursuant to the terms of the Lilly License Agreement, unless terminated earlier by the parties. In no event will the term of the Lilly License Agreement exceed 15 years past the anniversary of the first commercial sale of a xanomeline product. We may terminate the Lilly License Agreement for any reason with proper prior notice to Eli Lilly. Either party may terminate the Lilly License Agreement upon an uncured material breach by the other party.

Patent License Agreement with PureTech Health LLC

In March 2011, we entered into an exclusive license agreement, or the Patent License Agreement, with PureTech Health, pursuant to which PureTech Health granted us an exclusive license to patent rights relating to combinations of a muscarinic activator with a muscarinic inhibitor for the treatment of central nervous system disorders.

In connection with the Patent License Agreement, we have agreed to make milestone payments to PureTech Health of up to an aggregate of $10 million upon the achievement of specified development and regulatory milestones. In addition, we are obligated to pay PureTech Health low single-digit royalties on the worldwide net sales of any commercialized product covered by the licenses granted under the Patent License Agreement. In the event that we sublicense any of the patent rights granted under the Patent License Agreement, we will be obligated to pay PureTech Health royalties within the range of 15% to 25% on any income we receive from the sublicensee, excluding royalties.

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We may terminate the Patent License Agreement for any reason with proper prior notice to PureTech Health. Either party may terminate the Patent License Agreement upon an uncured material breach by the other party.

**Government Regulation**

Government authorities in the United States, at the federal, state and local level, and in other countries and jurisdictions, including the European Union, extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting, and import and export of pharmaceutical products. The processes for obtaining regulatory approvals in the United States and in foreign countries and jurisdictions, along with subsequent compliance with applicable statutes and regulations, require the expenditure of substantial time and financial resources.

**Review and Approval of Drugs in the United States**

In the United States, the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act, or FDCA, and its implementing regulations. The failure to comply with applicable U.S. requirements at any time during the product development process, approval process or after approval may subject an applicant and/or sponsor to a variety of administrative or judicial sanctions, including refusal by the FDA to approve pending applications, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters and other types of letters, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement of profits, or civil or criminal investigations and penalties brought by the FDA and the Department of Justice or other governmental entities. In addition, an applicant may need to recall a product.

An applicant seeking approval to market and distribute a new drug product in the United States must typically undertake the following:

- completion of nonclinical, or preclinical, laboratory tests, animal studies and formulation studies in compliance with the FDA's good laboratory practice, or GLP, regulations;
- submission to the FDA of an investigational new drug application, or IND, which must take effect before human clinical trials may begin;
- approval by an independent Institutional Review Board, or IRB, representing each clinical site before each clinical trial may be initiated at that site;
- performance of adequate and well-controlled human clinical trials in accordance with good clinical practices, or GCPs, to establish the safety and efficacy of the proposed drug product for each indication;
- preparation and submission to the FDA of a new drug application, or NDA, and payment of user fees;
- review of the product by an FDA advisory committee, where appropriate or if applicable;
- satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities at which the product, or components thereof, are produced to assess compliance with current Good Manufacturing Practice, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the product's identity, strength, quality and purity;
- satisfactory completion of FDA audits of clinical trial sites to assure compliance with GCPs and the integrity of the clinical data;
Preclinical Studies

Before an applicant begins testing a compound in humans, the drug candidate enters the preclinical testing stage. Preclinical studies include laboratory evaluation of the purity and stability of the manufactured drug substance or active pharmaceutical ingredient and the formulated drug or drug product, as well as in vitro and animal studies to assess the safety and activity of the drug for initial testing in humans and to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations. Some long-term preclinical testing, such as animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted.

The IND and IRB Processes

An IND is an exemption from the FDCA that allows an unapproved drug to be shipped in interstate commerce for use in an investigational clinical trial and a request for FDA authorization to administer such investigational drug to humans. Such authorization must be secured prior to interstate shipment and administration of the investigational drug. In an IND, applicants must submit a protocol for each clinical trial and any subsequent protocol amendments. In addition, the results of the preclinical tests, manufacturing information, analytical data, any available clinical data or literature and plans for clinical trials, among other things, are submitted to the FDA as part of an IND. The FDA requires a 30-day waiting period after the filing of each IND before clinical trials may begin. At any time during this 30-day period, the FDA may raise concerns or questions about the conduct of the trials as outlined in the IND and impose a clinical hold. In this case, the IND sponsor and the FDA must resolve any outstanding concerns before clinical trials can begin.

Following commencement of a clinical trial under an IND, the FDA may also place a clinical hold or partial clinical hold on that trial. A clinical hold is an order issued by the FDA to the sponsor to delay a proposed clinical investigation or to suspend an ongoing investigation. A partial clinical hold is a delay or suspension of only part of the clinical work requested under the IND. No more than 30 days after imposition of a clinical hold or partial clinical hold, the FDA will provide the sponsor a written explanation of the basis for the hold. Following issuance of a clinical hold or partial clinical hold, an investigation may only resume after the FDA has notified the sponsor that the investigation may proceed. The FDA will base that determination on information provided by the sponsor correcting the deficiencies previously cited or otherwise satisfying the FDA that the investigation can proceed.

A sponsor may choose, but is not required, to conduct a foreign clinical study under an IND. When a foreign clinical study is conducted under an IND, all FDA IND requirements must be met unless waived. When the foreign clinical study is not conducted under an IND, the sponsor must ensure that the study is conducted in accordance with GCP, including review and approval by an independent ethics committee, or IEC, and informed consent from subjects. The GCP requirements are intended to help ensure the protection of human subjects enrolled in non-IND foreign clinical studies, as well as the quality and integrity of the resulting data. FDA must also be able to validate the data from the study through an on-site inspection if necessary.

In addition to the foregoing IND requirements, an IRB representing each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that point.
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institution, and the IRB must conduct continuing review of the study at least annually. The IRB must review and approve, among other things, the study protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. An IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB’s requirements or if the product candidate has been associated with unexpected serious harm to patients.

Additionally, some trials are overseen by an independent group of qualified experts organized by the trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether or not a trial may move forward at designated check points based on access that only the group maintains to available data from the study. Suspension or termination of development during any phase of clinical trials can occur if it is determined that the subjects or patients are being exposed to an unacceptable health risk. Other reasons for suspension or termination may be made by us based on evolving business objectives and/or competitive climate.

Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on its ClinicalTrials.gov website.

Human Clinical Trials in Support of an NDA

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include, among other things, the requirement that all research subjects, or their legal representative, provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written study protocols detailing, among other things, the inclusion and exclusion criteria, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated.

Human clinical trials are typically conducted in three sequential phases, which may overlap or be combined:

- **Phase 1.** The drug is initially introduced into healthy human subjects or, in certain indications such as cancer, patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness and to determine optimal dosage.

- **Phase 2.** The drug is administered to a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.

- **Phase 3.** The drug is administered to an expanded patient population, generally at geographically dispersed clinical trial sites, in well-controlled clinical trials to generate enough data to evaluate the efficacy and safety of the product for approval, to establish the overall risk-benefit profile of the product and to provide adequate information for the labeling of the product.

- **Phase 4.** Post-approval studies may be conducted after initial regulatory approval. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA. In addition, within 15 calendar days after the sponsor determines that the information qualifies for reporting, IND safety reports must be submitted to the FDA for any of the following: serious and unexpected suspected adverse reactions; findings from other studies or animal or in vitro testing that suggest a significant risk in humans exposed to the drug; and any clinically important increase in
the case of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor’s initial receipt of the information. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB’s requirements or if the drug has been associated with unexpected serious harm to patients. The FDA will typically inspect one or more clinical sites to assure compliance with GCP and the integrity of the clinical data submitted.

Concurrent with clinical trials, companies often complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, the applicant must develop methods for testing the identity, strength, quality, purity, and potency of the final drug. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the drug candidate does not undergo unacceptable deterioration over its shelf life.

**Combination Rule**

The FDA’s Combination Rule governing fixed combination drug products provides that two or more drugs may be combined in a single dosage form when each component contributes to the claimed effects and the dosage of each component (amount, frequency, duration) is such that the combination is safe and effective for a significant patient population requiring such concurrent therapy as defined in the labeling for the drug. This rule is meant to ensure that any fixed-dose combination drug provides an advantage to the patient over and above that obtained when one of the individual ingredients is used in the usual safe and effective dose.

**Review of an NDA by the FDA**

Assuming successful completion of required clinical testing and other requirements, the results of the preclinical studies and clinical trials, together with detailed information relating to the product’s chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA requesting approval to market the drug product for one or more indications. Under federal law, the submission of most NDAs is additionally subject to a significant application user fee as well as annual prescription drug product program fees. These fees are typically increased annually. Certain exceptions and waivers are available for some of these fees.

The FDA conducts a preliminary review of an NDA within 60 days of its receipt, before accepting the NDA for filing, to determine whether the application is sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA has agreed to specified performance goals in the review process of NDAs. Applications for drugs containing new molecular entities are meant to be reviewed within ten months from the date of filing, and applications for “priority review” products containing new molecular entities are meant to be reviewed within six months of filing. The review process may be extended by the FDA for three additional months to consider new information or clarification provided by the applicant to address an outstanding deficiency identified by the FDA following the original submission.
During its review of an NDA, the FDA typically will inspect the facility or facilities where the product is or will be manufactured. These pre-approval inspections may cover all facilities associated with an NDA, including drug component manufacturing (such as active pharmaceutical ingredients), finished drug product manufacturing, and control testing laboratories. The FDA will not approve an NDA unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications.

In addition, as a condition of approval, the FDA may require an applicant to develop a REMS. REMS use risk minimization strategies beyond the professional labeling to ensure that the benefits of the product outweigh the potential risks. To determine whether a REMS is needed, the FDA will consider the size of the population likely to use the product, seriousness of the disease, expected benefit of the product, expected duration of treatment, seriousness of known or potential adverse events, and whether the product is a new molecular entity. REMS can include medication guides, physician communication plans for healthcare professionals, and elements to assure safe use, or ETASU. ETASU may include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring, and the use of patient registries. The FDA may require a REMS before approval or post-approval if it becomes aware of a serious risk associated with use of the product.

The FDA is required to refer an application for a novel drug to an advisory committee or explain why such referral was not made. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

**Fast Track, Breakthrough Therapy, and Priority Review**

The FDA has a number of programs intended to facilitate and expedite development and review of new drugs if they are intended to address an unmet medical need in the treatment of a serious or life-threatening disease or condition. Three of these programs are referred to as fast track designation, breakthrough therapy designation, and priority review designation.

Specifically, the FDA may designate a product for Fast Track review if it is intended, whether alone or in combination with one or more other products, for the treatment of a serious or life-threatening disease or condition, and it demonstrates the potential to address unmet medical needs for such a disease or condition. For Fast Track products, sponsors may have greater interactions with the FDA and the FDA may initiate review of sections of a Fast Track product's application before the application is complete. This rolling review may be available if the FDA determines, after preliminary evaluation of clinical data submitted by the sponsor, that a Fast Track product may be effective. The sponsor must also provide, and the FDA must approve, a schedule for the submission of the remaining information and the sponsor must pay applicable user fees. However, the FDA's time period goal for reviewing a Fast Track application does not begin until the last section of the application is submitted. In addition, the Fast Track designation may be withdrawn by the FDA if the FDA believes that the designation is no longer supported by data emerging in the clinical trial process.

Second, a product may be designated as a Breakthrough Therapy if it is intended, either alone or in combination with one or more other products, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The FDA may take certain actions with
respect to Breakthrough Therapies, including holding meetings with the sponsor throughout the development process; providing timely advice to the product sponsor regarding development and approval; involving more senior staff in the review process; assigning a cross-disciplinary project lead for the review team; and taking other steps to design the clinical trials in an efficient manner.

Third, the FDA may designate a product for priority review if it is a product that treats a serious or life-threatening disease or condition and, if approved, would provide a significant improvement in safety or effectiveness. The FDA determines, on a case-by-case basis, whether the proposed product represents a significant improvement when compared with other available therapies. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting product reaction, documented enhancement of patient compliance that may lead to improvement in serious outcomes, and evidence of safety and effectiveness in a new subpopulation. A priority designation is intended to direct overall attention and resources to the evaluation of such applications, and to shorten the FDA’s goal for taking action on a marketing application from ten months to six months.

**Accelerated Approval Pathway**

The FDA may grant accelerated approval to a product for a serious or life-threatening condition that provides meaningful therapeutic advantage to patients over existing treatments based upon a determination that the product has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit or on an intermediate clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality, or IMM, and that is reasonably likely to predict an effect on IMM or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Products granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval.

For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign, or other measure that is thought to predict clinical benefit, but is not itself a measure of clinical benefit. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. An intermediate clinical endpoint is a measurement of a therapeutic effect that is considered reasonably likely to predict the clinical benefit of a product, such as an effect on IMM. The FDA has limited experience with accelerated approvals based on intermediate clinical endpoints, but has indicated that such endpoints generally may support accelerated approval where the therapeutic effect measured by the endpoint is not itself a clinical benefit and basis for traditional approval, if there is a basis for concluding that the therapeutic effect is reasonably likely to predict the ultimate clinical benefit of a product.

The accelerated approval pathway is most often used in settings in which the course of a disease is long and an extended period of time is required to measure the intended clinical benefit of a product, even if the effect on the surrogate or intermediate clinical endpoint occurs rapidly.

The accelerated approval pathway is usually contingent on a sponsor’s agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the product’s clinical benefit. As a result, a product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to confirm the effect on the clinical endpoint. Failure to conduct required post-approval studies, or confirm a clinical benefit during post-marketing studies, could result in the FDA’s withdrawal of the approval and require the withdrawal of the product from the market on an expedited basis. All promotional materials for product candidates approved under accelerated regulations are subject to prior review by the FDA.
The FDA's Decision on an NDA

On the basis of the FDA's evaluation of the NDA and accompanying information, including the results of the inspection of the manufacturing facilities and select clinical trial sites, the FDA may issue an approval letter or a complete response letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. If a complete response letter is issued, the applicant may resubmit the NDA to address all of the deficiencies identified in the letter, withdraw the application, or request a hearing. If the applicant resubmits the NDA, only when the deficiencies have been addressed to the FDA's satisfaction will the FDA issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

If the FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess the drug's safety or effectiveness after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, including REMS, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs.

Post-Approval Requirements

Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, many changes to the approved product, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. There also are annual prescription drug product program fee requirements for certain marketed products.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and state agencies, and are subject to periodic unannounced inspections by the FDA and these state agencies for compliance with cGMP requirements. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting and documentation requirements upon the NDA holder and any third-party manufacturers that the NDA holder may decide to use. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical trials to assess new safety risks; or imposition of
distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or voluntary product recalls;
- fines, warning or untitled letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending NDAs or supplements to approved NDAs, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. However, companies may share truthful and not misleading information that is otherwise consistent with a product's FDA approved labeling. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act, or PDMA, which regulates the distribution of drugs and drug samples at the federal level, and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription pharmaceutical product samples and impose requirements to ensure accountability in distribution.

**Hatch-Waxman Amendments**

Section 505 of the FDCA describes three types of marketing applications that may be submitted to the FDA to request marketing authorization for a new drug. A Section 505(b)(1) NDA is an application that contains full reports of investigations of safety and efficacy. A 505(b)(2) NDA is an application that contains full reports of investigations of safety and efficacy but where at least some of the information required for approval comes from investigations that were not conducted by or for the applicant and for which the applicant has not obtained a right of reference or use from the person by or for whom the investigations were conducted. This regulatory pathway enables the applicant to rely, in part, on the FDA's prior findings of safety and efficacy for an existing product, or published literature, in support of its application. Section 505(j) establishes an abbreviated approval process for a generic version of approved drug products through the submission of an Abbreviated New Drug Application, or ANDA. An ANDA provides for marketing of a generic drug product that has the same active ingredients, dosage form, strength, route of administration, labeling, performance characteristics and intended use, among other things, to a previously approved product, known as a reference listed drug, or RLD. ANDAs are termed "abbreviated" because they are generally not required to include preclinical (animal) and clinical (human) data to establish safety and efficacy. Instead, generic applicants must scientifically demonstrate that their product is bioequivalent to, or performs in the same manner as, the innovator drug through in vitro, in vivo, or other testing. The generic version must deliver the same amount of active ingredients into a subject's bloodstream in the same amount of time as the innovator drug and can often be substituted by pharmacists under prescriptions written for the reference listed drug.

**Non-Patent Exclusivity**

Under the Hatch-Waxman Amendments, the FDA may not approve (or in some cases accept) an ANDA or 505(b)(2) application until any applicable period of non-patent exclusivity for the RLD has
expired. The FDCA provides a period of five years of non-patent data exclusivity for a new drug containing a new chemical entity, or NCE. For the purposes of this provision, an NCE is a drug that contains no active moiety that has previously been approved by the FDA in any other NDA. An active moiety is the molecule or ion responsible for the physiological or pharmacological action of the drug substance. In cases where such NCE exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification, which states the proposed generic drug will not infringe one or more of the already approved product’s listed patents or that such patents are invalid or unenforceable, in which case the applicant may submit its application four years following the original product approval.

The FDCA also provides for a period of three years of exclusivity for non-NCE drugs if the NDA or a supplement to the NDA includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the application or supplement. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication, but it generally would not protect the original, unmodified product from generic competition. Unlike five-year NCE exclusivity, an award of three-year exclusivity does not block the FDA from accepting ANDAs seeking approval for generic versions of the drug as of the date of approval of the original drug product; it only prevents FDA from approving such ANDAs.

**Hatch-Waxman Patent Certification and the 30-Month Stay**

In seeking approval of an NDA or a supplement thereto, NDA sponsors are required to list with the FDA each patent with claims that cover the applicant’s product or an approved method of using the product. Upon approval, each of the patents listed by the NDA sponsor is published in the FDA’s Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Upon submission of an ANDA or 505(b)(2) NDA, an applicant is required to certify to the FDA concerning any patents listed for the RLD in the Orange Book that:

- no patent information on the drug product that is the subject of the application has been submitted to the FDA;
- such patent has expired;
- the date on which such patent expires; or
- such patent is invalid, unenforceable or will not be infringed upon by the manufacture, use, or sale of the drug product for which the application is submitted.

Generally, the ANDA or 505(b)(2) NDA cannot be approved until all listed patents have expired, except where the ANDA or 505(b) (2) NDA applicant challenges a listed patent through the last type of certification, also known as a paragraph IV certification. If the applicant does not challenge the listed patents or indicates that it is not seeking approval of a patented method of use, the ANDA or 505(b) (2) NDA application will not be approved until all of the listed patents claiming the referenced product have expired. If the ANDA or 505(b) (2) NDA applicant has provided a paragraph IV certification the applicant must send notice of the paragraph IV certification to the NDA and patent holders once the application has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the paragraph IV certification. If the paragraph IV certification is challenged by an NDA holder or the patent owner(s) asserts a patent challenge to the paragraph IV certification, the FDA may not approve that application until the earlier of 30 months from the receipt of the notice of the paragraph IV certification, the expiration of the patent, when the infringement case concerning each such patent was favorably decided in the applicant’s favor or settled, or such shorter or longer period as may be ordered by a court. This prohibition is generally

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referred to as the 30-month stay. In instances where an ANDA or 505(b)(2) NDA applicant files a paragraph IV certification, the NDA holder or patent owner(s) regularly take action to trigger the 30-month stay, recognizing that the related patent litigation may take many months or years to resolve. Thus, approval of an ANDA or 505(b)(2) NDA could be delayed for a significant period of time depending on the patent certification the applicant makes and the reference drug sponsor’s decision to initiate patent litigation. If the drug has NCE exclusivity and the ANDA is submitted four years after approval, the 30-month stay is extended so that it expires seven and a half years after approval of the innovator drug, unless the patent expires or there is a decision in the infringement case that is favorable to the ANDA applicant before then.

**Patent Term Restoration and Extension**

A patent claiming a new drug product may be eligible for a limited patent term extension under the Hatch-Waxman Amendments, which permits a patent term restoration of up to seven and a half years for patent term lost during product development and the FDA regulatory review. The restoration period granted is typically one-half the time between the effective date of an IND and the submission date of an NDA, plus the time between the submission date of an NDA and the ultimate approval date, provided the sponsor acted with diligence. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product’s approval date. Only one patent applicable to an approved drug product is eligible for the extension, and the application for the extension must be submitted prior to the expiration of the patent in question and within 60 days of drug approval. A patent that covers multiple drugs for which approval is sought can only be extended in connection with one of the approvals. The U.S. Patent and Trademark Office reviews and approves the application for any patent term extension or restoration in consultation with the FDA.

**Review and Approval of Medicinal Products in the European Union**

In order to market any product outside of the United States, a company must also comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of products. Whether or not it obtains FDA approval for a product, an applicant will need to obtain the necessary approvals by the comparable foreign regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. Specifically, the process governing approval of medicinal products in the European Union generally follows the same lines as in the United States. It entails satisfactory completion of preclinical studies and adequate and well-controlled clinical trials to establish the safety and efficacy of the product for each proposed indication. It also requires the submission to the relevant competent authorities of a marketing authorization application, or MAA, and granting of a marketing authorization by these authorities before the product can be marketed and sold in the European Union.

**Clinical Trial Approval**

The Clinical Trials Directive 2001/20/EC, the Directive 2005/28/EC on Good Clinical Practice, or GCP, and the related national implementing provisions of the individual EU Member States govern the system for the approval of clinical trials in the European Union. Under this system, an applicant must obtain prior approval from the competent national authority of the EU Member States in which the clinical trial is to be conducted. Furthermore, the applicant may only start a clinical trial at a specific study site after the competent ethics committee has issued a favorable opinion. The clinical trial application must be accompanied by, among other documents, an investigational medicinal product dossier (the Common Technical Document) with supporting information prescribed by Directive 2001/20/EC, Directive 2005/28/EC, where relevant the implementing national provisions of the individual EU Member States and further detailed in applicable guidance documents.
In April 2014, the new Clinical Trials Regulation, (EU) No 536/2014 (Clinical Trials Regulation) was adopted. The Regulation is anticipated to apply in 2020. The Clinical Trials Regulation will be directly applicable in all the EU Member States, repealing the current Clinical Trials Directive 2001/20/EC. Conduct of all clinical trials performed in the European Union will continue to be bound by currently applicable provisions until the new Clinical Trials Regulation becomes applicable. The extent to which ongoing clinical trials will be governed by the Clinical Trials Regulation will depend on when the Clinical Trials Regulation becomes applicable and on the duration of the individual clinical trial. If a clinical trial continues for more than three years from the day on which the Clinical Trials Regulation becomes applicable the Clinical Trials Regulation will at that time begin to apply to the clinical trial.

The new Clinical Trials Regulation aims to simplify and streamline the approval of clinical trials in the European Union. The main characteristics of the regulation include: a streamlined application procedure via a single entry point, the “EU portal”; a single set of documents to be prepared and submitted for the application as well as simplified reporting procedures for clinical trial sponsors; and a harmonized procedure for the assessment of applications for clinical trials, which is divided in two parts. Part I is assessed by the competent authorities of all EU Member States in which an application for authorization of a clinical trial has been submitted (Member States concerned). Part II is assessed separately by each Member State concerned. Strict deadlines have been established for the assessment of clinical trial applications. The role of the relevant ethics committees in the assessment procedure will continue to be governed by the national law of the concerned EU Member State. However, overall related timelines will be defined by the Clinical Trials Regulation.

Marketing Authorization

To obtain a marketing authorization for a product under European Union regulatory systems, an applicant must submit an MAA either under a centralized procedure administered by the European Medicines Agency, or EMA, or one of the procedures administered by competent authorities in the EU Member States (decentralized procedure or mutual recognition procedure). A marketing authorization may be granted only to an applicant established in the European Union. Regulation (EC) No 1901/2006 provides that prior to obtaining a marketing authorization in the European Union, applicants have to demonstrate compliance with all measures included in an EMA-approved Pediatric Investigation Plan, or PIP, covering all subsets of the pediatric population, unless the EMA has granted (1) a product-specific waiver, (2) a class waiver or (3) a deferral for one or more of the measures included in the PIP.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all EU Member States and Iceland, Liechtenstein and Norway. Pursuant to Regulation (EC) No 726/2004, the centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases, including products for the treatment of HIV or AIDS, cancer, diabetes, neurodegenerative diseases, auto-immune and other immune dysfunctions and viral diseases. For products with a new active substance indicated for the treatment of other diseases and products that are a significant therapeutic, scientific or technical innovation and whose authorization would be in the interest of public health at EU level, the centralized procedure is optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use, or the CHMP, established at the EMA is responsible for conducting the initial assessment of a product. The CHMP is also responsible for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops, when additional information or written or oral explanation is to be
provided by the applicant in response to questions of the CHMP. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and in particular from the viewpoint of therapeutic innovation. If the CHMP accepts such request, the time limit of 210 days will be reduced to 150 days but it is possible that the CHMP can revert to the standard time limit for the centralized procedure if it considers that it is no longer appropriate to conduct an accelerated assessment. At the end of this period, the CHMP provides a scientific opinion on whether or not a marketing authorization should be granted in relation to a medicinal product. Within 67 days from the date of the CHMP Opinion, the European Commission will adopt its final decision on the marketing authorization application.

Unlike the centralized authorization procedure, the decentralized marketing authorization procedure requires a separate application to, and leads to separate approval by, the competent authorities of each EU Member State in which the product is to be marketed. This application is identical to the application that would be submitted to the EMA for authorization through the centralized procedure. The reference EU Member State prepares a draft assessment and drafts of the related materials within 120 days after receipt of a valid application. The resulting assessment report is submitted to the concerned EU Member States who, within 90 days of receipt, must decide whether to approve the assessment report and related materials. If a concerned EU Member State cannot approve the assessment report and related materials due to concerns relating to a potential serious risk to public health, disputed elements may be referred to the European Commission, whose decision is binding on all EU Member States.

The mutual recognition procedure similarly is based on the acceptance by the competent authorities of the EU Member States of the marketing authorization of a medicinal product by the competent authorities of other EU Member States. The holder of a national marketing authorization may submit an application to the competent authority of an EU Member State requesting that this authority recognize the marketing authorization delivered by the competent authority of another EU Member State.

**Regulatory Data Protection in the European Union**

In the European Union, innovative medicinal products approved on the basis of a complete independent data package qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity pursuant to Directive 2001/83/EC. Regulation (EC) No 726/2004 repeats this entitlement for medicinal products authorized in accordance the centralized authorization procedure. Data exclusivity prevents applicants for authorization of generics of these innovative products from referencing the innovator’s data to assess a generic (abbreviated) application for a period of eight years. During an additional two-year period of market exclusivity, a generic marketing authorization application can be submitted and authorized, and the innovator’s data may be referenced, but no generic medicinal product can be placed on the European Union market until the expiration of the market exclusivity. The overall ten-year period will be extended to a maximum of 11 years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies. Even if a compound is considered to be a new chemical entity so that the innovator gains the prescribed period of data exclusivity, another company nevertheless could also market another version of the product if such company obtained marketing authorization based on an MAA with a complete independent data package of pharmaceutical tests, preclinical tests and clinical trials.

**Periods of Authorization and Renewals**

A marketing authorization has an initial validity for five years in principle. The marketing authorization may be renewed after five years on the basis of a re-evaluation of the risk-benefit
balance by the EMA or by the competent authority of the EU Member State. To this end, the marketing authorization holder must provide the EMA or the competent authority with a consolidated version of the file in respect of quality, safety and efficacy, including all variations introduced since the marketing authorization was granted, at least six months before the marketing authorization ceases to be valid. The European Commission or the competent authorities of the EU Member States may decide, on justified grounds relating to pharmacovigilance, to proceed with one further five year period of marketing authorization. Once subsequently definitively renewed, the marketing authorization shall be valid for an unlimited period. Any authorization which is not followed by the actual placing of the medicinal product on the European Union market (in case of centralized procedure) or on the market of the authorizing EU Member State within three years after authorization ceases to be valid (the so-called sunset clause).

Regulatory Requirements after a Marketing Authorization has been Obtained

In case an authorization for a medicinal product in the European Union is obtained, the holder of the marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion and sale of medicinal products. These include:

- Compliance with the European Union’s stringent pharmacovigilance or safety reporting rules must be ensured. These rules can impose post-authorization studies and additional monitoring obligations.

- The manufacturing of authorized medicinal products, for which a separate manufacturer’s license is mandatory, must also be conducted in strict compliance with the applicable European Union laws, regulations and guidance, including Directive 2001/83/EC, Directive 2003/94/EC, Regulation (EC) No 726/2004 and the European Commission Guidelines for Good Manufacturing Practice. These requirements include compliance with European Union cGMP standards when manufacturing medicinal products and active pharmaceutical ingredients, including the manufacture of active pharmaceutical ingredients outside of the European Union with the intention to import the active pharmaceutical ingredients into the European Union.

- The marketing and promotion of authorized drugs, including industry-sponsored continuing medical education and advertising directed toward the prescribers of drugs and/or the general public, are strictly regulated in the European Union notably under Directive 2001/83/EC, as amended, and EU Member State laws.

Brexit and the Regulatory Framework in the United Kingdom

On June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the European Union, commonly referred to as “Brexit”. Thereafter, on March 29, 2017, the country formally notified the European Union of its intention to withdraw pursuant to Article 50 of the Lisbon Treaty. The withdrawal of the United Kingdom from the European Union will take effect on the effective date of the withdrawal agreement or, in the absence of agreement, two years after the United Kingdom provides a notice of withdrawal pursuant to the EU Treaty. Since the regulatory framework for pharmaceutical products in the United Kingdom covering quality, safety and efficacy of pharmaceutical products, clinical trials, marketing authorization, commercial sales and distribution of pharmaceutical products is derived from European Union directives and regulations, Brexit could materially impact the future regulatory regime which applies to products and the approval of product candidates in the United Kingdom. It remains to be seen how, if at all, Brexit will impact regulatory requirements for product candidates and products in the United Kingdom.

European Data Collection Regulation

In the event we decide to conduct clinical trials in the European Union, we may be subject to additional privacy restrictions. The collection and use of personal health information in the European
Union is governed by the provisions of the Data Protection Directive, and as of May 25, 2018, the General Data Protection Regulation, or GDPR. This directive imposes several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, notification of data processing obligations to the competent national data protection authorities and the security and confidentiality of the personal data. The GDPR also imposes strict rules on the transfer of personal data out of the EU to the United States. Failure to comply with the requirements of the Data Protection Directive (which governs the collection and use of personal health data in the European Union), the GDPR, and the related national data protection laws of the EU Member States may result in fines and other administrative penalties. The GDPR introduced new data protection requirements in the EU and substantial fines for breaches of the data protection rules. The GDPR regulations may impose additional responsibility and liability in relation to personal data that we process and we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. This may be onerous and adversely affect our business, financial condition, results of operations and prospects.

**Healthcare and Privacy Laws and Regulation**

Healthcare providers and third-party payors play a primary role in the recommendation and prescription of drug products that are granted regulatory approval. Arrangements with providers, consultants, third-party payors and customers are subject to broadly applicable fraud and abuse, anti-kickback, false claims laws, reporting of payments to physicians and teaching hospitals and patient privacy laws and regulations and other healthcare laws and regulations that may constrain our business and/or financial arrangements. Restrictions under applicable federal and state healthcare and privacy laws and regulations, include the following:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid; a person or entity need not have actual knowledge of the federal Anti-Kickback Statute or specific intent to violate it in order to have committed a violation. Violations are subject to civil and criminal fines and penalties for each violation, plus up to three times the remuneration involved, imprisonment, and exclusion from government healthcare programs. In addition, the government may assert that a claim that includes items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;

- the federal civil and criminal false claims laws, including the civil False Claims Act, or FCA, and civil monetary penalties laws, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false, fictitious or fraudulent; knowingly making a false statement or record material to a false or fraudulent claim or obligation to pay or transmit money or property to the federal government; or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay money to the federal government. Manufacturers can be held liable under the FCA even when they do not submit claims directly to government payors if they are deemed to “cause” the submission of false or fraudulent claims. The FCA also permits a private individual acting as a “whistleblower” to bring actions on behalf of the federal government alleging violations of the FCA and to share in any monetary recovery. When an entity is determined to have violated the federal civil False Claims Act, the government may impose civil fines and penalties for each false claim, plus treble damages, and exclude the entity from participation in Medicare, Medicaid and other federal healthcare programs;
• the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created additional federal civil and criminal laws that prohibit, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services; similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

• HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH and their respective implementing regulations, including the Final Omnibus Rule published in January 2013, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses as well as their respective business associates that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information. HITECH also created new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions;

• the federal transparency requirements known as the federal Physician Payments Sunshine Act, under the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the Affordable Care Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies to report annually to the Centers for Medicare & Medicaid Services, or CMS, within the United States Department of Health and Human Services, or HHS, information related to payments and other transfers of value made by that entity to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;

• analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, which may apply to healthcare items or services that are reimbursed by non-governmental third-party payors, including private insurers;

• many state laws govern the privacy of personal information in specified circumstances, for example, in California the California Consumer Protection Act (“CCPA”), which will go into effect on January 1, 2020, establishes a new privacy framework for covered businesses by creating an expanded definition of personal information, establishing new data privacy rights for consumers in the State of California, imposing special rules on the collection of consumer data from minors, and creating a new and potentially severe statutory damages framework for violations of the CCPA and for businesses that fail to implement reasonable security procedures and practices to prevent data breaches. While clinical trial data and information governed by HIPAA are currently exempt from the current version of the CCPA, other personal information may be applicable and possible changes to the CCPA may broaden its scope; and

• some state laws require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring manufacturers to report information related to payments to physicians and other healthcare providers, marketing expenditures, and drug pricing information. Certain state and local laws require the registration of pharmaceutical sales and medical representatives. State and foreign laws, including for example the European Union General Data Protection Regulation, also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

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Pharmaceutical Insurance Coverage and Healthcare Reform

In the United States and markets in other countries, patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Thus, even if a product candidate is approved, sales of the product will depend, in part, on the extent to which third-party payors, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers and managed care organizations, provide coverage, and establish adequate reimbursement levels for, the product. In the United States, no uniform policy of coverage and reimbursement for drug products exists among third-party payors. Therefore, coverage and reimbursement for drug products can differ significantly from payor to payor. The process for determining whether a third-party payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors are increasingly challenging the prices charged, examining the medical necessity, and reviewing the cost-effectiveness of medical products and services and imposing controls to manage costs. Third-party payors may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. Additionally, companies may also need to provide discounts to purchasers, private health plans or government healthcare programs. Nonetheless, product candidates may not be considered medically necessary or cost effective. A decision by a third-party payor not to cover a product could reduce physician utilization once the product is approved and have a material adverse effect on sales, results of operations and financial condition. Additionally, a third-party payor’s decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, one payor’s determination to provide coverage for a product does not assure that other payors will also provide coverage and reimbursement for the product, and the level of coverage and reimbursement can differ significantly from payor to payor.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of products have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company’s revenue generated from the sale of any approved products. Coverage policies and third-party payor reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which a company or its collaborators receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

There have been a number of federal and state proposals during the last few years regarding the pricing of pharmaceutical products, limiting coverage and the amount of reimbursement for drugs and other medical products, government control and other changes to the healthcare system in the United States. For example, in March 2010, the United States Congress enacted the Affordable Care Act, which, among other things, includes changes to the coverage and payment for products under government health care programs. The Affordable Care Act includes provisions of importance to our potential product candidates that:

- created an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic products, apportioned among these entities according to their market share in certain government healthcare programs;
• expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to certain
individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer’s Medicaid
rebate liability;
• expanded manufacturers’ rebate liability under the Medicaid Drug Rebate Program by increasing the minimum rebate for both
branded and generic drugs and revising the definition of “average manufacturer price,” or AMP, for calculating and reporting
Medicaid drug rebates on outpatient prescription drug prices;
• addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are
 calculated for drugs that are inhaled, infused, instilled, implanted or injected;
• expanded the types of entities eligible for the 340B drug discount program;
• established the Medicare Part D coverage gap discount program by requiring manufacturers to provide a 50% point-of-sale-discount, which was increased to 70% starting January 1, 2019, off the negotiated price of applicable brand drugs
to eligible beneficiaries during their coverage gap period as a condition for the manufacturers’ outpatient drugs to be covered
under Medicare Part D; and
• created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical
effectiveness research, along with funding for such research.

Some of the provisions of the Affordable Care Act have yet to be implemented, and there have been judicial and Congressional
challenges to certain provisions of the Affordable Care Act, as well as recent efforts by the Trump administration to repeal or replace
certain aspects of the Affordable Care Act. Since January 2017, President Trump has signed two Executive Orders and other directives
designed to delay the implementation of certain provisions of the Affordable Care Act. Concurrently, Congress has considered legislation
that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed comprehensive repeal
legislation, it has enacted laws that modify certain provisions of the Affordable Care Act such as removing penalties, starting January 1,
2019, for not complying with the Affordable Care Act’s individual mandate to carry health insurance, delaying the implementation of certain
Affordable Care Act-mandated fees, and increasing the point-of-sale discount that is owed by pharmaceutical manufacturers who
participate in Medicare Part D. On December 14, 2018, a Texas U.S. District Court Judge ruled that the Affordable Care Act is
unconstitutional in its entirety because the “individual mandate” was repealed by Congress as part of the Tax Cuts and Jobs Act of 2017.
While the Texas U.S. District Court Judge, as well as the Trump administration and CMS, have stated that the ruling will have no
immediate effect pending appeal of the decision, it is unclear how this decision, subsequent appeals, and other efforts to repeal and
replace the Affordable Care Act will impact the Affordable Care Act.

Other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. In
August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select
Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through
2021, was unable to reach required goals, thereby triggering the legislation’s automatic reduction to several government programs. This
includes aggregate reductions of Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013 and, due to
subsequent legislative amendments to the statute, will remain in effect through 2027 unless additional Congressional action is taken. In
January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, further reduced
Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of
limitations period for the government to recover overpayments to providers from three to five years.
In addition, recently there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their commercial products, which has resulted in several Congressional inquiries and proposed and enacted state and federal legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for pharmaceutical products. For example, at the federal level, the Trump administration released a “Blueprint” to lower drug prices and reduce out of pocket costs of drugs that contains additional proposals to increase drug manufacturer competition, increase the negotiating power of certain federal healthcare programs, incentivize manufacturers to lower the list price of their products, and reduce the out of pocket costs of drug products paid by consumers. On January 31, 2019, the HHS Office of Inspector General, proposed modifications to the federal Anti-Kickback Statute discount safe harbor for the purpose of reducing the cost of drug products to consumers which, among other things, if finalized, will affect discounts paid by manufacturers to Medicare Part D plans, Medicaid managed care organizations and pharmacy benefit managers working with these organizations. While some proposed measures may require additional authorization to become effective, Congress and the Trump administration have each indicated that it will continue to seek new legislative and/or administrative measures to control drug costs. Individual states in the United States have also increasingly passed legislation and implemented regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Outside the United States, ensuring coverage and adequate payment for a product also involves challenges. Pricing of prescription pharmaceuticals is subject to government control in many countries. Pricing negotiations with government authorities can extend well beyond the receipt of regulatory approval for a product and may require a clinical trial that compares the cost-effectiveness of a product to other available therapies. The conduct of such a clinical trial could be expensive and result in delays in commercialization.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies or so-called health technology assessments, in order to obtain reimbursement or pricing approval. For example, the European Union provides options for its member states to restrict the range of products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other member states allow companies to fix their own prices for products, but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. Recently, many countries in the European Union have increased the amount of discounts required on pharmaceuticals and these efforts could continue as countries attempt to manage healthcare expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the European Union. The downward pressure on healthcare costs in general, particularly prescription products, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various European Union member states, and parallel trade, i.e., arbitrage between low-priced and high-priced member states, can further reduce prices. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any products, if approved in those countries.
Legal Proceedings

We are not currently subject to any material legal proceedings.

Facilities

Our offices are located in Boston, Massachusetts and consist of approximately 7,000 square feet of leased office space. The lease expires in February 2023. We believe that our facilities are adequate for our current needs and that suitable additional or substitute space would be available if needed.

Employees

As of May 30, 2019, we had 16 full-time employees, including a total of six employees with M.D. and/or Ph.D. degrees. Of our workforce, eight employees are directly engaged in research and development with the rest providing administrative, business and operations support. None of our employees are represented by labor unions or covered by collective bargaining agreements. We consider the relationship with our employees to be good.
MANAGEMENT

The following table sets forth the name, age as of May 30, 2019, and position of each of our executive officers and directors.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Position</th>
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<tbody>
<tr>
<td><strong>Executive Officers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven Paul, M.D.</td>
<td>68</td>
<td>Chief Executive Officer, President and Chairman</td>
</tr>
<tr>
<td>Andrew Miller, Ph.D.</td>
<td>37</td>
<td>Chief Operating Officer</td>
</tr>
<tr>
<td>Stephen Brannan, M.D.</td>
<td>62</td>
<td>Chief Medical Officer</td>
</tr>
<tr>
<td>Troy Ignelzi</td>
<td>51</td>
<td>Chief Financial Officer</td>
</tr>
<tr>
<td><strong>Non-Employee Directors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bharat Chowira, J.D., Ph.D.</td>
<td>54</td>
<td>Director</td>
</tr>
<tr>
<td>Eric Elenko, Ph.D.(4)</td>
<td>46</td>
<td>Director</td>
</tr>
<tr>
<td>Edmund Harrigan, M.D.(2)</td>
<td>66</td>
<td>Director</td>
</tr>
<tr>
<td>James Healy, M.D., Ph.D.(1)(5)</td>
<td>54</td>
<td>Director</td>
</tr>
<tr>
<td>Jeffrey Jonas, M.D.(3)</td>
<td>66</td>
<td>Director</td>
</tr>
<tr>
<td>Joep Muijrers, Ph.D.(4)</td>
<td>46</td>
<td>Director</td>
</tr>
<tr>
<td>Robert Nelsen(2)</td>
<td>56</td>
<td>Director</td>
</tr>
<tr>
<td>Atul Pande, M.D.(2)(5)</td>
<td>64</td>
<td>Director</td>
</tr>
<tr>
<td>Heather Preston, M.D.(1)(3)</td>
<td>53</td>
<td>Director</td>
</tr>
</tbody>
</table>

(1) Member of audit committee.
(2) Member of compensation committee.
(3) Member of nominating and corporate governance committee.
(4) Drs. Elenko and Muijrers will resign from our board of directors effective immediately prior to the effectiveness of the registration statement of which this prospectus forms a part.
(5) Drs. Healy and Pande will join our board of directors effective immediately after the effectiveness of the registration statement of which this prospectus forms a part.

Executive Officers

Steven Paul, M.D. has served as our Chairman and Chief Executive Officer since August 2018 and as a member of our board of directors since March 2018. Previously, Dr. Paul was the President and Chief Executive Officer of Voyager Therapeutics, Inc. from September 2014 to August 2018. Dr. Paul also serves as a venture partner at Third Rock Ventures, LLC, a life sciences venture capital firm. Together with Third Rock, Dr. Paul co-founded Sage Therapeutics, Inc. and Voyager Therapeutics, Inc. From August 2010 to September 2014, Dr. Paul was a professor of neuroscience, psychiatry and pharmacology at Weill Cornell Medical College. Prior to that, from 1993 to 2010, Dr. Paul held several key positions at Eli Lilly and Company, or Eli Lilly, including Executive Vice President for Science and Technology, President of the Lilly Research Laboratories, Vice President of Neuroscience (CNS) Research and Group Vice President of Discovery Research. Prior to Eli Lilly, from 1988 to 1993, Dr. Paul served as the Scientific Director of the National Institute of Mental Health, or NIMH. From 1982 to 1988 Dr. Paul served as a laboratory branch chief and tenured investigator at NIMH. Dr. Paul also served as Medical Director in the Commissioned Corps of the United States Public Health Service. Dr. Paul is an elected fellow of the American Association for the Advancement of Science and a member of the National Academy of Medicine. Dr. Paul is currently on the board of directors or is a trustee of several organizations, including Sage Therapeutics, Inc. (NASDAQ: SAGE), Voyager Therapeutics, Inc. (NASDAQ: VYGR), Alnylam Pharmaceuticals, Inc. (NASDAQ: ALNY) and the Foundation for the National Institutes of Health, or FNIH. In the past five years, Dr. Paul also served on the board of Sigma Aldrich Corporation (NASDAQ: SIAL). Dr. Paul was appointed by the Secretary of the Department of Health and Human Services as a member of the advisory committee to the Director of the NIH from 2001 to 2006. Dr. Paul was also a member of the National Advisory Mental
Health Council (2008-2012) and is board certified by the American Board of Psychiatry and Neurology. Dr. Paul received his B.A. in Biology and Psychology from Tulane University, and his M.S. and M.D. degrees from the Tulane University School of Medicine. Our board of directors believes that Dr. Paul is qualified to serve on our board of directors due to his extensive career in neuroscience and his leadership and managerial experiences at various pharmaceutical and biotechnology companies and healthcare organizations.

**Andrew Miller, Ph.D.** has served as our Chief Operating Officer since August 2018 and served as a member of our board of directors from April 2012 to March 2019. Dr. Miller was our founder and prior to serving as our Chief Operating Officer, he was our President and Chief Executive Officer from July 2016 to August 2018. From August 2008 to July 2016, Dr. Miller held several positions at PureTech Health plc, last serving as a Vice President, Venture Partner at PureTech Health plc, and in such capacity served as Chief Operating Officer of Tal Medical and the acting Chief Operating Officer of Entrega, Inc. He is currently a member of the board of directors of Entrega, Inc. Dr. Miller received a B.S. in Chemical Engineering from the University of Illinois with highest honors and completed his Ph.D. in Chemical Engineering at the Massachusetts Institute of Technology.

**Stephen Brannan, M.D.** has served as our Chief Medical Officer since March 2017. From July 2016 to February 2017, Dr. Brannan was an independent consultant. Prior to that, he served as the Vice President Clinical Research and Medical Affairs at Forum Pharmaceuticals Inc. from August 2015 to June 2016. From May 2011 to August 2015, Dr. Brannan served as the Therapeutic Head of Neuroscience at Takeda Pharmaceutical Company. Dr. Brannan has been active in the development of multiple important central nervous system treatments including Cymbalta, Exelon Patch, Trintellix, and VNS for Treatment Resistant Depression while holding various roles at Forum, Takeda, Novartis, Cyberonics, and Eli Lilly. Prior to joining the pharmaceutical industry, Dr. Brannan worked on the faculty at the University of Texas Health Science Center at San Antonio (UTHSCSA). Dr. Brannan trained in psychiatry at UTHSCSA, received his A.B. from Harvard College and holds a M.D. degree from the University of Texas Health Science Center at Dallas (Southwestern Medical School).

**Troy Ignelzi** has served as our Chief Financial Officer since March 2019. Prior to that, Mr. Ignelzi was the Chief Financial Officer of scPharmaceuticals Inc. from March 2016 to February 2019, and provided consulting services to scPharmaceuticals Inc. in February and March 2016. Mr. Ignelzi previously served as Chief Financial Officer and as a member of the executive leadership teams at Juventas Therapeutics Inc., a privately held biotechnology company, from October 2014 to February 2016. From October 2013 to October 2014, Mr. Ignelzi served as Senior Vice President—Operations and Business Development of Pharmalex GmbH. Prior to Pharmalex, Mr. Ignelzi was Vice President—Business Development at Esperion Therapeutics, Inc., a public pharmaceutical company, from January 2009 to September 2013. Mr. Ignelzi served as Vice President, Business Development & Strategic Planning at Insys Therapeutics, Inc. a specialty pharmaceutical company from February 2007 to February 2009. Previously, Mr. Ignelzi had served as a specialty senior sales representative at Eli Lilly, from February 2002 to August 2005. Mr. Ignelzi holds a B.S. in Accounting from Ferris State University.

**Non-Employee Directors**

**Bharat Chowrira, J.D., Ph.D.** has served as a member of our board of directors since March 2017. Dr. Chowrira has been the President and Chief of Business and Strategy at PureTech Health plc since March 2017. Prior to joining PureTech Health plc, Dr. Chowrira was the President of Synlogic, Inc., a biopharmaceutical company focused on developing synthetic microbiome-based therapeutics, from September 2015 to February 2017, where he oversaw and managed corporate and business development, alliance management, financial, human resources, intellectual property and legal
operations. Prior to that, Dr. Chowrira was the Chief Operating Officer of Auspex Pharmaceuticals, Inc. from October 2013 to July 2015, which was acquired by Teva Pharmaceuticals Ltd. in the spring of 2015. Previously, he was President and Chief Executive Officer of Addex Therapeutics Ltd., a biotechnology company publicly-traded on the SIX Swiss Exchange, from August 2011 to July 2013. Prior to that Dr. Chowrira held various leadership and management positions at Nektar Therapeutics (COO), Merck & Co (VP), Sirna Therapeutics (GC; acquired by Merck &Co) and Ribozyme Pharmaceuticals (chief patent counsel). Dr. Chowrira is currently a member of the board of directors of Akili Interactive Labs, Vedanta Biosciences and Vor Biopharma. Dr. Chowrira received a J.D. from the University of Denver’s Sturm College of Law, a Ph.D. in Molecular Biology from the University of Vermont College of Medicine, an M.S. in Molecular Biology from Illinois State University and a B.S. in Microbiology from the UAS, Bangalore, India. Our board of directors believes that Dr. Chowrira is qualified to serve on our board of directors due to his extensive management experience in the biotechnology sector.

**Eric Elenko, Ph.D.** has served as a member of our board of directors since our incorporation in July 2009. Dr. Elenko is the Chief Innovation Officer of PureTech Health plc, where he has served as an Executive Vice President since September 2005. Prior to joining PureTech Health plc, Dr. Elenko was a consultant with McKinsey and Company from February 2002 to September 2005. Dr. Elenko received his BA in Biology from Swarthmore College and his Ph.D. in Biomedical Sciences from University of California, San Diego. Our board of directors believes that Dr. Elenko is qualified to serve on our board of directors effective immediately prior to the effectiveness of the registration statement of which this prospectus forms a part.

**Edmund Harrigan, M.D.** has served as a member of our board of directors since March 2011. Dr. Harrigan served in a variety of roles at Pfizer Inc. from March 2003 to July 2015, most recently serving as Senior Vice President of Worldwide Safety and Regulatory. Dr. Harrigan's previous executive leadership roles at Pfizer included serving as Senior Vice President, Head of Worldwide Business Development, Senior Vice President, Head of Worldwide Regulatory Affairs and Quality Assurance, and Vice President, Head of Neuroscience and Ophthalmology. Before entering the pharmaceutical industry in 1990, Dr. Harrigan was a practicing neurologist for seven years. He currently serves on the Board of Directors of Acadia Pharmaceuticals, Inc. (NASDAQ: ACAD), Bellicum Pharmaceuticals, Inc. (NASDAQ: BLCM) and PhaseBio Pharmaceuticals, Inc. (NASDAQ: PHAS). Dr. Harrigan earned his B.A. degree in Chemistry from St. Anselm College and holds an M.D. from the University of Massachusetts at Worcester. Our board of directors believes that Dr. Harrigan is qualified to serve on our board of directors due to his scientific and business experience in the pharmaceutical and healthcare industries.

**James Healy, M.D., Ph.D.** has been elected to serve as a director on our board of directors immediately after the effectiveness of the registration statement of which this prospectus forms a part. Dr. Healy has been a General Partner of Sofinnova Investments (formerly Sofinnova Ventures), a biotech investment firm, since June 2000. Prior to June 2000, Dr. Healy held various positions at Sanderling Ventures, Bayer Healthcare Pharmaceuticals (as successor to Miles Laboratories) and ISTA Pharmaceuticals, Inc. Dr. Healy is currently on the board of directors of Ascendis Pharma A/S (NASDAQ: ASND), Coherus BioSciences, Inc. (NASDAQ: CHRS), Iterum Therapeutics, PLC (NASDAQ: ITRM), Natco, Inc. (NASDAQ: NTRA), NuCana PLC (NASDAQ: NCNA), ObsEva SA (NASDAQ: OBSV) and Y-mAbs Therapeutics, Inc. (NASDAQ: YMAB) and several private companies. Previously, he served as a board member of Amarin Corporation, Auris Medical Holding AG, Edge Therapeutics, Inc., Hyperion Therapeutics, Inc., InterMune, Inc., Anthera Pharmaceuticals, Inc., Durata Therapeutics, Inc., CoTherix, Inc., Movetis NV and several private companies. In 2011, Dr. Healy won the IBF Risk Innovator Award and was named as one of the industry’s top leading Life Science
investors in 2013 by Forbes Magazine. Dr. Healy received an M.D. and a Ph.D. in Immunology from Stanford University School of Medicine and holds a B.A. in Molecular Biology and a B.A. in Scandinavian Studies from the University of California, Berkeley. Our board of directors believes that Dr. Healy is qualified to serve on our board of directors due to his experience working with and serving on the boards of directors of life sciences companies and his experience working in the venture capital industry.

Jeffrey Jonas, M.D. has served as a member of our board of directors since October 2018. Dr. Jonas has been the Chief Executive Officer and President and a member of the Board of Directors of Sage Therapeutics, Inc. since August 2013. From November 2012 to August 2013, Dr. Jonas served as the President of the Regenerative Medicine Division of Shire plc, or Shire, and from July 2008 to November 2012 as Senior Vice President of Research and Development, Pharmaceuticals at Shire. From February 2007 to July 2008, Dr. Jonas served as the Executive Vice President of Ionis Pharmaceuticals, Inc., formerly known as ISIS Pharmaceuticals, Inc. and from January 2002 to January 2007 as Chief Medical Officer and Executive Vice President of Forest Laboratories, Inc. and from 1991 to 1996 in senior-level positions at Upjohn Laboratories. Dr. Jonas also founded AVAX Technologies, Inc. and SCEPTOR Industries, Inc., where he served as the Chief Executive Officer, President and a Director. Dr. Jonas received his B.A. from Amherst College and M.D. from Harvard Medical School. He completed a residency in psychiatry at Harvard Medical School, and he served as Chief Resident in psychopharmacology at McLean Hospital, Harvard Medical School. Our board of directors believes that Dr. Jonas is qualified to serve on our board of directors due to his more than 20 years of experience on both the scientific and business sides of the pharmaceutical and healthcare industries, particularly in the Central Nervous System (CNS) field.

Joep Muijrers, Ph.D. has served as a member of our board of directors since August 2018. Dr. Muijrers has been the Chief Financial Officer at PureTech Health plc since April 2018. Prior to joining PureTech Health plc, Dr. Muijrers was a portfolio manager and partner with Life Sciences Partners (LSP), a specialist investor group with sole focus on investing in healthcare and life sciences, in The Netherlands and in Boston for 11 years. Dr. Muijrers received a Master of Science degree from the University of Nijmegen and a Ph.D. from EMBL Heidelberg. Our board of directors believes that Dr. Muijrers is qualified to serve on our board of directors due to his extensive investment experience in the biotechnology industry. Dr. Muijrers will resign from our board of directors effective immediately prior to the effectiveness of the registration statement of which this prospectus forms a part.

Robert Nelsen has served as a member of our board of directors since August 2018. Mr. Nelsen co-founded ARCH Venture Partners in 1986 and currently serves as a Managing Director. Mr. Nelsen currently serves on boards of directors of Denali Therapeutics, Inc. (NASDAQ: DNLI) and Unity Biotechnology, Inc. (NASDAQ: UBX) and on the boards of a number of private companies. Mr. Nelsen served on the boards of Agios Pharmaceuticals Inc. (NASDAQ: AGIO) from 2007 to 2017, Fate Therapeutics, Inc. (NASDAQ: FATE) from 2007 to 2014, Syros Pharmaceuticals, Inc. (NASDAQ: SYRS) from 2012 to 2018, Sage Therapeutics, Inc. (NASDAQ: SAGE) from 2013 to 2016, Juno Therapeutics, Inc. (NASDAQ: JUNO) from 2013 to 2018, when it was acquired by Celgene Corporation, Bellerophon Therapeutics, Inc. (NASDAQ: BLPH) from 2014 to 2015, Sienna Biopharmaceuticals, Inc. (NASDAQ: SNNA) from 2015 to 2018 and Gossamer Bio, Inc. from 2017 to 2018, prior to its initial public offering. He previously served as a Trustee of the Fred Hutchinson Cancer Research Institute, the Institute for Systems Biology, and was a director of the National Venture Capital Association. Mr. Nelsen holds an M.B.A. from the University of Chicago and a B.S. from the University of Puget Sound with majors in Economics and Biology. Our board of directors believes that Mr. Nelsen is qualified to serve on our board of directors due to his venture capital experience in the biotechnology industry.
Atul Pande, M.D. has been elected to serve as a director on our board of directors immediately after the effectiveness of the registration statement of which this prospectus forms a part. Dr. Pande has served as Chief Medical Advisor of PureTech Health plc since February 2018, and previously served as its Chief Medical Officer since February 2017 and a Senior Advisor from July 2016 through February 2017. Dr. Pande has also served as Chief Executive Officer of Verity BioConsulting LLC, a drug development consulting firm since 2014. He previously served as Chief Medical Officer of Tal Medical, Inc., a clinical-stage medical device company, from December 2014 to December 2017. From 2007 to April 2014, Dr. Pande was Senior Vice President and Senior Advisor, Pharmaceutical R&D at GlaxoSmithKline plc, a pharmaceutical company. He has also held senior roles at Pfizer Inc., Parke-Davis/Warner-Lambert, a subsidiary of Pfizer Inc. and Lilly Research Laboratories, a division of Eli Lilly & Co., all of which are pharmaceutical companies. Dr. Pande is also a non-executive board member of Autifony Therapeutics Limited, a biotechnology company, and Axovant Sciences Ltd. (NASDAQ: AXGT) and serves on the Scientific Advisory Boards of Cennerv Pharma PTE LTD and Centrexion Corporation. Dr. Pande received his MBBS (Bachelor of Medicine, Bachelor of Surgery) and his M.D. from the University of Lucknow, India and completed his research fellowship training in psychiatry at the University of Michigan Medical School and his postgraduate specialty training and psychiatry residency program at Western University. Our board of directors believes that Dr. Pande is qualified to serve on our board of directors due to his significant medical background and extensive experience in the life science industry.

Heather Preston, M.D. has served as a member of our board of directors since March 2019. Dr. Preston has been the Managing Partner of Pivotal bioVenture Partners since July 2018, and previously she was a Firm Partner and Managing Director of TPG Biotech, a biotechnology venture capital firm, from May 2005 to July 2018. Prior to joining TPG Biotech, Dr. Preston was a medical device and biotechnology venture capital investor at JP Morgan Partners, LLC, and an Entrepreneur-in-Residence at New Enterprise Associates, a diversified venture capital firm. Before her investing career, she spent five years as a leader of the healthcare practice at Mckinsey & Co., advising large pharmaceutical and biotechnology companies on strategic issues. Dr. Preston holds a B.Sc.Hons degree in biochemistry from the University of London and an M.B.B.Chir degree in medicine from the University of Oxford. After leaving Oxford, Dr. Preston completed a post-doctoral fellowship in molecular biology at the Dana Farber Cancer Institute, Harvard University. Dr. Preston is trained in Internal Medicine at the Massachusetts General Hospital and then sub-specialized in Gastroenterology and Hepatology at U.C.S.F. She currently serves on the boards of directors of Alder Biopharmaceuticals Inc, Otonomy, Inc., Oxford BioMedica plc and Entasis Therapeutics Holdings Inc., previously served on the board of directors of Albireo Pharma, Inc. and currently serves on the boards of directors of a number of private companies. Our board of directors believes that Dr. Preston is qualified to serve on our board of directors due to her experience working with and serving on the boards of directors of life sciences companies and her experience working in the venture capital industry.

Board Composition and Election of Directors

Board Composition

Our board of directors currently consists of eight members, each of whom are members pursuant to the board composition provisions of our certificate of incorporation and agreements with our stockholders. These board composition provisions will terminate upon the completion of this offering. Upon the termination of these provisions, there will be no further contractual obligations regarding the election of our directors.

Our amended and restated certificate of incorporation and bylaws that will become effective as of the closing date of this offering provide that the authorized number of directors may be changed only by resolution of our board of directors. Our certificate of incorporation and bylaws will also provide that our directors may be removed only for cause by the affirmative vote of the holders of at least 75% of
our shares of capital stock present in person or by proxy and entitled to vote, and that any vacancy on our board of directors, including a
vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

We have no formal policy regarding board diversity. Our priority in selection of board members is identification of members who will
further the interests of our stockholders through his or her established record of professional accomplishment, the ability to contribute
positively to the collaborative culture among board members, knowledge of our business and understanding of the competitive landscape.

Staggered Board

In accordance with the terms of our certificate of incorporation and bylaws that will become effective as of the closing date of this
offering, our board of directors will be divided into three classes, Class I, Class II and Class III, with members of each class serving
staggered three-year terms. Upon the closing of this offering, the members of the classes will be divided as follows:

- the Class I directors will be Bharat Chowwira, J.D., Ph.D. and Heather Preston, M.D., and their term will expire at the annual
  meeting of stockholders to be held in 2020;
- the Class II directors will be Jeffrey Jonas, M.D., James Healy, M.D., Ph.D. and Robert Nelsen, and their term will expire at the
  annual meeting of stockholders to be held in 2021; and
- the Class III directors will be Edmund Harrigan, M.D., Atul Pande, M.D. and Steven Paul, M.D., and their term will expire at the
  annual meeting of stockholders to be held in 2022.

Upon the expiration of the term of a class of directors, directors in that class will be eligible to be elected for a new three-year term
at the annual meeting of stockholders in the year in which their term expires. Our amended and restated certificate of incorporation and
amended and restated bylaws, both of which will become effective immediately prior to the completion of the offering provide that the
number of our directors shall be fixed from time to time by a resolution of the majority of our board of directors.

The division of our board of directors into three classes with staggered three-year terms may delay or prevent stockholder efforts to
effect a change of our management or a change in control.

Director Independence

Applicable Nasdaq Stock Market, or Nasdaq, rules require a majority of a listed company's board of directors to be comprised of
independent directors within one year of listing. In addition, the Nasdaq rules require that, subject to specified exceptions, each member of
a listed company's audit, compensation and nominating and corporate governance committees be independent. Audit committee
members must also satisfy the independence criteria set forth in Rule 10A-3 under the Securities Exchange Act of 1934, as amended, or
the Exchange Act, and compensation committee members must also satisfy the independence criteria set forth in Rule 10C-1 under the
Exchange Act. Under applicable Nasdaq rules, a director will only qualify as an “independent director” if, in the opinion of the listed
company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in
carrying out the responsibilities of a director. In order to be considered independent for purposes of Rule 10A-3, a member of an audit
committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors, or
any other board committee, accept, directly or indirectly, any consulting, advisory, or other compensatory fee from the listed company or
any of its subsidiaries or otherwise be an affiliated person of the listed company or any of its subsidiaries. In order to be considered
independent for purposes of Rule 10C-1, the board must consider, for each member of a compensation committee of a listed company, all
factors specifically relevant to determining whether a director has a relationship to
such company which is material to that director’s ability to be independent from management in connection with the duties of a compensation committee member, including, but not limited to: the source of compensation of the director, including any consulting, advisory or other compensatory fee paid by such company to the director; and whether the director is affiliated with the company or any of its subsidiaries or affiliates.

In May 2019, our board of directors undertook a review of the composition of our board of directors and its committees and the independence of each director. Based upon information requested from and provided by each director concerning his or her background, employment and affiliations, including family relationships, our board of directors has determined that each of Drs. Chowriria, Healy, Harrigan, Pande and Preston and Mr. Nelson is an “independent director” as defined under applicable Nasdaq rules, including, in the case of the members of our audit committee, other than Dr. Chowriria, independence criteria set forth in Rule 10A-3 under the Exchange Act, and in the case of all the members of our compensation committee, the independence criteria set forth in Rule 10C-1 under the Exchange Act. In making such determination, our board of directors considered the relationships that each such non-employee director has with our company and all other facts and circumstances that our board of directors deemed relevant in determining his or her independence, including the beneficial ownership of our capital stock by each non-employee director. Dr. Paul is not an independent director under these rules because he is our President and Chief Executive Officer. Dr. Jonas is not an independent director under these rules because Dr. Paul serves on the compensation committee of Sage Therapeutics, Inc., where Dr. Jonas serves as the Chief Executive Officer.

There are no family relationships among any of our directors or executive officers.

**Board Leadership Structure and Board’s Role in Risk Oversight**

Our board of directors is currently chaired by Steven Paul, M.D. Our corporate governance guidelines provide that, if the Chairman of the board of directors is a member of management or does not otherwise qualify as independent, the independent directors of the board may or may not elect a lead independent director. Our corporate governance guidelines further provide the flexibility for our board of directors to modify our leadership structure in the future, as it deems appropriate.

Risk is inherent with every business, and how well a business manages risk can ultimately determine its success. We face a number of risks, including risks relating to our financial condition, development and commercialization activities, operations, strategic direction and intellectual property as more fully discussed under “Risk Factors” in this prospectus. Management is responsible for the day-to-day management of risks we face, while our board of directors, as a whole and through its committees, has responsibility for the oversight of risk management. In its risk oversight role, our board of directors has the responsibility to satisfy itself that the risk management processes designed and implemented by management are adequate and functioning as designed.

The role of the board of directors in overseeing the management of our risks is conducted primarily through committees of the board of directors, as disclosed in the descriptions of each of the committees below and in the charters of each of the committees. The full board of directors (or the appropriate board committee in the case of risks that are under the purview of a particular committee) discusses with management our major risk exposures, their potential impact on us, and the steps we take to manage them. When a board committee is responsible for evaluating and overseeing the management of a particular risk or risks, the chairman of the relevant committee reports on the discussion to the full board of directors during the committee reports portion of the next board meeting. This enables the board of directors and its committees to coordinate the risk oversight role, particularly with respect to risk interrelationships.
Board Committees

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee. Each of these committees will operate under a charter that has been approved by our board of directors. The composition of each committee will be effective as of the date of this prospectus.

Audit Committee

The members of our audit committee are Bharat Chowiria, J.D., Ph.D., James Healy, M.D., Ph.D. and Heather Preston, M.D., and Dr. Healy is the chair of the audit committee. Effective as of the date of this prospectus, our audit committee’s responsibilities will include:

• appointing, approving the compensation of, and assessing the independence of our independent registered public accounting firm;
• pre-approving auditing and permissible non-audit services, and the terms of such services, to be provided by our independent registered public accounting firm;
• reviewing the overall audit plan with our independent registered public accounting firm and members of management responsible for preparing our financial statements;
• reviewing and discussing with management and our independent registered public accounting firm our annual and quarterly financial statements and related disclosures as well as critical accounting policies and practices used by us;
• coordinating the oversight and reviewing the adequacy of our internal control over financial reporting;
• establishing policies and procedures for the receipt and retention of accounting-related complaints and concerns;
• recommending based upon the audit committee’s review and discussions with management and our independent registered public accounting firm whether our audited financial statements shall be included in our Annual Report on Form 10-K;
• monitoring the integrity of our financial statements and our compliance with legal and regulatory requirements as they relate to our financial statements and accounting matters;
• preparing the audit committee report required by SEC rules to be included in our annual proxy statement;
• reviewing all related person transactions for potential conflict of interest situations and approving all such transactions; and
• reviewing quarterly earnings releases.

All audit and non-audit services, other than de minimis non-audit services, to be provided to us by our independent registered public accounting firm must be approved in advance by our audit committee.

Our board of directors has determined that Dr. Healy is an “audit committee financial expert” as defined in applicable SEC rules and that each of the members of our audit committee possesses the financial sophistication required for audit committee members under Nasdaq rules. Under the applicable Nasdaq rules, a company listed in connection with its initial public offering is permitted to phase in its compliance with the independent audit committee requirements set forth in Marketplace Rule 5615(b)(1) on the same schedule as it is permitted to phase in its compliance with the
independence audit committee requirement pursuant to Rule 10A-3(b)(1)(iv)(A) under the Exchange Act, that is, (1) one independent member at the time of listing; (2) a majority of independent members within 90 days of listing; and (3) all independent members within one year of listing.

Compensation Committee

The members of our compensation committee are Edmund Harrigan, M.D., Robert Nelsen and Atul Pande, M.D., and Dr. Harrigan is the chair of the compensation committee. Effective as of the date of this prospectus, our compensation committee’s responsibilities will include:

- annually reviewing and approving corporate goals and objectives relevant to the compensation of our Chief Executive Officer;
- evaluating the performance of our Chief Executive Officer in light of such corporate goals and objectives and determining the compensation of our Chief Executive Officer;
- reviewing and approving the compensation of our other executive officers;
- reviewing and establishing our overall management compensation, philosophy and policy;
- overseeing and administering our compensation and similar plans;
- evaluating and assessing potential and current compensation advisors in accordance with the independence standards identified in the applicable Nasdaq rules;
- retaining and approving the compensation of any compensation advisors;
- reviewing and making recommendations to our board of directors about our policies and procedures for the grant of equity-based awards;
- evaluating and making recommendations to the board of directors about director compensation;
- preparing the compensation committee report required by SEC rules, if and when required, to be included in our annual proxy statement; and
- reviewing and approving the retention or termination of any consulting firm or outside advisor to assist in the evaluation of compensation matters.

Nominating and Corporate Governance Committee

The members of our nominating and corporate governance committee are Bharat Chowira, J.D., Ph.D, Jeffrey Jonas, M.D. and Heather Preston, M.D., and Dr. Preston is the chair of the nominating and corporate governance committee. Effective as of the date of this prospectus, our nominating and corporate governance committee’s responsibilities will include:

- developing and recommending to the board of directors criteria for board and committee membership;
- establishing procedures for identifying and evaluating board of director candidates, including nominees recommended by stockholders;
- reviewing the size and composition of the board of directors to ensure that it is composed of members containing the appropriate skills and expertise to advise us;
- identifying individuals qualified to become members of the board of directors;
- recommending to the board of directors the persons to be nominated for election as directors and to each of the board’s committees;
• developing and recommending to the board of directors a code of business conduct and ethics and a set of corporate
governance guidelines; and

• overseeing the evaluation of our board of directors and management.

Under the applicable Nasdaq rules, a company listing in conjunction with its initial public offering is permitted to phase in its
compliance with the independent committee requirements set forth in Nasdaq Rules §5605(d) and (e) as follows: (1) one independent
member at the time of listing; (2) a majority of independent members within 90 days of listing; and (3) all independent members within one
year of listing.

Compensation Committee Interlocks and Insider Participation

Dr. Paul currently serves as a member of the board of directors and a member of the compensation committee of Sage
Therapeutics, Inc. Jeffrey Jonas, one of our directors, serves as the Chief Executive Officer. None of our other executive officers serves, or
in the past year has served, as a member of the board of directors or compensation committee, or other committee serving an equivalent
function, of any other entity that has one or more of its executive officers serving as a member of our board of directors or our
compensation committee. None of the members of our compensation committee is, or has ever been, an officer or employee of our
company.

Code of Business Conduct and Ethics

We plan to adopt a written code of business conduct and ethics that applies to our directors, officers and employees, including our
principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, which
will be effective upon the closing of this offering. Following this offering, we will post a copy of the code on the Corporate Governance
section of our website. If we make any substantive amendments to, or grant any waivers from, the code of business conduct and ethics for
any officer or director, we will disclose the nature of such amendment or waiver on our website or in a current report on Form 8-K.
EXECUTIVE COMPENSATION

This section describes the material elements of compensation awarded to, earned by or paid to each of our named executive officers for the year ended December 31, 2018. We are an “emerging growth company,” within the meaning of the JOBS Act, and have elected to comply with the reduced compensation disclosure requirements available to emerging growth companies under the JOBS Act. Our named executive officers for 2018 were Steven Paul, Andrew Miller and Stephen Brannan. This section also provides qualitative information regarding the manner and context in which compensation is awarded to and earned by our named executive officers and is intended to place in perspective the data presented in the tables and narrative that follow.

Summary Compensation Table

The following table sets forth information regarding compensation awarded to, earned by or paid to our named executive officers during 2018.

<table>
<thead>
<tr>
<th>Name and Principal Position</th>
<th>Year</th>
<th>Salary ($)</th>
<th>Option Awards ($)</th>
<th>Non-Equity Incentive Compensation ($)</th>
<th>All Other Compensation ($)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steven Paul, M.D.(4)</td>
<td>2018</td>
<td>204,567</td>
<td>660,811</td>
<td>102,284</td>
<td>6,137</td>
<td>973,799</td>
</tr>
<tr>
<td>Chief Executive Officer, President and Chairman</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrew Miller, Ph.D.</td>
<td>2018</td>
<td>262,485</td>
<td>112,527</td>
<td>191,870(5)</td>
<td>8,250</td>
<td>575,132</td>
</tr>
<tr>
<td>Chief Operating Officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stephen Brannan, M.D.</td>
<td>2018</td>
<td>316,510</td>
<td>87,909</td>
<td>94,953</td>
<td>8,250</td>
<td>507,622</td>
</tr>
<tr>
<td>Chief Medical Officer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) The amounts reported in the “Option Awards” column reflects the aggregate grant date fair value of share-based compensation awarded during the year computed in accordance with the provisions of Financial Accounting Standards Board Accounting Standards Codification, or ASC, Topic 718. See Note 2 to our financial statements appearing at the end of this prospectus regarding assumptions underlying the valuation of equity awards.

(2) Amounts reported reflect the annual cash incentive bonus paid based upon achievement of certain corporate performance objectives described below under “Annual Cash Incentive Bonus.”

(3) Amounts reported reflect our matching contributions to 401(k) plans.

(4) Dr. Paul commenced employment with us in 2018 and, accordingly, his base salary and non-equity incentive compensation amounts have been prorated to reflect his partial year of service. Dr. Paul received two option awards in April 2018 as compensation for his services as our director, and a third option award in August 2018 in connection with his election as our Chief Executive Officer and President. These awards are described in greater detail below under “Outstanding Equity Awards at 2018 Year End.”

(5) Amount includes a bonus of $100,000 in connection with the closing of our Series A financing.

Narrative to Summary Compensation Table

Base Salary. Each named executive officer’s base salary is a fixed component of annual compensation for performing specific duties and functions, and has been established by our board of directors taking into account each individual’s roles, responsibilities, skills and expertise. In 2018, we paid annual base salaries of $375,000, $262,485 and $316,510 to each of Drs. Paul, Miller and Brannan, respectively.
Annual Cash Incentive Bonus. Our annual bonus program is intended to reward our named executive officers for meeting individual and/or corporate performance goals for a fiscal year. In the first quarter of 2018, our Board of Directors set our corporate performance goals for 2018, which goals related to product development, funding and corporate development, and other general corporate goals. For 2018, the target bonus for Dr. Paul was 50 percent of his base salary, for Dr. Miller 35 percent of his base salary and for Dr. Brannan, 30 percent of his base salary. In March 2019, our Board of Directors determined that the Company had achieved its corporate goals at 100%.

Long-Term Equity Incentive. Although we do not have a formal policy with respect to the grant of equity incentive awards to our named executive officers, we believe that equity grants provide our named executive officers with a strong link to our long-term performance, create an ownership culture and help to align the interests of our named executive officers and our stockholders. In addition, we believe that equity grants with a time-based vesting feature promote executive retention because this feature incent our named executive officers to remain in our employment during the vesting period. We also believe that equity grants with performance-based vesting incent our executives to achieve specified performance goals. Our board of directors intends to periodically review the equity incentive compensation of our named executive officers and from time to time may grant equity incentive awards to them in the form of stock options.

In April 2018, the board of directors granted Dr. Paul an option to purchase 55,154 shares of our common stock and a second option to purchase 49,639 shares of our common stock, in each case, in connection with his services as our director. In August 2018, in connection with his election as our President and Chief Executive Officer the board of directors granted Dr. Paul an option to purchase 604,108 shares of our common stock. Also in August 2018, our board of directors granted Dr. Miller an option to purchase 82,500 shares of our common stock in connection with his election as our Chief Operating Officer. The board of directors granted Dr. Brannan an option to purchase 48,964 shares of our common stock in September 2018.

Outstanding Equity Awards at 2018 Year End

The following table sets forth information regarding outstanding equity awards held by our named executive officers as of December 31, 2018:

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of Securities Underlying Options</th>
<th>Number of Securities Underlying Options</th>
<th>Option Exercise Price ($/share)</th>
<th>Option Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercisable (#)</td>
<td>Unexercisable (#)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven Paul, M.D.</td>
<td>225,000(1)</td>
<td>-</td>
<td>0.14</td>
<td>3/3/2021</td>
</tr>
<tr>
<td></td>
<td>9,192(2)</td>
<td>45,962</td>
<td>9.14</td>
<td>4/29/2028</td>
</tr>
<tr>
<td></td>
<td>120,821(4)</td>
<td>483,287</td>
<td>9.44</td>
<td>8/8/2028</td>
</tr>
<tr>
<td>Andrew Miller, Ph.D.</td>
<td>13,750(5)</td>
<td>-</td>
<td>3.79</td>
<td>5/30/2026</td>
</tr>
<tr>
<td></td>
<td>77,343(6)</td>
<td>46,407</td>
<td>3.79</td>
<td>10/11/2026</td>
</tr>
<tr>
<td></td>
<td>11,000(7)</td>
<td>71,500</td>
<td>9.44</td>
<td>8/8/2028</td>
</tr>
<tr>
<td>Stephen Brannan, M.D.</td>
<td>25,781(8)</td>
<td>42,969</td>
<td>7.08</td>
<td>6/1/2027</td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>48,964</td>
<td>9.44</td>
<td>8/8/2028</td>
</tr>
</tbody>
</table>

(1) This option was granted on March 4, 2011 and vested as to 20% of the shares on the date of grant, with an additional 20% vesting on each anniversary thereof.

(2) This option was granted on April 30, 2018 and vests as to 1/6th of the shares underlying the option award on each six month anniversary of February 28, 2018. Pursuant to Dr. Paul's...
(3) This option was granted on April 30, 2018 and, while no shares were vested as of December 31, 2018, the award vested in full upon the closing of our Series B financing in March 2019.

(4) This option was granted on August 9, 2018 and vests as to 1/30th of the shares underlying the option award on each one month anniversary of June 15, 2018. An additional 211,438 shares vested upon closing of our Series B financing in March 2019, and an additional 50% of those shares that remain unvested upon closing of this initial public offering will vest upon such closing. Pursuant to Dr. Paul's employment agreement, this option shall accelerate in full in the event Dr. Paul's employment is terminated in certain circumstances within 12 months following a change in control.

(5) This option was granted on May 31, 2016 and was vested in full on the date of grant.

(6) This option was granted on October 12, 2016 and vested as to 1/16th of the shares underlying the option award as of July 18, 2016 and as to an additional 1/16th of the shares on each three month anniversary thereof. Following a change in control, 50% of the then-unvested shares underlying this option shall accelerate and vest in full as of such date.

(7) This option was granted on August 9, 2018 and vests as to 1/30th of the shares underlying the option award on each one month anniversary of August 15, 2018. Pursuant to Dr. Miller's offer letter, in the event Dr. Miller's employment terminates in certain circumstances following a change in control, 50% of the then-unvested shares underlying this option shall accelerate and vest in full as of such date.

(8) This option was granted on June 2, 2017 and vested as to 25% of the shares as of March 1, 2018 and as to an additional 12.5% on each six month anniversary thereof. Pursuant to Dr. Brannan's offer letter, in the event Dr. Brannan's employment terminates in certain circumstances following a change in control, 50% of the then-unvested shares underlying this option shall accelerate and vest in full as of such date.

(9) This option was granted on August 9, 2018 and vests as to 12.5% on each six month anniversary of August 8, 2018.

Employment Arrangements with our Named Executive Officers

We have entered into new employment agreements with each of Drs. Paul, Miller and Brannan, which will become effective upon the closing of this offering and will amend and restate each named executive officer’s existing employment arrangement, as described below.

Amended and Restated Employment Agreements with our Named Executive Officers

Steven Paul, M.D.

Under the amended and restated employment agreement effective upon the closing of this offering, Dr. Paul's base salary will be $500,000, which will be reviewed annually by our compensation committee, and he will be eligible to earn annual incentive compensation with a target amount equal to 50% of his base salary. Dr. Paul is also eligible to participate in the employee benefit plans available to our employees, including our stock option plan, subject to the terms of those plans.

Dr. Paul’s employment agreement provides that, in the event that his employment is terminated by us without “cause” (as defined in his employment agreement) or Dr. Paul resigns for “good reason” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 12 months of his base salary, payable in substantially equal installments over 12 months following his termination, (ii) his pro-rated target bonus, (iii) acceleration of vesting of all time-based stock options and other stock-based awards held by Dr. Paul that would have vested in the 12 months following his termination, and (iv) if Dr. Paul elects continuation of health coverage under
COBRA, continued health coverage at the active employees’ rate until the earlier of 12 months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of his COBRA health continuation period. In lieu of the payments and benefits described in the preceding sentence, in the event that Dr. Paul's employment is terminated by us without cause or Dr. Paul resigns for good reason, in either case within 12 months following a “change in control” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 18 months of his base salary, plus 150% of his annual target bonus, (ii) full acceleration of vesting of all time-based stock options and other stock-based awards held by Dr. Paul on the termination date, and (iii) if Dr. Paul elects continuation of health coverage under COBRA, continued health coverage at the active employees’ rate until the earlier of 18 months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of Dr. Paul's COBRA health continuation period.

The payments and benefits provided to Dr. Paul under his employment agreement in connection with a change in control may not be eligible for a federal income tax deduction for the Company pursuant to Section 280G of the Code. These payments and benefits also may be subject to an excise tax under Section 4999 of the Code. If the payments or benefits payable to Dr. Paul in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to such officer.

In addition, Dr. Paul has executed an Employee Invention and Non-Disclosure Agreement and a Non-Competition and Non-Solicitation Agreement which contain certain restrictive covenants, including, among other things, non-competition and non-solicitation provisions that apply during the term of Dr. Paul's employment and for 12 months thereafter.

Andrew Miller, Ph.D.

Under the amended and restated employment agreement effective upon the closing of this offering, Dr. Miller's base salary will be $400,000, which will be reviewed annually by our compensation committee, and he will be eligible to earn annual incentive compensation with a target amount equal to 40% of his base salary. Dr. Miller is also eligible to participate in the employee benefit plans available to our employees, including our stock option plan, subject to the terms of those plans.

Dr. Miller's employment agreement provides that, in the event that his employment is terminated by us without “cause” (as defined in his employment agreement) or Dr. Miller resigns for “good reason” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to nine months of his base salary, payable in substantially equal installments over nine months following his termination, (ii) his pro-rated target bonus, and (iii) if Dr. Miller elects continuation of health coverage under COBRA, continued health coverage at the active employees’ rate until the earlier of nine months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of Dr. Miller’s COBRA health continuation period. In lieu of the payments and benefits described in the preceding sentence, in the event that Dr. Miller’s employment is terminated by us without cause or Dr. Miller resigns for good reason, in either case within 12 months following a “change in control” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 12 months of his base salary, plus his annual target bonus, (ii) full acceleration of vesting of all time-based stock options and other stock-based awards held by Dr. Miller on the termination date, and (iii) if Dr. Miller elects continuation of health coverage under COBRA, continued health coverage at the active employees’ rate until the earlier of 12
months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of Dr. Miller’s COBRA health continuation period.

The payments and benefits provided to Dr. Miller under his employment agreement in connection with a change in control may not be eligible for a federal income tax deduction for the Company pursuant to Section 280G of the Code. These payments and benefits also may be subject to an excise tax under Section 4999 of the Code. If the payments or benefits payable to Dr. Miller in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to such officer.

In addition, Dr. Miller has executed an Employee Invention and Non-Disclosure Agreement and a Non-Competition and Non-Solicitation Agreement which contain certain restrictive covenants, including, among other things, non-competition and non-solicitation provisions that apply during the term of Dr. Miller’s employment and for 12 months thereafter.

Stephen Brannan, M.D.

Under the amended and restated employment agreement effective upon the closing of this offering, Dr. Brannan’s base salary will be $400,000, which will be reviewed annually by our compensation committee, and he will be eligible to earn annual incentive compensation with a target amount equal to 35% of his base salary. Dr. Brannan is also eligible to participate in the employee benefit plans available to our employees, including our stock option plan, subject to the terms of those plans.

Dr. Brannan’s employment agreement provides that, in the event that his employment is terminated by us without “cause” (as defined in his employment agreement) or Dr. Brannan resigns for “good reason” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to nine months of his base salary, payable in substantially equal installments over nine months following his termination, (ii) his pro-rated target bonus, and (iii) if Dr. Brannan elects continuation of health coverage under COBRA, continued health coverage at the active employees’ rate until the earlier of nine months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of Dr. Brannan’s COBRA health continuation period. In lieu of the payments and benefits described in the preceding sentence, in the event that Dr. Brannan’s employment is terminated by us without cause or Dr. Brannan resigns for good reason, in either case within 12 months following a “change in control” (as defined in his employment agreement), subject to the execution and effectiveness of a separation agreement, including a general release of claims in our favor, he will be entitled to receive (i) an amount equal to 12 months of his base salary, plus his annual target bonus, (ii) full acceleration of vesting of all time-based stock options and other stock-based awards held by Dr. Brannan on the termination date, and (iii) if Dr. Brannan elects continuation of health coverage under COBRA, continued health coverage at the active employees’ rate until the earlier of 12 months following his termination, the date he becomes eligible for group medical benefits with another employer or the end of Dr. Brannan’s COBRA health continuation period.

The payments and benefits provided to Dr. Brannan under his employment agreement in connection with a change in control may not be eligible for a federal income tax deduction for the Company pursuant to Section 280G of the Code. These payments and benefits also may be subject to an excise tax under Section 4999 of the Code. If the payments or benefits payable to Dr. Brannan in connection with a change in control would be subject to the excise tax on golden parachutes imposed under Section 4999 of the Code, then those payments or benefits will be reduced if such reduction would result in a higher net after-tax benefit to such officer.
In addition, Dr. Brannan has executed an Employee Invention and Non-Disclosure Agreement and a Non-Competition and Non-Solicitation Agreement which contain certain restrictive covenants, including, among other things, non-competition and non-solicitation provisions that apply during the term of Dr. Brannan's employment and for 12 months thereafter.

Prior Employment Arrangements With Our Named Executive Officers

**Steven Paul, M.D.**

In August 2018, we entered into an employment agreement with Dr. Paul. The employment agreement establishes Dr. Paul's title, his base annual salary of $475,000, his eligibility for an annual bonus, and his eligibility for benefits made available to employees generally and also provides for certain benefits upon termination of his employment under specified conditions. Our board of directors has determined that Dr. Paul is eligible to receive an annual bonus of up to 50% of his base salary.

Under the terms of his employment agreement, if Dr. Paul's employment is terminated by us without "cause" or by Dr. Paul for "good reason," each as defined in his employment agreement, and subject to Dr. Paul's execution of a general release of potential claims against us, we have agreed to pay Dr. Paul an amount equal to twelve months of his then-current base salary and a pro-rated portion of his annual performance bonus for the calendar year in which his employment was terminated. Dr. Paul's employment agreement further provides that upon such termination, all outstanding equity awards held by Dr. Paul which would have vested in the twelve month period following his termination shall immediately accelerate and become fully exercisable as of the date of termination.

In the event that Dr. Paul's employment is terminated by us without cause or by Dr. Paul for good reason within twelve months following a “change in control,” as defined in Dr. Paul's employment agreement, and subject to Dr. Paul's execution of a general release of potential claims against us, then in lieu of the benefits described in the prior paragraph, Dr. Paul shall be entitled to a lump sum in cash in an amount equal to 1.5 times his then-current base salary plus his target annual performance bonus for the calendar year in which his employment was terminated. Additionally, upon such termination, all outstanding equity awards held by Dr. Paul shall accelerate in full.

Dr. Paul's employment agreement also provides that upon closing of any equity financing (including securities convertible into equity), up to and including this offering (and the exercise of any over-allotment option), Dr. Paul shall receive an additional stock option such that Dr. Paul's fully diluted share ownership will not be less than 8.5% after giving effect to such financing. In the event that we terminate Dr. Paul's employment without cause or Dr. Paul terminates his employment for good reason within three months of the closing of this offering, Dr. Paul's employment agreement requires us to grant to Dr. Paul an additional option such that Dr. Paul's fully diluted share ownership will not be less than 8.5% after giving effect to this offering. Any options granted to Dr. Paul in connection with this offering will have an exercise price equal to the public offering price and a vesting commencement date of June 15, 2018. The options will vest ratably over 30 months from the vesting commencement date. Dr. Paul's right to maintain a fully diluted share ownership of not less than 8.5% will terminate immediately following this offering.

Dr. Paul also entered into an employee invention and non-disclosure agreement and a non-competition and non-solicitation agreement with us in August 2018 which provide that he will (1) not compete with us during his employment and for a period of one year after the termination of his employment, (2) not solicit our employees, independent contractors or customers during his employment and for a period of one year after the termination of his employment, (3) protect our confidential and proprietary information and (4) assign to us related intellectual property developed during the course of his employment.
Andrew Miller, Ph.D.

In August 2018, we entered into an offer letter with Dr. Miller. The offer letter establishes Dr. Miller’s title, his base salary, his eligibility for an annual bonus, and his eligibility for benefits made available to employees generally and also provides for certain benefits upon termination of his employment under specified conditions. Our board of directors has determined that Dr. Miller is eligible to receive an annual bonus of up to 35% of his base salary. Dr. Miller’s offer letter also provided that Dr. Miller would receive an additional bonus of $100,000 upon closing of a subsequent equity financing, which Dr. Miller earned upon completion of our Series A financing in August 2018 and our Series B financing in March 2019.

Under the terms of his offer letter, if Dr. Miller’s employment is terminated by us without “cause” or by Dr. Miller for “good reason,” each as defined in his offer letter, and subject to Dr. Miller’s execution of a general release of potential claims against us, we have agreed to pay Dr. Miller an amount equal to six months of his then-current base salary and a pro-rated portion of his annual performance bonus for the calendar year in which his employment was terminated.

In the event that Dr. Miller’s employment is terminated by us without cause or by Dr. Miller for good reason, following a “change in control,” as defined in Dr. Miller’s offer letter, and subject to Dr. Miller’s execution of a general release of potential claims against us, then upon such termination, 50% of the shares underlying the option to purchase 82,500 shares of our common stock granted to Dr. Miller on August 9, 2018 that remain unvested as of his termination date shall become fully vested and exercisable as of such date.

Stephen Brannan, M.D.

In February 2017, we entered into an offer letter with Dr. Brannan. The offer letter establishes Dr. Brannan's title, his base salary, his eligibility for an annual bonus, and his eligibility for benefits made available to employees generally. Our board of directors has determined that Dr. Brannan is eligible to receive an annual bonus of up to 30% of his base salary.

Under the terms of his offer letter, if Dr. Brannan's employment is terminated by us without “cause” or by Dr. Brannan for “good reason,” each as defined in his offer letter, and subject to Dr. Brannan's execution of a general release of potential claims against us, we have agreed to pay Dr. Brannan an amount equal to four months of his then-current base salary.

In the event that Dr. Brannan's employment is terminated by us without cause or by Dr. Brannan for good reason following a “change in control,” as defined in Dr. Brannan’s offer letter, and subject to Dr. Brannan’s execution of a general release of potential claims against us, then upon such termination, 50% of the shares underlying the option to purchase 68,750 shares of our common stock granted to Dr. Brannan on June 2, 2017 that remain unvested as of his termination date shall become fully vested and exercisable as of such date.

Dr. Brannan also entered into an employee invention and non-disclosure agreement and a non-competition and non-solicitation agreement with us in February 2017 which provide that he will
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(1) not compete with us during his employment and for a period of one year after the termination of his employment, (2) not solicit our employees, independent contractors or customers during his employment and for a period of one year after the termination of his employment, (3) protect our confidential and proprietary information and (4) assign to us related intellectual property developed during the course of his employment.

Stock Option and Other Compensation Plans

The three equity incentive plans described in this section are our 2009 stock incentive plan, as amended, or the 2009 Plan, our 2019 Stock Option and Incentive Plan, or the 2019 Plan, and our 2019 Employee Stock Purchase Plan, or the ESPP. Prior to this offering, we granted awards to eligible participants under the 2009 Plan. Following the closing of this offering, we expect to grant awards to eligible participants only under the 2019 Plan.

2009 Stock Incentive Plan

The 2009 Plan was adopted by our board of directors and approved by our stockholders in July 2009 and amended by our board and stockholders in March 2011, July 2018 and March 2019. The 2009 Plan provides for the grant of incentive stock options, nonqualified stock options, restricted stock awards, restricted stock units, stock appreciation rights and other stock-based awards. Our employees, officers, directors, consultants and advisors are eligible to receive awards under the 2009 Plan; however, incentive stock options may only be granted to our employees. Our board of directors, or a committee appointed by our board, administers the 2009 Plan and, subject to any limitations set forth in the 2009 Plan, will select the recipients of awards and determine:

- the number of shares of common stock covered by options and the dates upon which those options become exercisable;
- the type of options to be granted;
- the exercise prices of options;
- the duration of options; and
- the number of shares of common stock subject to any restricted stock or other stock-based awards and the terms and conditions of those awards, including the issue price, conditions for repurchase or forfeiture and repurchase price.

If our board of directors delegates authority to an executive officer to grant awards under the 2009 Plan, the executive officer has the power to make awards to employees and officers, except executive officers. Our board of directors will fix the terms of the awards to be granted by such executive officer, including the exercise price of such awards, and the maximum number of shares subject to awards that such executive officer may make.

The 2009 Plan provides that a maximum of 3,011,580 shares of our common stock are authorized for issuance under the plan. Our board of directors may amend, suspend, or terminate the 2009 Plan at any time.

Upon the occurrence of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spinoff, or other similar change in capitalization or event, or any dividend or distribution to holders of our common stock other than an ordinary cash dividend, under the terms of the 2009 Plan, we are required to equitably adjust (or make substitute awards, if applicable), in the manner determined by our board of directors:

- the number and class of securities available under the 2009 plan;
- the number and class of securities and exercise price per share of each outstanding option;
the share and per-share provisions and the measurement price of each outstanding stock appreciation right;
the number of shares subject to and the repurchase price per share subject to each outstanding restricted stock award; and
the share and per-share-related provisions and the purchase price, if any, of each outstanding other stock-based award.

Upon the occurrence of a merger or consolidation of our company with or into another entity as a result of which all of our common stock is converted into or exchanged for the right to receive cash, securities, or other property or is cancelled; any transfer or disposition of all of our common stock for cash, securities, or other property pursuant to a share exchange or other transaction; or a liquidation or dissolution of our company, our board of directors may, on such terms as our board of directors determines (except to the extent specifically provided otherwise in an applicable award agreement or other agreement between us and the plan participant), take any one or more of the following actions pursuant to the 2009 Plan, as to some or all outstanding awards, other than restricted stock awards:

provide that awards shall be assumed, or substantially equivalent awards shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof);
upon written notice to a plan participant, provide that the participant’s unexercised awards will terminate immediately prior to the consummation of such transaction unless exercised by the participant (to the extent then exercisable) within a specified period;
provide that outstanding awards shall become exercisable, realizable or deliverable, or restrictions applicable to an award shall lapse, in whole or in part, prior to or upon such transaction;
in the event of a transaction under the terms of which holders of common stock will receive upon consummation thereof a cash payment for each share surrendered in the transaction, make or provide for a cash payment to a plan participant;
provide that, in connection with a liquidation of dissolution of the company, awards shall convert into the right to receive liquidation proceeds; or
any combination of the foregoing.

Our board of directors is not obligated under the 2009 Plan to treat all awards, all awards held by a participant, or all awards of the same type, identically.

Upon the occurrence of any corporate transaction described above, other than our liquidation or dissolution, our repurchase and other rights under each outstanding restricted stock award will continue for the benefit of our successor and will, unless our board of directors determines otherwise, apply to the cash, securities, or other property which our common stock was converted into or exchanged for in the transaction in the same manner and to the same extent as they applied to the common stock subject to the restricted stock award; provided, however, that the board may provide termination or deemed satisfaction of such repurchase or other rights under the restricted stock award agreement, either initially or by amendment, or provide for forfeiture of such restricted stock if issued at no cost.

Our board of directors, in its sole discretion, may accelerate the exercisability of any option or time at which any restrictions shall lapse or be removed from any restricted stock award, as the case may be.
As of May 30, 2019, there were 2,875,488 shares of common stock issuable upon the exercise of stock options outstanding under the 2009 Plan at a weighted average exercise price of $8.62 per share, 30,000 options to purchase shares had been exercised and 106,092 shares of common stock were available for future issuance under the 2009 Plan (which includes 80,976 shares of common stock underlying fully vested restricted stock units we issued in May 2019, which we are obligated to issue and deliver no later than March 15, 2020). On and after the effective date of the 2019 Plan described below, we will grant no further stock options or other awards under the 2009 Plan.

2019 Stock Option and Incentive Plan

Our 2019 Stock Option and Incentive Plan, or our 2019 Plan, was adopted by our board of directors in May 2019, and approved by our stockholders on [July 19, 2019], 2019 and will become effective on the date immediately prior to the date on which the registration statement of which this prospectus is part is declared effective by the U.S. Securities and Exchange Commission, or the SEC. Our 2019 Plan will replace our 2009 Plan as our board of directors has determined not to make additional awards under that plan following the consummation of our initial public offering. Our 2019 Plan allows the compensation committee to make equity-based incentive awards to our officers, employees, directors and other key persons (including consultants).

We have initially reserved 2,000,000 shares of our common stock, or the Initial Limit, for the issuance of awards under our 2019 Plan, plus the shares of common stock remaining available for issuance under our 2009 Plan. This limit is subject to adjustment in the event of a stock split, stock dividend or other change in our capitalization. Our 2019 Plan provides that the number of shares reserved and available for issuance thereunder will automatically increase on January 1, 2019 and each January 1 thereafter by 4% of the number of shares of common stock outstanding on the immediately preceding December 31 or such lesser number of shares determined by the compensation committee, or the Annual Increase.

The shares we issue under our 2019 Plan will be authorized but unissued shares or shares that we reacquire. The shares of common stock underlying any awards that are forfeited, cancelled, held back upon exercise or settlement of an award to satisfy the exercise price or tax withholding, reacquired by us prior to vesting, satisfied without the issuance of stock, expire or are otherwise terminated (other than by exercise) under our 2019 Plan and our 2014 Plan will be added back to the shares of common stock available for issuance under our 2019 Plan.

The maximum number of shares that may be issued as incentive stock options may not exceed the Initial Limit, cumulatively increased on January 1, 2020 and on each January 1 thereafter by the lesser of the Annual Increase, or 200,000 shares.

Our 2019 Plan will be administered by our compensation committee. Our compensation committee has full power to select, from among the individuals eligible for awards, the individuals to whom awards will be granted, to make any combination of awards to participants, and to determine the specific terms and conditions of each award, subject to the provisions of our 2019 Plan. Persons eligible to participate in our 2019 Plan will be those full or part-time officers, employees, non-employee directors, and other key persons (including consultants) as selected from time to time by our compensation committee in its discretion.

Our 2019 Plan permits the granting of both options to purchase common stock intended to qualify as incentive stock options under Section 422 of the U.S. Internal Revenue Code of 1986, as amended, or the Code, and options that do not so qualify. The option exercise price of each option will be determined by our compensation committee but may not be less than 100% of the fair market value of our common stock on the date of grant. The term of each option will be fixed by our compensation committee and may not exceed ten years from the date of grant. Our compensation committee will
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determine at what time or times each option may be exercised.

Our compensation committee may award stock appreciation rights subject to such conditions and restrictions as it may determine. Stock appreciation rights entitle the recipient to shares of common stock equal to the value of the appreciation in our stock price over the exercise price. The exercise price may not be less than 100% of the fair market value of our common stock on the date of grant. The term of each stock appreciation right will be fixed by our compensation committee and may not exceed ten years from the date of grant. Our compensation committee will determine at what time or times each stock appreciation right may be exercised.

Our compensation committee may award restricted shares of common stock and restricted stock units to participants subject to such conditions and restrictions as it may determine. These conditions and restrictions may include the achievement of certain performance goals and/or continued employment with us through a specified vesting period. Our compensation committee may also grant shares of common stock that are free from any restrictions under our 2019 Plan. Unrestricted stock may be granted to participants in recognition of past services or for other valid consideration and may be issued in lieu of cash compensation due to such participant.

Our compensation committee may grant performance share awards to participants that entitle the recipient to receive awards of common stock upon the achievement of certain performance goals and such other conditions as our compensation committee may determine. Our compensation committee may grant dividend equivalent rights to participants that entitle the recipient to receive credits for dividends that would be paid if the recipient had held a specified number of shares of common stock.

Our compensation committee may grant cash bonuses under our 2019 Plan to participants, subject to the achievement of certain performance goals.

Our 2019 Plan provides that upon the effectiveness of a “sale event,” as defined in our 2019 Plan, an acquirer or successor entity may assume, continue or substitute outstanding awards under our 2019 Plan. To the extent that awards granted under our 2019 Plan are not assumed or continued or substituted by the successor entity, except as may be otherwise provided in the relevant award certificate, all awards with time-based vesting, conditions or restrictions shall become fully vested and nonforfeitable as of the effective time of the sale event, and all awards with conditions and restrictions relating to the attainment of performance goals may become vested and nonforfeitable in connection with a sale event in the compensation committee’s discretion or to the extent specified in the relevant award certificate. Upon the effective time of the sale event, all outstanding awards granted under our 2019 Plan shall terminate. In the event of such termination, individuals holding options and stock appreciation rights will be permitted to exercise such options and stock appreciation rights (to the extent exercisable) within a specified period of time prior to the sale event. In addition, in connection with the termination of our 2019 Plan upon a sale event, we may make or provide for a payment, in cash or in kind, to participants holding vested and exercisable options and stock appreciation rights equal to the difference between the per share cash consideration payable to stockholders in the sale event and the exercise price of the options or stock appreciation rights and we may make or provide for a payment, in cash or in kind, to participants holding other vested awards.

Our board of directors may amend or discontinue our 2019 Plan and our compensation committee may amend or cancel outstanding awards for purposes of satisfying changes in law or any other lawful purpose, but no such action may adversely affect rights under an award without the holder’s consent. Certain amendments to our 2019 Plan require the approval of our stockholders.

No awards may be granted under our 2019 Plan after the date that is ten years from the effective date of our 2019 Plan. No awards under our 2019 Plan have been made prior to the date hereof.
2019 Employee Stock Purchase Plan

In May 2019, our board of directors adopted and our stockholders approved our 2019 Employee Stock Purchase Plan, or the ESPP. Our ESPP initially reserves and authorizes the issuance of up to a total of [quantity] shares of common stock to participating employees. Our ESPP provides that the number of shares reserved and available for issuance will automatically increase on each January 1, beginning on January 1, 2020 and ending on January 1, 2029, by the lesser of (i) [quantity] shares of common stock, (ii) 1.0% of the outstanding shares of common stock on the immediately preceding December 31 or (iii) such lesser number of shares as determined by the administrator of our ESPP. This number is subject to adjustment in the event of a stock split, stock dividend or other change in our capitalization.

All employees whose customary employment is for more than 20 hours a week are eligible to participate in our ESPP. Any employee who owns 5% or more of the voting power or value of our shares of common stock is not eligible to purchase shares under our ESPP.

We will make one or more offerings each year to our employees to purchase shares under our ESPP. Offerings will usually begin on each January 1 and July 1 and will continue for six-month periods, referred to as offering periods. Each eligible employee may elect to participate in any offering by submitting an enrollment form at least 15 business days before the relevant offering date.

Each employee who is a participant in our ESPP may purchase shares by authorizing payroll deductions of up to 15% of his or her eligible compensation during an offering period. Unless the participating employee has previously withdrawn from the offering, his or her accumulated payroll deductions will be used to purchase shares of common stock on the last business day of the offering period at a price equal to 85% of the fair market value of the shares on the first business day or the last business day of the offering period, whichever is lower, provided that no more than $25,000 worth of shares of common stock, valued at the start of the purchase period (or such lesser number of shares determined by the administrator) may be purchased by any one employee during each offering period. Under applicable tax rules, an employee may purchase no more than $25,000 worth of shares of common stock, valued at the start of the purchase period, under our ESPP in any calendar year.

The accumulated payroll deductions of any employee who is not a participant on the last day of an offering period will be refunded. An employee’s rights under our ESPP terminate upon voluntary withdrawal from the plan or when the employee ceases employment with us for any reason.

Our ESPP may be terminated or amended by our board of directors at any time. An amendment that increases the number of shares of common stock authorized under our ESPP and certain other amendments require the approval of our stockholders.

Senior Executive Cash Incentive Bonus Plan

In May 2019, our board of directors adopted the Senior Executive Cash Incentive Bonus Plan, or the Bonus Plan. Our Bonus Plan provides for bonus payments based upon the attainment of performance targets established by our compensation committee. The payment targets will be related to financial and operational measures or objectives with respect to our company, or the Corporate Performance Goals, as well as individual performance objectives. Our compensation committee may select Corporate Performance Goals from among the following: cash flow (including, but not limited to, operating cash flow and free cash flow); revenue; corporate revenue; earnings before interest, taxes, depreciation and amortization; net income (loss) (either before or after interest, taxes, depreciation and/or amortization); changes in the market price of our common stock; economic value-added; development, clinical, regulatory or commercial milestones; acquisitions or strategic transactions; operating income (loss); return on capital, assets, equity, or investment; stockholder returns; return on
sales; gross or net profit levels; productivity; expense efficiency; margins; operating efficiency; customer satisfaction; working capital; earnings (loss) per share of our common stock; bookings, new bookings or renewals; sales or market shares; number of customers; number of new customers or customer references; operating income and/or net annual recurring revenue, any of which may be measured in absolute terms, as compared to any incremental increase, in terms of growth, as compared to results of a peer group, against the market as a whole, compared to applicable market indices and/or measured on a pre-tax or post-tax basis. Each executive officer who is selected to participate in our Bonus Plan will have a target bonus opportunity set for each performance period. The bonus formulas will be adopted in each performance period by the compensation committee and communicated to each executive. The Corporate Performance Goals will be measured at the end of each performance period after our financial reports have been published. If the Corporate Performance Goals and individual performance objectives are met, payments will be made as soon as practicable following the end of each performance period. Subject to the rights contained in any agreement between the executive officer and us, an executive officer must be employed by us on the bonus payment date to be eligible to receive a bonus payment. Our Bonus Plan also permits the compensation committee to approve additional bonuses to executive officers in its sole discretion.

401(k) Retirement Plan

We participate in a 401(k) retirement plan sponsored by PureTech Health, our shareholder, which is intended to be a tax-qualified defined contribution plan under Section 401(k) of the Internal Revenue Code. In general, all of our employees are eligible to participate, beginning two months after the commencement of their employment. The 401(k) plan includes a salary deferral arrangement pursuant to which participants may elect to reduce their current compensation by up to the statutorily prescribed limit and have the amount of the reduction contributed to the 401(k) plan. We currently contribute to each employee’s 401(k) account, in the first quarter of each year, 3% of his or her eligible earnings from the prior year.

Limitations on Liability and Indemnification

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers or controlling persons, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Rule 10b5-1 Sales Plans

Our directors and executive officers may adopt written plans, known as Rule 10b5-1 plans, in which they will contract with a broker to buy or sell shares of our common stock on a periodic basis. Under a Rule 10b5-1 plan, a broker executes trades pursuant to parameters established by the director or officer when entering into the plan, without further direction from the director or officer. The director or officer may amend or terminate the plan in some circumstances. Our directors and executive officers may also buy or sell additional shares outside of a Rule 10b5-1 plan when they are not in possession of material, nonpublic information.
## DIRECTOR COMPENSATION

The following table sets forth information regarding compensation earned by our non-employee directors during the year ended December 31, 2018. We reimburse non-employee members of our board of directors for reasonable travel expenses. The compensation of our Chief Executive Officer, President and Chairman and our Chief Operating Officer are discussed above in the “Executive Compensation” section.

<table>
<thead>
<tr>
<th>Name</th>
<th>Fees earned or paid in cash($)</th>
<th>Option Awards($)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bharat Chowria, J.D., Ph.D.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Eric Elenko, Ph.D.(1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Edmund Harrigan, M.D.(2)</td>
<td>25,000</td>
<td>-</td>
<td>25,000</td>
</tr>
<tr>
<td>Jeffrey Jonas, M.D.(3)</td>
<td>11,250</td>
<td>221,496(4)</td>
<td>232,746</td>
</tr>
<tr>
<td>Joep Muijrers, Ph.D.(1)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Stephen Muniz, J.D.(5)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Robert Nelsen, M.B.A.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Atul Pande, M.D.(6)</td>
<td>25,000</td>
<td>-</td>
<td>25,000</td>
</tr>
<tr>
<td>Bennett Shapiro(7)</td>
<td>10,000(8)</td>
<td>-</td>
<td>10,000</td>
</tr>
</tbody>
</table>

(1) Drs. Elenko and Muijrers will resign from our board of directors effective immediately prior to the effectiveness of the registration statement of which this prospectus forms a part.

(2) As of December 31, 2018, Dr. Harrigan held unexercised stock options to purchase an aggregate of 27,500 shares of our common stock. Dr. Harrigan also receives an annual payment of $25,000 pursuant to an advisor agreement, dated May 25, 2017.

(3) Dr. Jonas joined our board of directors in October 2018. Pursuant to his board agreement, he is entitled to a fee of $45,000 per year in consideration for his services as a member of our board. As of December 3, 2018, Dr. Jonas held unexercised stock options to purchase an aggregate of 47,218 shares of our common stock.

(4) This option was granted on October 1, 2018 in connection with Dr. Jonas’s election to our board of directors and vests as to 12.5% of the shares on each six month anniversary of September 20, 2018.

(5) Mr. Muniz resigned as a director effective March 21, 2019.

(6) As of December 31, 2018, Dr. Pande held unexercised stock options to purchase an aggregate of 27,500 shares of our common stock. Dr. Pande resigned as a director effective March 15, 2019. Dr. Pande will join our board of directors effective immediately after the effectiveness of the registration statement of which this prospectus forms a part.

(7) Dr. Shapiro resigned as a director effective March 21, 2019.

(8) Represents amount paid to Dr. Shapiro for his service as a director by our stockholder, PureTech Health LLC, which fees were reimbursed by us to PureTech Health LLC.

We currently do not have a formal non-employee director compensation policy. We pay Dr. Harrigan an annual fee of $25,000 in consideration for his services as a member of our board and, until their resignation from our board in March 2019, we paid Dr. Pande an annual fee of $25,000. We pay Dr. Jonas an annual fee of $45,000 in consideration for his services as a member of our board, and we granted him an option to purchase 47,218 shares of our common stock in October 2018 in connection with his election to the board. We also reimburse our non-employee directors for reasonable travel and out-of-pocket expenses incurred in connection with attending board of directors and committee meetings.

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Non-Employee Director Compensation Policy

In connection with this offering, our board of directors plans to adopt a Non-Employee Director Compensation Policy. The policy is designed to ensure that the compensation aligns the directors’ interests with the long-term interests of the stockholders, that the structure of the compensation is simple, transparent and easy for stockholders to understand and that our directors are fairly compensated. Employee directors will not receive additional compensation for their services as directors.

Under the policy, upon initial election or appointment to the board of directors, new non-employee directors receive a one-time stock option grant to purchase 25,000 shares of our common stock, which will vest in equal monthly installments over three years. In each subsequent year of a non-employee director’s tenure, the director will receive an annual equity grant of options to purchase 12,500 shares of our common stock, which vests in full upon the earlier to occur of the first anniversary of the grant date or the date of the next annual meeting of stockholders. If either an initial equity award or an annual equity award is in the form of a nonqualified stock option, then the exercise price will equal the fair market value of our common stock, as measured by reference to market quotations on Nasdaq, as of the grant date. Vesting of any equity award will cease if a director resigns from our board of directors or otherwise ceases to serve as a director, unless the board of directors determines that circumstances warrant continuation of vesting.

In addition, each non-employee director is paid an annual retainer of $35,000 for their services. Such cash retainers are paid quarterly, and may be pro-rated based on the number of actual days served by the director during such calendar quarter.

Committee members also receive additional annual retainers. These additional payments for service on a committee are due to the workload and broad-based responsibilities of the committees. These committee retainers are as follows:

<table>
<thead>
<tr>
<th>Committee</th>
<th>Member Annual Fee</th>
<th>Chairman Additional Annual Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Committee</td>
<td>$7,500</td>
<td>$15,000</td>
</tr>
<tr>
<td>Compensation Committee</td>
<td>$5,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Nominating and Corporate Governance Committee</td>
<td>$4,000</td>
<td>$8,000</td>
</tr>
</tbody>
</table>
CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

Other than the compensation agreements and other arrangements described under “Executive Compensation” and “Director Compensation” in this prospectus and the transactions described below, since January 1, 2016, there has not been and there is not currently proposed, any transaction or series of similar transactions to which we were, or will be, a party in which the amount involved exceeded, or will exceed, $120,000 and in which any director, executive officer, holder of five percent or more of any class of our capital stock or any member of the immediate family of, or entities affiliated with, any of the foregoing persons, had, or will have, a direct or indirect material interest.

We believe the terms obtained or consideration that we paid or received, as applicable, in connection with the transactions described below were comparable to terms available or the amounts that we would pay or receive, as applicable, in arm’s-length transactions.

Issuance of Common Stock Warrant

In October 2016, we issued a warrant, or the Warrant, to purchase 15,400 shares of our common stock at a price of $3.79 per share to PureTech Health LLC, or PureTech Health. On July 31, 2018, PureTech Health partially exercised the Warrant and purchased ten shares of common stock for an aggregate exercise price of $37.90. On March 18, 2019, PureTech Health exercised the remaining portion of the Warrant and purchased 15,390 shares for an aggregate exercise price of $58,328.

Issuance of Convertible Promissory Notes to PureTech Health

On August 31, 2017, we issued a convertible promissory note, or the Initial August 2017 Note, to PureTech Health in the principal amount of $345,819. On the same date, we issued a second convertible promissory note, or the Second August 2017 Note, and together with the Initial August 2017 Note, the 2017 Notes, to PureTech Health in the principal amount of up to $6.5 million. The Second August 2017 Note was payable in installments, with $3.5 million of the note drawn down upon execution of the note and an additional $3.0 million drawn down upon our receipt of permission from the FDA to dose a second cohort in our Phase 2 clinical trial and confirmation that a material adverse event had not occurred. This second draw down occurred in January 2018. In June 2018, we issued an additional convertible promissory note to PureTech Health in the principal amount of $4.0 million, or the 2018 Note. The 2017 Notes and the 2018 Note accrued interest at a rate of 10% per year and the 2017 Notes converted at a 25% discount in our Series A preferred stock financing, as further described below, and the 2018 Notes converted at no discount.

Wellcome Trust Funding Agreement

In July 2015, we entered into a company funding agreement, or the 2015 Wellcome Funding Agreement, with The Wellcome Trust Limited, or Wellcome Trust, pursuant to which we were eligible to receive $3.8 million in gross proceeds upon the achievement of specified milestones. As of December 31, 2017, we had received the full amount of gross proceeds under the 2015 Wellcome Funding Agreement. In June 2018, we entered into another company funding agreement with Wellcome Trust, or the 2018 Wellcome Funding Agreement, to receive up to $8.0 million in gross proceeds upon the achievement of specified milestones. Pursuant to the 2018 Wellcome Funding Agreement, we received $2.0 million in July 2018, $2.7 million in November 2018, $1.6 million in March 2019 and $1.6 million in April 2019. The 2015 Wellcome Funding Agreement and 2018 Wellcome Funding Agreement are together referred to as the Wellcome Funding Agreements.

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The outstanding principal under the Wellcome Funding Agreements is convertible into shares of our preferred stock upon certain events, including equity financings, and the discount applied to conversion of the outstanding principal upon an equity financing is 20% for the 2015 Wellcome Funding Agreement and adjusts from 0% to 25% for the 2018 Wellcome Funding Agreement, based on when such conversion occurs, with the discount increasing as time elapses from the effective date of the applicable Wellcome Funding Agreement.

In August 2018, the outstanding $3.8 million principal balance under the 2015 Wellcome Funding Agreement as well as the initial $2.0 million principal balance under the 2018 Wellcome Funding Agreement were converted to Series A preferred stock in connection with our Series A preferred stock financing, as further described below.

We received an additional $2.7 million, $1.6 million and $1.6 million in November 2018, March 2019 and April 2019, respectively, pursuant to the 2018 Wellcome Funding Agreement, all of which converted into Series B preferred stock in our Series B preferred stock financing at either a 15% or 25% discount in March and April 2019, as further described below. We are eligible to receive up to an aggregate of $128,855 in future funding under the terms of the 2018 Wellcome Funding Agreement, which would be payable at our option upon the achievement of a specified clinical milestone.

### Series A Preferred Stock Financing

In August 2018, we issued and sold an aggregate of 3,126,700 shares of Series A preferred stock at a price per share of $13.46, for an aggregate purchase price of approximately $42.1 million. Included in this amount was approximately $26.1 million of outstanding principal, interest and discount on convertible promissory notes issued between May 2011 and June 2018, including the 2017 Notes, and the outstanding principal amount under the Wellcome Funding Agreements, all of which converted into Series A preferred stock in this financing in accordance with their terms.

The following table sets forth the aggregate cash purchase price of the Series A preferred stock purchased by our directors, executive officers and 5% stockholders and their affiliates and the number of shares of our Series A preferred stock issued in consideration of such amounts.

<table>
<thead>
<tr>
<th>Name</th>
<th>Cash Purchase Price</th>
<th>Number of Shares of Series A Preferred Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH Venture Fund IX, L.P.</td>
<td>$7,600,000</td>
<td>557,207</td>
</tr>
<tr>
<td>ARCH Venture Fund IX Overage, L.P.</td>
<td>$7,500,000</td>
<td>557,206</td>
</tr>
<tr>
<td>Steven Paul, M.D.</td>
<td>$1,000,000</td>
<td>74,294</td>
</tr>
<tr>
<td>Total</td>
<td>$16,000,000</td>
<td>1,188,707</td>
</tr>
</tbody>
</table>

The following table sets forth the aggregate principal and interest under the 2017 Notes and the Wellcome Funding Agreements converted by PureTech Health and Wellcome Trust, respectively, as 5% stockholder, and the number of shares of our Series A preferred stock issued upon conversion of such securities.

<table>
<thead>
<tr>
<th>Name</th>
<th>Principal, Interest and Discount</th>
<th>Number of Shares of Series A Preferred Stock Issued Upon Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>PureTech Health LLC</td>
<td>$18,155,036</td>
<td>1,348,814</td>
</tr>
<tr>
<td>The Wellcome Trust Limited</td>
<td>$6,811,097</td>
<td>506,025</td>
</tr>
</tbody>
</table>

### Series B Preferred Stock Financing

In March and April 2019, we issued and sold an aggregate of 5,422,845 shares of Series B preferred stock at a price per share of $15.14, for an aggregate purchase price of approximately $81,997,534.

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$82.1 million. Included in this amount was approximately $5.8 million of outstanding principal loaned to us subsequent to the Series A financing pursuant to the Wellcome Funding Agreements, which converted into Series B preferred stock in this financing at either a 15% or 25% discount in accordance with the terms of the Wellcome Funding Agreements.

<table>
<thead>
<tr>
<th>Name</th>
<th>Cash Purchase Price</th>
<th>Number of Shares of Series B Preferred Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>PureTech Health LLC</td>
<td>$5,000,000</td>
<td>330,250</td>
</tr>
<tr>
<td>ARCH Venture Fund IX, L.P.</td>
<td>$10,000,000</td>
<td>660,502</td>
</tr>
<tr>
<td>ARCH Venture Fund IX Overage, L.P.</td>
<td>$10,000,000</td>
<td>660,501</td>
</tr>
<tr>
<td>Sofinnova Venture Partners X, L.P.</td>
<td>$12,000,000</td>
<td>792,602</td>
</tr>
<tr>
<td>Total</td>
<td>$37,000,000</td>
<td>2,443,855</td>
</tr>
</tbody>
</table>

The following table sets forth the aggregate principal and interest under the Wellcome Funding Agreements converted by The Wellcome Trust, as a 5% stockholder, and the number of shares of our Series B preferred stock issued upon conversion.

<table>
<thead>
<tr>
<th>Name</th>
<th>Aggregate Principal and Discount</th>
<th>Number of Shares of Series B Preferred Stock Issued Upon Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Wellcome Trust Limited</td>
<td>$7,101,977</td>
<td>469,087</td>
</tr>
</tbody>
</table>

Patent License Agreement with PureTech Health LLC

In March 2011, we entered into an exclusive license agreement, or the Patent License Agreement, with PureTech Health, pursuant to which PureTech Health granted us an exclusive license to patents relating to combinations of a muscarinic activator with a muscarinic inhibitor for the treatment of central nervous system disorders. In connection with the Patent License Agreement, we have agreed to make milestone payments to PureTech Health of up to an aggregate of $10.0 million upon the achievement of specified developmental, regulatory and commercial milestones. In addition, we are obligated to pay PureTech Health low single-digit royalties on the worldwide net sales of any commercialized product covered by the licenses granted under the Patent License Agreement. In the event that we sublicense any of the patent rights granted under the Patent License Agreement, we will be obligated to pay PureTech Health royalties within the range of 15-25% on any income we receive from the sublicensee, excluding royalties. We have not paid any fees to date to PureTech Health to date pursuant to the Patent License Agreement.

Pursuant to an allocation agreement, dated March 4, 2011 between PureTech Health and Edmund Harrigan, M.D., a member of our board of directors and our Chief Executive Officer from January 2011 until February 2012, Dr. Harrigan will receive an amount equal to less than 2.0% of any consideration we pay to PureTech Health pursuant to the terms of the Patent License Agreement.

PureTech Health Shared Resources

PureTech Health is a founder of our company and in that capacity has provided us with strategic medical, clinical and scientific advice pursuant to a business services, personnel and information management agreement. In addition, we currently share administrative resources with PureTech Health, including human resources support, and we partake in various insurance and benefit plans maintained by PureTech Health. In the years ended December 31, 2016, 2017 and 2018, PureTech Health has invoiced us at cost for such services, with such amounts totaling $156,000, $221,000 and
$216,000, respectively. In addition, PureTech Health periodically invoices us for reimbursement of out of pocket expenses reasonably incurred on our behalf in connection with providing such business services.

**Investors’ Rights Agreement**

We are a party to an amended and restated investors’ rights agreement, dated as of March 15, 2019, with holders of our preferred stock, including some of our 5% stockholders and entities affiliated with our directors. Such holders consisted of entities affiliated with PureTech Health, ARCH Ventures, Wellcome Trust and Sofinnova Investments, each a 5% stockholder. Each of PureTech Health and ARCH Ventures has appointed representatives to our board of directors. The investor rights agreement provides these holders the right, following the completion of this offering, to demand that we file a registration statement or request that their shares be covered by a registration statement that we are otherwise filing. See “Description of Capital Stock—Registration Rights” for additional information regarding these registration rights.

**Voting Agreement**

We are a party to an amended and restated voting agreement, dated as of March 15, 2019, with holders of our preferred stock, including some of our 5% stockholders and entities affiliated with our directors. Such holders consisted of entities affiliated with PureTech Health, ARCH Ventures, Wellcome Trust and Sofinnova Investments, each a 5% stockholder. Each of PureTech Health and ARCH Ventures have appointed representatives to our board of directors. The voting agreement provides the holders the right to elect certain directors to the Board. Pursuant to the voting agreement, we agreed to appoint to our board of directors three representatives designated by PureTech Health, who are Bharat Chowrira, Eric Elenko and Joep Muijrers, and one representative designated by an entity affiliated with ARCH Ventures, who is Robert Nelsen. The voting agreement will terminate upon completion of this offering.

**Right of First Refusal and Co-Sale Agreement**

We are a party to an amended and restated right of first refusal and co-sale agreement, dated as March 15, 2019, with holders of our preferred stock, including some of our 5% stockholders and entities affiliated with our directors. Such holders consisted of entities affiliated with PureTech Health, ARCH Ventures, Wellcome Trust and Sofinnova Investments, each a 5% stockholder. Each of PureTech Health and ARCH Ventures have appointed representatives to our board of directors. The right of first refusal and co-sale agreement provides the key holders the right to purchase all or any portion of transfer stock, as well as the right of co-sale and participate in any proposed transfers. The agreement shall terminate upon completion of this offering.

**Employment Agreements**

See the “Executive Compensation—Agreements with Our Named Executive Officers” section of this prospectus for a further discussion of these arrangements.

**Indemnification Agreements**

Our certificate of incorporation that will become effective as of the closing date of this offering provides that we will indemnify our directors and officers to the fullest extent permitted by Delaware law.
In addition, we plan to enter into indemnification agreements with each of our officers and directors that may be broader in scope than the specific indemnification provisions contained in the Delaware General Corporation Law. See “Executive Compensation—Limitations on Liability and Indemnification” for additional information regarding these agreements.

**Policies and Procedures for Related Person Transactions**

Our board of directors reviews and approves transactions with directors, officers and holders of 5% or more of our voting securities and their affiliates, each a related party. Prior to this offering, the material facts as to the related party’s relationship or interest in the transaction are disclosed to our board of directors prior to their consideration of such transaction, and the transaction is not considered approved by our board of directors unless a majority of the directors who are not interested in the transaction approve the transaction. Further, when stockholders are entitled to vote on a transaction with a related party, the material facts of the related party’s relationship or interest in the transaction are disclosed to the stockholders, who must approve the transaction in good faith.

In connection with this offering, we have adopted a written related party transactions policy that such transactions must be approved by our audit committee. This policy will become effective on the date on which the registration statement of which this prospectus is part is declared effective by the SEC. Pursuant to this policy, the audit committee has the primary responsibility for reviewing and approving or disapproving “related party transactions,” which are transactions between us and related persons in which the aggregate amount involved exceeds or may be expected to exceed $120,000 and in which a related person has or will have a direct or indirect material interest. For purposes of this policy, a related person will be defined as a director, executive officer, nominee for director, or greater than 5% beneficial owner of our common stock, in each case since the beginning of the most recently completed year, and their immediate family members. Our audit committee charter will provide that the audit committee shall review and approve or disapprove any related party transactions.
PRINCIPAL STOCKHOLDERS

The following table sets forth information with respect to the beneficial ownership of our common stock as of May 30, 2019 by:

- each of our directors;
- each of our named executive officers;
- all of our directors and executive officers as a group; and
- each person, or group of affiliated persons, who is known by us to beneficially own more than 5% of our common stock.

The column entitled “Percentage of Shares Beneficially Owned—Before Offering” is based on a total of 13,088,421 shares of our common stock deemed outstanding as of May 30, 2019, assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of our common stock upon the closing of this offering. The column entitled “Percentage of Shares Beneficially Owned—After Offering” is based on shares of our common stock to be outstanding after this offering, including the shares of our common stock that we are selling in this offering, but not including any additional shares issuable upon exercise of outstanding options or any exercise by the underwriters of their option to purchase additional shares.
Beneficial ownership is determined in accordance with the rules and regulations of the SEC and includes voting or investment power with respect to our common stock. Shares of our common stock subject to options that are currently exercisable or exercisable within 60 days after May 30, 2019 are considered outstanding and beneficially owned by the person holding the options for the purpose of calculating the percentage ownership of that person but not for the purpose of calculating the percentage ownership of any other person. Except as otherwise noted, the persons and entities in this table have sole voting and investment power with respect to all of the shares of our common stock beneficially owned by them, subject to community property laws, where applicable. Except as otherwise set forth below, the address of the beneficial owner is c/o Karuna Therapeutics, Inc., 33 Arch Street, Suite 3110, Boston, Massachusetts 02110.

<table>
<thead>
<tr>
<th>Name of Beneficial Owner</th>
<th>Shares Beneficially Owned</th>
<th>Percentage of Shares Beneficially Owned</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5% Stockholders</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PureTech Health LLC(1)</td>
<td>5,694,464</td>
<td>43.5%</td>
</tr>
<tr>
<td>ARCH Ventures(2)</td>
<td>2,435,416</td>
<td>18.6%</td>
</tr>
<tr>
<td>The Wellcome Trust Limited(3)</td>
<td>975,112</td>
<td>7.5%</td>
</tr>
<tr>
<td>Sofinnova Investments(4)</td>
<td>792,602</td>
<td>6.1%</td>
</tr>
<tr>
<td><strong>Named Executive Officers and Directors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steven Paul, M.D.(5)</td>
<td>1,173,579</td>
<td>8.3%</td>
</tr>
<tr>
<td>Andrew Miller, Ph.D.(6)</td>
<td>182,073</td>
<td>1.4%</td>
</tr>
<tr>
<td>Stephen Brannan, M.D.(7)</td>
<td>40,495</td>
<td>*</td>
</tr>
<tr>
<td>Bharat Chowrira, J.D., Ph.D.</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Eric Elenko, Ph.D.</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Edmund Harrigan, M.D.(8)</td>
<td>13,750</td>
<td>*</td>
</tr>
<tr>
<td>Jeffrey Jonas, M.D.(9)</td>
<td>5,902</td>
<td>*</td>
</tr>
<tr>
<td>Joep Muijers</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Robert Nelsen</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>Heather Preston, M.D.</td>
<td>-</td>
<td>*</td>
</tr>
<tr>
<td>James Healy(10)</td>
<td>792,602</td>
<td>6.1%</td>
</tr>
<tr>
<td>Atul Pande(11)</td>
<td>22,000</td>
<td>*</td>
</tr>
<tr>
<td><strong>All Current Executive Officers and Directors as a Group (11 persons)(12)</strong></td>
<td>1,417,245</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

* Represents beneficial ownership of less than 1% of our outstanding stock.

(1) Consists of (a) 15,400 shares of common stock, (b) 4,000,000 shares of Series seed preferred stock, (c) 1,348,814 shares of Series A preferred stock, and (d) 330,250 shares of Series B preferred stock. Voting and investment power over the shares held by PureTech Health LLC is exercised by its parent entity, PureTech Health plc. The board of directors of PureTech Health plc consists of Mr. Joichi Ito, Dr. Raju Kucherlapati, Dr. John LaMattina, Dr. Robert Langer, Dame Marjorie Scardino, Dr. Bennett Shapiro, Mr. Christopher Viehbacher, Ms. Daphne Zohar and Mr. Stephen Muniz. None of the members of the board of directors of PureTech Health plc or PureTech Health LLC has individual voting or investment power with respect to such shares. The address for PureTech Health LLC and the individuals listed above is c/o PureTech Health LLC, 501 Boylston Street, Suite 6102, Boston, MA 02116.

(2) Consists of (a) 1,114,413 shares of Series A preferred stock and (b) 1,321,003 shares of Series B preferred stock. The address of ARCH Ventures is 8755 W. Higgins Road, Suite 1025, Chicago, IL 60631.

(3) Consists of (a) 506,025 shares of Series A preferred stock and (b) 469,087 shares of Series B preferred stock. The address of The Wellcome Trust Limited is 215 Euston Road, London NW1 2BE UK.
(4) Consists of 792,602 shares of Series B preferred stock. All shares held by Sofinnova Venture Partners X, L.P. ("SVP X"). Sofinnova Management X, L.L.C. ("SM X"), the general partner of SVP X, may be deemed to have sole voting power, and Dr. Michael F. Powell, Dr. James I. Healy, and Dr. Anand Mehra, the managing members of SM X, may be deemed to have shared power to vote these shares. Such individuals disclaim beneficial ownership of such shares except to the extent of their pecuniary interest therein. The address of Sofinnova Investments is 3000 Sand Hill Road, Building 4, Suite 250 Menlo Park, CA 94025.

(5) Consists of (a) 74,294 shares of Series A preferred stock and (b) 1,099,285 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019. Excludes options immediately exercisable or exercisable within 60 days after May 30, 2019 that we will grant Dr. Paul upon completion of this offering pursuant to his current employment agreement, based on the assumed number of shares offered set forth on the cover of this prospectus.

(6) Consists of 162,207 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019.

(7) Consists of 40,495 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019.

(8) Consists of 13,750 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019.

(9) Consists of 5,902 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019.

(10) Consists of the shares set forth in footnote (4) above. Dr. Healy will join our board of directors effective immediately after the effectiveness of the registration statement of which this prospectus forms a part.

(11) Consists of 22,000 shares of common stock issuable upon the exercise of options exercisable within 60 days after May 30, 2019. Dr. Pande will join our board of directors effective immediately after the effectiveness of the registration statement of which this prospectus forms a part.

(12) Excludes shares beneficially held by Drs. Healy and Pande, who will join our board of directors effective immediately after the effectiveness of the registration statement of which this prospectus forms a part.
DESCRIPTION OF CAPITAL STOCK

The following descriptions are summaries of the material terms of our amended and restated certificate of incorporation, which will be effective upon the closing of this offering and amended and restated bylaws, which will be effective upon the effectiveness of the registration statement of which this prospectus is a part. The descriptions of the common stock and preferred stock give effect to changes to our capital structure that will occur immediately prior to the completion of this offering. We refer in this section to our amended and restated certificate of incorporation as our certificate of incorporation, and we refer to our amended and restated bylaws as our bylaws.

General

Upon completion of this offering, our authorized capital stock will consist of 150,000,000 shares of common stock, par value $0.0001 per share, and 10,000,000 shares of preferred stock, par value $0.0001 per share, all of which shares of preferred stock will be undesignated.

As of May 30, 2019, 126,376 shares of our common stock and 12,962,045 shares of our preferred stock were outstanding and held by two common shareholders of record and 28 holders of our preferred stock.

Common Stock

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by our board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in all assets remaining after payment of all debts and other liabilities and any liquidation preference of any outstanding preferred stock. The shares to be issued by us in this offering will be, when issued and paid for, validly issued, fully paid and non-assessable.

Preferred Stock

Upon the completion of this offering, all outstanding shares of our preferred stock will be converted into shares of our common stock.

Upon the consummation of this offering, our board of directors will have the authority, without further action by our stockholders, to issue up to 10,000,000 shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting, or the designation of, such series, any or all of which may be greater than the rights of common stock. The issuance of our preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon our liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of our company or other corporate action. Immediately after consummation of this offering, no shares of preferred stock will be outstanding, and we have no present plan to issue any shares of preferred stock.
Registration Rights

Upon the completion of this offering, the holders of 12,226,972 shares of our common stock, including those issuable upon the conversion of preferred stock, will be entitled to rights with respect to the registration of these securities under the Securities Act. These rights are provided under the terms of an amended and restated investors' rights agreement, or the investors' rights agreement, between us and holders of our preferred stock. The investors' rights agreement includes demand registration rights, short-form registration rights and piggyback registration rights. All fees, costs and expenses of underwritten registrations under this agreement will be borne by us and all selling expenses, including underwriting discounts and selling commissions, will be borne by the holders of the shares being registered.

Demand Registration Rights

Beginning 180 days after the effective date of this registration statement, the holders of 12,226,972 shares of our common stock, including those issuable upon the conversion of preferred stock, are entitled to demand registration rights. Under the terms of the investors' rights agreement, we will be required, upon the written request of the holders of at least 40% of our outstanding registrable securities, as defined in the investors' rights agreement, or a lesser percent if the total amount of registrable shares requested to be registered has an anticipated aggregate offering price to the public, net of selling expenses, of at least $10.0 million, to file a registration statement and use commercially reasonable efforts to effect the registration of all or a portion of their registrable securities for public resale. We are required to effect only two registrations pursuant to this provision of the investors' rights agreement.

Short-Form Registration Rights

Pursuant to the investor rights agreement, if we are eligible to file a registration statement on Form S-3, upon the written request of the holders of our outstanding registrable securities, as defined in the investors' rights agreement, may demand in writing that we register their registrable securities under the Securities Act so long as the total amount of registrable shares requested to be registered has an anticipated aggregate offering price to the public, net of selling expenses, of at least $5.0 million. We are required to effect only two registrations in any twelve month period pursuant to this provision of the investors' rights agreement. The right to have such shares registered on Form S-3 is further subject to other specified conditions and limitations.

Piggyback Registration Rights

Pursuant to the investors' rights agreement, if we register any of our securities either for our own account or for the account of other security holders, the holders of these shares are entitled to include their shares in the registration. Subject to certain exceptions contained in the investors' rights agreement, we and the underwriters may limit the number of shares included in the underwritten offering to the number of shares which we and the underwriters determine in our sole discretion will not jeopardize the success of the offering.

Indemnification

Our investor rights agreement contains customary cross-indemnification provisions, under which we are obligated to indemnify holders of registrable securities in the event of material misstatements or omissions in the registration statement attributable to us, and they are obligated to indemnify us for material misstatements or omissions attributable to them.
Expiration of Registration Rights

The demand registration rights and short form registration rights granted under the investor rights agreement will terminate on the fifth anniversary of the completion of this offering.

Anti-Takeover Effects of our Certificate of Incorporation and Bylaws and Delaware Law

Our certificate of incorporation and bylaws include a number of provisions that may have the effect of delaying, deferring or preventing another party from acquiring control of us and encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

Board Composition and Filling Vacancies

Our certificate of incorporation provides for the division of our board of directors into three classes serving staggered three-year terms, with one class being elected each year. Our certificate of incorporation also provides that directors may be removed only for cause and then only by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of directors. Further, any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of our board, may only be filled by the affirmative vote of a majority of our directors then in office even if less than a quorum. The classification of directors, together with the limitations on removal of directors and treatment of vacancies, has the effect of making it more difficult for stockholders to change the composition of our board of directors.

No Written Consent of Stockholders

Our certificate of incorporation provides that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting. This limit may lengthen the amount of time required to take stockholder actions and would prevent the amendment of our bylaws or removal of directors by our stockholders without holding a meeting of stockholders.

Meetings of Stockholders

Our certificate of incorporation and bylaws provide that only a majority of the members of our board of directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our bylaws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance Notice Requirements

Our bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. Our bylaws specify the requirements as to form and content of all stockholders’ notices. These requirements may preclude stockholders from bringing matters before the stockholders at an annual or special meeting.
Amendment to Certificate of Incorporation and Bylaws

Any amendment of our certificate of incorporation must first be approved by a majority of our board of directors, and if required by law or our certificate of incorporation, must thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, board composition, limitation of liability and the amendment of our bylaws and certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote on the amendment, and not less than 75% of the outstanding shares of each class entitled to vote thereon as a class. Our bylaws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the bylaws; and may also be amended by the affirmative vote of at least 75% of the outstanding shares entitled to vote on the amendment, or, if our board of directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

Undesignated Preferred Stock

Our certificate of incorporation will provide for 10,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Exclusive Jurisdiction for Certain Actions

Our bylaws provide that, unless we consent in writing to an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for state law claims for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers and employees to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws, or (iv) any action asserting a claim that is governed by the internal affairs doctrine, in each case subject to the Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein. This provision will not apply to actions arising under the Securities Act or the Exchange Act. Although we believe this provision benefits us by providing increased consistency in the application of Delaware law in the types of lawsuits to which it applies, the provision may have the effect of discouraging lawsuits against our directors and officers. The enforceability of similar exclusive forum provisions in other companies’ bylaws has been challenged in legal proceedings, and it is possible that a court could rule that this provision in our bylaws is inapplicable or unenforceable.

Section 203 of the Delaware General Corporation Law

Upon completion of this offering, we will be subject to the provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly held Delaware
corporation from engaging in a “business combination” with an “interested stockholder” for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions:

- before the stockholder became interested, our board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances, but not the outstanding voting stock owned by the interested stockholder; or
- at or after the time the stockholder became interested, the business combination was approved by our board of directors and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder; any sale, transfer, lease, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation; subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Nasdaq Global Market Listing

We have applied to list our common stock on The Nasdaq Global Market under the trading symbol “KRTX.”

Transfer Agent and Registrar

The transfer agent and registrar for our common stock will be American Stock Transfer & Trust Company, LLC.
SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for our shares. Future sales of our common stock in the public market, or the availability of such shares for sale in the public market, could adversely affect market prices prevailing from time to time. As described below, only a limited number of shares will be available for sale shortly after this offering due to contractual and legal restrictions on resale. Nevertheless, sales of our common stock in the public market after such restrictions lapse, or the perception that those sales may occur, could adversely affect the prevailing market price at such time and our ability to raise equity capital in the future.

Based on the number of shares outstanding as of May 30, 2019, upon the completion of this offering, shares of our common stock will be outstanding, assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 12,962,045 shares of our common stock upon the closing of this offering, no exercise of the underwriters’ option to purchase additional shares and no exercise of outstanding options. Of the outstanding shares, all of the shares sold in this offering will be freely tradable, except that any shares held by our affiliates, as that term is defined in Rule 144 under the Securities Act, may only be sold in compliance with the limitations described below. All remaining shares of common stock held by existing stockholders immediately prior to the completion of this offering will be “restricted securities” as such term is defined in Rule 144. These restricted securities were issued and sold by us, or will be issued and sold by us, in private transactions and are eligible for public sale only if registered under the Securities Act or if they qualify for an exemption from registration under the Securities Act, including the exemptions provided by Rule 144 or Rule 701, summarized below.

Rule 144

In general, under Rule 144, beginning 90 days after the date of this prospectus, any person who is not our affiliate and has not been our affiliate at any time during the preceding three months and has held their shares for at least six months, including the holding period of any prior owner other than one of our affiliates, may sell shares without restriction, subject to the availability of current public information about us. In addition, under Rule 144, any person who is not our affiliate and has not been our affiliate at any time during the preceding three months and has held their shares for at least one year, including the holding period of any prior owner other than one of our affiliates, would be entitled to sell an unlimited number of shares immediately upon the closing of this offering without regard to whether current public information about us is available.

Beginning 90 days after the date of this prospectus, a person who is our affiliate or who was our affiliate at any time during the preceding three months may sell any unrestricted securities, as well as restricted securities that the person has beneficially owned for at least six months, including the holding period of any prior owner other than one of our affiliates, under Rule 144. Affiliates selling restricted or unrestricted securities may sell a number of shares within any three-month period that does not exceed the greater of:

- 1% of the number of shares then outstanding, which will equal approximately shares immediately after this offering, assuming no exercise of the underwriters’ option to purchase additional shares; or
- the average weekly trading volume of our common stock on The Nasdaq Global Market during the four calendar weeks preceding the filing of a notice on Form 144 with respect to the sale.

Sales under Rule 144 by our affiliates are also subject to manner of sale provisions and notice requirements and to the availability of current public information about us.
Rule 701

In general, under Rule 701 of the Securities Act, any of our employees, consultants or advisors, other than our affiliates, who purchased shares from us in connection with a qualified compensatory stock plan or other written agreement is eligible to resell these shares 90 days after the date of this prospectus in reliance on Rule 144, but without compliance with the holding period requirements of Rule 144 and without regard to the volume of such sales or the availability of public information about us.

However, substantially all Rule 701 shares are subject to lock-up agreements as described below and under “Underwriting” included elsewhere in this prospectus and will become eligible for sale upon the expiration of the restrictions set forth in those agreements.

Lock-Up Agreements

All of our directors and executive officers and substantially all of our stockholders have signed a lock-up agreement which prevents them from selling any of our common stock or any securities convertible into or exercisable or exchangeable for common stock for a period of not less than 180 days from the date of this prospectus without the prior written consent of the representatives, subject to certain exceptions. Goldman Sachs & Co. LLC and Citigroup Global Markets Inc. may waive the restrictions contained in such lock-up agreements at any time in their sole discretion. See the section entitled “Underwriting” appearing elsewhere in this prospectus for more information.

Registration Rights

Upon completion of this offering, certain holders of our securities will be entitled to various rights with respect to registration of their shares under the Securities Act. Registration of these shares under the Securities Act would result in these shares becoming fully tradable without restriction under the Securities Act immediately upon the effectiveness of the registration. See the section entitled “Description of Capital Stock—Registration Rights” appearing elsewhere in this prospectus for more information.

Equity Incentive Plans

We intend to file one or more registration statements on Form S-8 under the Securities Act to register our shares issued or reserved for issuance under our equity incentive plans. The first such registration statement is expected to be filed soon after the date of this prospectus and will automatically become effective upon filing with the SEC. Accordingly, shares registered under such registration statement will be available for sale in the open market, unless such shares are subject to vesting restrictions with us or the lock-up restrictions described above.
The following discussion is a summary of the material U.S. federal income tax considerations applicable to non-U.S. holders (as defined below) with respect to their ownership and disposition of shares of our common stock issued pursuant to this offering. For purposes of this discussion, a non-U.S. holder means a beneficial owner of our common stock that is for U.S. federal income tax purposes:

- a non-resident alien individual;
- a foreign corporation or any other foreign organization taxable as a corporation for U.S. federal income tax purposes; or
- a foreign estate or trust, the income of which is not subject to U.S. federal income tax on a net income basis.

This discussion does not address the tax treatment of partnerships or other entities that are pass-through entities for U.S. federal income tax purposes or persons that hold their common stock through partnerships or other pass-through entities. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her or its tax advisor regarding the tax consequences of acquiring, holding and disposing of our common stock through a partnership or other pass-through entity, as applicable.

This discussion is based on current provisions of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, all as in effect as of the date of this prospectus and, all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any such change or differing interpretation could alter the tax consequences to non-U.S. holders described in this prospectus.

There can be no assurance that the Internal Revenue Service, which we refer to as the IRS, will not challenge one or more of the tax consequences described herein. We assume in this discussion that a non-U.S. holder holds shares of our common stock as a capital asset within the meaning of Section 1221 of the Code, generally property held for investment.

This discussion does not address all aspects of U.S. federal income taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder's individual circumstances nor does it address any U.S. state, local or non-U.S. taxes, the alternative minimum tax, or the Medicare tax on net investment income, the rules regarding qualified small business stock within the meaning of Section 1202 of the Code, or any other aspect of any U.S. federal tax other than the income tax. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt or governmental organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- “controlled foreign corporations,” “passive foreign investment companies,” and corporations that accumulate earnings to avoid U.S. federal income tax;
“qualified foreign pension funds,” or entities wholly owned by a “qualified foreign pension fund;”
• persons deemed to sell our common stock under the constructive sale provisions of the Code;
• persons who own, or are deemed to own, more than 5% of our capital stock (except to the extent specifically set forth below);
• persons that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment; and
• certain U.S. expatriates.

This discussion is for general information only and is not tax advice. Accordingly, all prospective non-U.S. holders of our common stock should consult their tax advisors with respect to the U.S. federal, state, local and non-U.S. tax consequences of the purchase, ownership and disposition of our common stock.

Distributions on Our Common Stock

Distributions, if any, on our common stock will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder’s investment, up to such holder’s tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below in “Gain on Sale or Other Taxable Disposition of Our Common Stock.” Any such distributions will also be subject to the discussions below under the sections titled “Backup Withholding and Information Reporting” and “Withholding and Information Reporting Requirements—FATCA.”

Subject to the discussion in the following two paragraphs in this section, dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder’s country of residence. Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States, are generally exempt from the 30% withholding tax if the non-U.S. holder satisfies applicable certification and disclosure requirements. However, such U.S. effectively connected income, net of specified deductions and credits, is taxed at the same graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional “branch profits tax” at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder’s country of residence.

A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder’s country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) to the applicable withholding agent and satisfy applicable certification and other requirements. Non-U.S. holders are urged to consult their tax advisors regarding their entitlement to benefits under a relevant income tax treaty. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing a U.S. tax return with the IRS.
Gain on Sale or Other Taxable Disposition of Our Common Stock

Subject to the discussions below under “Backup Withholding and Information Reporting” and “Withholding and Information Reporting Requirements—FATCA,” a non-U.S. holder generally will not be subject to any U.S. federal income tax on any gain realized upon such holder’s sale or other taxable disposition of shares of our common stock unless:

- the gain is effectively connected with the non-U.S. holder’s conduct of a U.S. trade or business and, if an applicable income tax treaty so provides, is attributable to a permanent establishment or a fixed-base maintained by such non-U.S. holder in the United States, in which case the non-U.S. holder generally will be taxed on a net income basis at the graduated U.S. federal income tax rates applicable to United States persons (as defined in the Code) and, if the non-U.S. holder is a foreign corporation, the branch profits tax described above in “Distributions on Our Common Stock” also may apply;

- the non-U.S. holder is a nonresident alien individual who is present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder’s country of residence) on the net gain derived from the disposition, which may be offset by certain U.S. source capital losses of the non-U.S. holder, if any (even though the individual is not considered a resident of the United States), provided that the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses; or

- we are, or have been, at any time during the five-year period preceding such sale or other taxable disposition (or the non-U.S. holder’s holding period, if shorter) a “U.S. real property holding corporation,” unless our common stock is regularly traded on an established securities market and the non-U.S. holder holds no more than 5% of our outstanding common stock, directly or indirectly, actually or constructively, during the shorter of the 5-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. Generally, a corporation is a U.S. real property holding corporation only if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we do not believe that we are, or have been, a U.S. real property holding corporation, or that we are likely to become one in the future. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rules described above.

Backup Withholding and Information Reporting

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a United States person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above in “Distributions on Our Common Stock,” generally will be exempt from U.S. backup withholding.

Information reporting and backup withholding will generally apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the
transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their tax advisors regarding the application of the information reporting and backup withholding rules to them. Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement. Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder’s U.S. federal income tax liability, if any, provided that an appropriate claim is filed with the IRS in a timely manner.

Withholding and Information Reporting Requirements—FATCA

Provisions of the Code commonly referred to as the Foreign Account Tax Compliance Act, or FATCA, generally impose a U.S. federal withholding tax at a rate of 30% on payments of dividends on our common stock paid to a foreign entity unless (i) if the foreign entity is a “foreign financial institution,” such foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a “foreign financial institution,” such foreign entity identifies certain of its U.S. investors, if any, or (iii) the foreign entity is otherwise exempt under FATCA. Such withholding may also apply to gross proceeds from the sale or other disposition of our common stock, although under recently proposed U.S. Treasury Regulations, no withholding would apply to such gross proceeds. The preamble to the proposed regulations specifies that taxpayers (including withholding agents) are permitted to rely on the proposed regulations pending finalization. Under certain circumstances, a non-U.S. holder may be eligible for refunds or credits of this withholding tax. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. Non-U.S. holders should consult their tax advisors regarding the possible implications of this legislation on their investment in our common stock and the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of the 30% withholding tax under FATCA.
We and the underwriters named below have entered into an underwriting agreement with respect to the shares being offered. Subject to certain conditions, each underwriter has severally agreed to purchase the number of shares indicated in the following table. Goldman Sachs & Co. LLC and Citigroup Global Markets Inc. are the representatives of the underwriters.

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<th>Underwriters</th>
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<td>Goldman Sachs &amp; Co. LLC</td>
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<tr>
<td>Citigroup Global Markets Inc.</td>
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<tr>
<td>Wells Fargo Securities, LLC</td>
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<td>Wedbush Securities Inc.</td>
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<tr>
<td>Total</td>
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The underwriters are committed to take and pay for all of the shares being offered, if any are taken, other than the shares covered by the option described below unless and until this option is exercised. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters have an option to buy up to an additional shares from us to cover sales by the underwriters of a greater number of shares than the total number set forth in the table above. They may exercise that option for 30 days. If any shares are purchased pursuant to this option, the underwriters will severally purchase shares in approximately the same proportion as set forth in the table above.

The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters by us. Such amounts are shown assuming both no exercise and full exercise of the underwriters’ option to purchase up to additional shares from us.

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<th>Per Share</th>
<th>No Exercise</th>
<th>Full Exercise</th>
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<td>Total</td>
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</tbody>
</table>

Shares sold by the underwriters to the public will initially be offered at the initial public offering price set forth on the cover of this prospectus. Any shares sold by the underwriters to securities dealers may be sold at a discount of up to $ per share from the initial public offering price. After the initial offering of the shares, the representatives may change the offering price and the other selling terms. The offering of the shares by the underwriters is subject to receipt and acceptance and subject to the underwriters’ right to reject any order in whole or in part. Sales of shares made outside of the United States may be made by affiliates of the underwriters.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make internet distributions on the same basis as other allocations.

We and our executive officers, directors, and holders of substantially all of our common stock and securities convertible into or exchangeable for our common stock have agreed or will agree with the
underwriters, subject to certain exceptions, not to dispose of or hedge any of our or their common stock or securities convertible into or exchangeable for shares of common stock during the period from the date of this prospectus continuing through the date 180 days after the date of this prospectus, except with the prior written consent of Goldman Sachs & Co. LLC and Citigroup Global Markets Inc. See the section of this prospectus titled “Shares Eligible for Future Sale” for a discussion of certain transfer restrictions.

Prior to the offering, there has been no public market for the shares. The initial public offering price will be negotiated among us and the representatives. Among the factors to be considered in determining the initial public offering price of the shares, in addition to prevailing market conditions, will be our historical performance, estimates of our business potential and earnings prospects, an assessment of our management and the consideration of the above factors in relation to market valuation of companies in related businesses.

We have applied to list our common stock on The Nasdaq Global Market under the symbol “KRTX.”

In connection with the offering, the underwriters may purchase and sell shares of our common stock in the open market. These transactions may include short sales, stabilizing transactions and purchases to cover positions created by short sales. Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in the offering, and a short position represents the amount of such sales that have not been covered by subsequent purchases. A “covered short position” is a short position that is not greater than the amount of additional shares for which the underwriters’ option described above may be exercised. The underwriters may cover any covered short position by either exercising their option to purchase additional shares or purchasing shares in the open market. In determining the source of shares to cover the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase additional shares pursuant to the option described above. “Naked” short sales are any short sales that create a short position greater than the amount of additional shares for which the option described above may be exercised. The underwriters must cover any such naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market after pricing that could adversely affect investors who purchase in the offering. Stabilizing transactions consist of various bids for or purchases of common stock made by the underwriters in the open market prior to the completion of the offering.

The underwriters may also impose a penalty bid. This occurs when a particular underwriter repays to the underwriters a portion of the underwriting discount received by it because the representatives have repurchased shares sold by or for the account of such underwriter in stabilizing or short covering transactions.

Purchases to cover a short position and stabilizing transactions, as well as other purchases by the underwriters for their own accounts, may have the effect of preventing or retarding a decline in the market price of our stock, and together with the imposition of the penalty bid, may stabilize, maintain or otherwise affect the market price of the common stock. As a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. The underwriters are not required to engage in these activities and may end any of these activities at any time. These transactions may be effected on The Nasdaq Global Market, in the over-the-counter market or otherwise.

We estimate that our share of the total expenses of the offering, excluding underwriting discounts and commissions, will be approximately $    million. We have agreed to reimburse the underwriters for certain of their expenses in an amount up to $    .
We have agreed to indemnify the several underwriters against certain liabilities, including liabilities under the Securities Act of 1933.

The underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Certain of the underwriters and their respective affiliates have provided, and may in the future provide, a variety of these services to the issuer and to persons and entities with relationships with the issuer, for which they received or will receive customary fees and expenses. We have entered into an agreement with Wedbush Securities Inc., an underwriter in this offering, for advisory services pursuant to which Wedbush Securities Inc. will receive an agreed-upon fee not to exceed 0.21% of the gross proceeds received by us from this offering.

In the ordinary course of their various business activities, the underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively traded securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account and for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities or instruments of the issuer (directly, as collateral securing other obligations or otherwise) or persons and entities with relationships with the issuer. The underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments.

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

**European Economic Area**

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a “Relevant Member State”) an offer to the public of our common stock may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of our common stock may be made at any time under the following exemptions under the Prospectus Directive:

1. To any legal entity which is a qualified investor as defined in the Prospectus Directive;
2. To fewer than 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), subject to obtaining the prior consent of the Representatives for any such offer; or
3. In any other circumstances falling within Article 3(2) of the Prospectus Directive;

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provided that no such offer or shares of our common stock shall require us or any underwriter to publish a prospectus pursuant to Article 3
of the Prospectus Directive.

For the purposes of this provision, the expression an “offer to public” in relation to our common stock in any Relevant Member State
means the communication in any form and by any means of sufficient information on the terms of the offer and our common stock to be
offered so as to enable an investor to decide to purchase our common stock, as the same may be varied in that Member State by any
measure implementing the Prospectus Directive in that Member State, and the expression “Prospectus Directive” means Directive
2003/71/EC (as amended), including by Directive 2010/73/EU and includes any relevant implementing measure in the Relevant Member State.

This European Economic Area selling restriction is in addition to any other selling restrictions set out below.

**United Kingdom**

In the United Kingdom, this prospectus is only addressed to and directed at qualified investors who are (i) investment professionals
falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the Order); or (ii) high net
worth entities and other persons to whom it may lawfully be communicated, falling within Article 49(2)(a) to (d) of the Order (all such
persons together being referred to as “relevant persons”). Any investment or investment activity to which this prospectus relates is
available only to relevant persons and will only be engaged in with relevant persons. Any person who is not a relevant person should not
act or rely on this prospectus or any of its contents.

**Canada**

The securities may be sold in Canada only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited
investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are
permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions, and Ongoing Registrant Obligations.
Any resale of the securities must be made in accordance with an exemption form, or in a transaction not subject to, the prospectus
requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages
if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages
are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser’s province or territory. The
purchaser should refer to any applicable provisions of the securities legislation of the purchaser’s province or territory for particulars of
these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to
comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

**Hong Kong**

The securities may not be offered or sold in Hong Kong by means of any document other than (i) in circumstances which do not
constitute an offer to the public within the meaning of the Companies
(Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32 of the Laws of Hong Kong) ("Companies (Winding Up and Miscellaneous Provisions) Ordinance") or which do not constitute an invitation to the public within the meaning of the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong) ("Securities and Futures Ordinance"), or (ii) to "professional investors" as defined in the Securities and Futures Ordinance and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance, and no advertisement, invitation or document relating to the securities may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" in Hong Kong as defined in the Securities and Futures Ordinance and any rules made thereunder.

Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor (as defined under Section 4A of the Securities and Futures Act, Chapter 289 of Singapore (the “SFA”)) under Section 274 of the SFA, (ii) to a relevant person (as defined in Section 275(2) of the SFA) pursuant to Section 275(1) of the SFA, or any person pursuant to Section 275(1A) of the SFA, and in accordance with the conditions specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA, in each case subject to conditions set forth in the SFA.

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor, the securities (as defined in Section 239(1) of the SFA) of that corporation shall not be transferable for 6 months after that corporation has acquired the shares under Section 275 of the SFA except: (1) to an institutional investor under Section 274 of the SFA or to a relevant person (as defined in Section 275(2) of the SFA), (2) where such transfer arises from an offer in that corporation's securities pursuant to Section 275(1A) of the SFA, (3) where no consideration is or will be given for the transfer, (4) where the transfer is by operation of law, (5) as specified in Section 276(7) of the SFA, or (6) as specified in Regulation 32 of the Securities and Futures (Offers of Investments) (Shares and Debentures) Regulations 2005 of Singapore ("Regulation 32").

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is a trust (where the trustee is not an accredited investor (as defined in Section 4A of the SFA)) whose sole purpose is to hold investments and each beneficiary of the trust is an accredited investor, the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferable for 6 months after that trust has acquired the shares under Section 275 of the SFA except: (1) to an institutional investor under Section 274 of the SFA or to a relevant person (as defined in Section 275(2) of the SFA), (2) where such transfer arises from an offer that is made on terms that such rights or interest are acquired at a consideration of not less than S$200,000 (or its equivalent in a foreign currency) for each transaction (whether such amount is to be paid for in cash or by exchange of securities or other assets), (3) where no consideration is or will be given for the transfer, (4)
transfer is by operation of law, (5) as specified in Section 276(7) of the SFA, or (6) as specified in Regulation 32.

Japan

The securities have not been and will not be registered under the Financial Instruments and Exchange Act of Japan (Act No. 25 of 1948, as amended), or the FIEA. The securities may not be offered or sold, directly or indirectly, in Japan or to or for the benefit of any resident of Japan (including any person resident in Japan or any corporation or other entity organized under the laws of Japan) or to others for reoffering or resale, directly or indirectly, in Japan or to or for the benefit of any resident of Japan, except pursuant to an exemption from the registration requirements of the FIEA and otherwise in compliance with any relevant laws and regulations of Japan.

Australia

No placement document, prospectus, product disclosure statement or other disclosure document has been lodged with the Australian Securities and Investments Commission (“ASIC”), in relation to the offering. This offering document does not constitute a prospectus, product disclosure statement or other disclosure document under the Corporations Act 2001 (the “Corporations Act”), and does not purport to include the information required for a prospectus, product disclosure statement or other disclosure document under the Corporations Act.

Any offer in Australia of the shares may only be made to persons (the “Exempt Investors”) who are “sophisticated investors” (within the meaning of section 708(8) of the Corporations Act), “professional investors” (within the meaning of section 708(11) of the Corporations Act) or otherwise pursuant to one or more exemptions contained in section 708 of the Corporations Act so that it is lawful to offer the shares without disclosure to investors under Chapter 6D of the Corporations Act.

The shares applied for by Exempt Investors in Australia must not be offered for sale in Australia in the period of 12 months after the date of allotment under the offering, except in circumstances where disclosure to investors under Chapter 6D of the Corporations Act would not be required pursuant to an exemption under section 708 of the Corporations Act or otherwise where the offer is pursuant to a disclosure document which complies with Chapter 6D of the Corporations Act. Any person acquiring shares must observe such Australian on-sale restrictions.

This offering document contains general information only and does not take account of the investment objectives, financial situation or particular needs of any particular person. It does not contain any securities recommendations or financial product advice. Before making an investment decision, investors need to consider whether the information in this offering document is appropriate to their needs, objectives and circumstances, and, if necessary, seek expert advice on those matters.

Dubai International Financial Centre

This offering document relates to an Exempt Offer in accordance with the Offered Securities Rules of the Dubai Financial Services Authority (“DFSA”). This offering document is intended for distribution only to persons of a type specified in the Offered Securities Rules of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt-Offer. The DFSA has not approved this prospectus nor taken steps to verify the information set forth in this prospectus and has no responsibility for the offering document. The securities to which this offering document relates may be
illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of this offering document you should consult an authorized financial advisor.

Switzerland

We have not and will not register with the Swiss Financial Market Supervisory Authority (“FINMA”) as a foreign collective investment scheme pursuant to Article 119 of the Federal Act on Collective Investment Scheme of 23 June 2006, as amended (“CISA”), and accordingly the securities being offered pursuant to this prospectus have not and will not be approved, and may not be licensable, with FINMA. Therefore, the securities have not been authorized for distribution by FINMA as a foreign collective investment scheme pursuant to Article 119 CISA and the securities offered hereby may not be offered to the public (as this term is defined in Article 3 CISA) in or from Switzerland. The securities may solely be offered to “qualified investors,” as this term is defined in Article 10 CISA, and in the circumstances set out in Article 3 of the Ordinance on Collective Investment Scheme of 22 November 2006, as amended (“CISO”), such that there is no public offer. Investors, however, do not benefit from protection under CISA or CISO or supervision by FINMA. This prospectus and any other materials relating to the securities are strictly personal and confidential to each offeree and do not constitute an offer to any other person. This prospectus may only be used by those qualified investors to whom it has been handed out in connection with the offer described in this prospectus and may neither directly or indirectly be distributed or made available to any person or entity other than its recipients. It may not be used in connection with any other offer and shall in particular not be copied and/or distributed to the public in Switzerland or from Switzerland. This prospectus does not constitute an issue prospectus as that term is understood pursuant to Article 652a and/or 1156 of the Swiss Federal Code of Obligations. We have not applied for a listing of the securities on the SIX Swiss Exchange or any other regulated securities market in Switzerland, and consequently, the information presented in this prospectus does not necessarily comply with the information standards set out in the listing rules of the SIX Swiss Exchange and corresponding prospectus schemes annexed to the listing rules of the SIX Swiss Exchange.
LEGAL MATTERS

The validity of the shares of our common stock offered hereby is being passed upon for us by Goodwin Procter LLP, Boston, Massachusetts. Certain legal matters relating to this offering will be passed upon for the underwriters by Cooley LLP, Boston, Massachusetts.

EXPERTS

The financial statements of Karuna Therapeutics, Inc, as of December 31, 2017 and 2018 and for each of the years then ended, have been included herein and in the registration statement in reliance on the report of KPMG LLP, independent registered public accounting firm, appearing elsewhere herein, and upon the authority of said firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the common stock we are offering by this prospectus. This prospectus does not contain all of the information included in the registration statement. For further information pertaining to us and our common stock, you should refer to the registration statement and its exhibits. Whenever we make reference to this prospectus to any of our contracts, agreements or other documents, the references are not necessarily complete, and you should refer to the exhibits attached to the registration statement for copies of the actual contract, agreement or other document.

Upon the completion of the offering, we will be subject to the informational requirements of the Exchange Act and will file annual, quarterly and current reports, proxy statements and other information with the SEC. You can read our SEC filings, including the registration statement, at the SEC’s website at www.sec.gov. We also maintain a website at www.karunatx.com. Upon completion of the offering, you may access, free of charge, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendment to those reported filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC.
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F-1
REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors
Karuna Therapeutics, Inc.:

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Karuna Therapeutics, Inc. (the Company) as of December 31, 2017 and 2018, the related statements of operations, redeemable convertible preferred stock and stockholders’ equity (deficit), and cash flows for each of the years then ended, and the related notes (collectively, the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2018, and the results of its operations and its cash flows for each of the years then ended, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on these financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG

We have served as the Company’s auditor since 2018.

Cambridge, Massachusetts
March 29, 2019
## KARUNA THERAPEUTICS, INC.
### BALANCE SHEETS
(In thousands, except share and per share data)

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2017</th>
<th>December 31, 2018 Actual</th>
<th>December 31, 2018 Pro Forma (unaudited)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current assets:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$1,942</td>
<td>$8,904</td>
<td>$85,526</td>
</tr>
<tr>
<td>Short-term investments</td>
<td></td>
<td>4,983</td>
<td>4,983</td>
</tr>
<tr>
<td>Prepaid expenses and other current assets</td>
<td>175</td>
<td>1,709</td>
<td>1,709</td>
</tr>
<tr>
<td>Total current assets</td>
<td>2,117</td>
<td>15,596</td>
<td>92,218</td>
</tr>
<tr>
<td>Restricted cash</td>
<td></td>
<td>123</td>
<td>123</td>
</tr>
<tr>
<td>Property and equipment, net</td>
<td>12</td>
<td>138</td>
<td>138</td>
</tr>
<tr>
<td>Total assets</td>
<td>$2,129</td>
<td>$15,857</td>
<td>$92,479</td>
</tr>
<tr>
<td><strong>Liabilities, Redeemable Convertible Preferred Stock and Stockholders’ Equity (Deficit)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current liabilities:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts payable (includes $716 and $112 at December 31, 2017 and 2018, respectively, due to related parties)</td>
<td>$798</td>
<td>269</td>
<td>269</td>
</tr>
<tr>
<td>Accrued expenses</td>
<td></td>
<td>433</td>
<td>538</td>
</tr>
<tr>
<td>Derivative liability</td>
<td>2,606</td>
<td>389</td>
<td>-</td>
</tr>
<tr>
<td>Current convertible notes, net of discount</td>
<td>7,674</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total current liabilities</td>
<td>11,511</td>
<td>1,196</td>
<td>807</td>
</tr>
<tr>
<td>Non-current convertible notes, net of discount</td>
<td>3,985</td>
<td>2,516</td>
<td>-</td>
</tr>
<tr>
<td>Deferred lease obligation</td>
<td>-</td>
<td>102</td>
<td>102</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>15,496</td>
<td>3,814</td>
<td>909</td>
</tr>
<tr>
<td>Commitments and Contingencies (Note 11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redeemable convertible preferred stock:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redeemable convertible preferred stock, Series Seed, $0.0001 par value; 4,412,500 shares authorized and outstanding at December 31, 2017 and 2018; no shares issued and outstanding pro forma (unaudited); liquidation preference of $4,412 as of December 31, 2017 and 2018</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Redeemable convertible preferred stock, Series A, $0.0001 par value; no and 3,126,700 shares authorized and outstanding at December 31, 2017 and 2018, respectively; no shares issued and outstanding pro forma (unaudited); liquidation preference of $42,085 as of December 31, 2018</td>
<td>-</td>
<td>41,964</td>
<td>-</td>
</tr>
<tr>
<td>Stockholders’ equity (deficit):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common stock, $0.0001 par value; 5,500,000, 9,500,000 and 16,000,000 shares authorized at December 31, 2017, 2018, and 2018 pro forma (unaudited), respectively; zero, 10 and 12,839,702 shares issued and outstanding at December 31, 2017, 2018, and 2018 pro forma (unaudited)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Additional paid-in capital</td>
<td>675</td>
<td>1,633</td>
<td>123,671</td>
</tr>
<tr>
<td>Accumulated deficit</td>
<td>(14,049)</td>
<td>(31,555)</td>
<td>(32,102)</td>
</tr>
<tr>
<td>Total stockholders’ equity (deficit)</td>
<td>(13,366)</td>
<td>(29,922)</td>
<td>91,570</td>
</tr>
<tr>
<td>Total liabilities, redeemable convertible preferred stock and stockholders’ equity (deficit)</td>
<td>$2,129</td>
<td>$15,857</td>
<td>$92,479</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these financial statements

F-3
KARUNA THERAPEUTICS, INC.
STATEMENTS OF OPERATIONS
(In thousands, except share and per share data)

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31,</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
</tr>
<tr>
<td>Revenue</td>
<td>$</td>
</tr>
<tr>
<td>Operating expenses:</td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>3,616</td>
</tr>
<tr>
<td>General and administrative</td>
<td>1,190</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>4,806</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(4,806)</td>
</tr>
<tr>
<td>Other income (expense):</td>
<td></td>
</tr>
<tr>
<td>Interest expense</td>
<td>(555)</td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>(616)</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>(55)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(1,226)</td>
</tr>
<tr>
<td>Net loss before income taxes</td>
<td>(6,032)</td>
</tr>
<tr>
<td>Income tax provision</td>
<td>-</td>
</tr>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$ (6,032)</td>
</tr>
<tr>
<td>Net loss per share, basic and diluted (Note 8)</td>
<td>$ (4,378,000)</td>
</tr>
<tr>
<td>Weighted average common shares outstanding used in computing net loss per share, basic and diluted</td>
<td>4</td>
</tr>
<tr>
<td>Pro forma net loss per share, basic and diluted (unaudited)</td>
<td>$ (3.06)</td>
</tr>
<tr>
<td>Weighted average common shares outstanding used in computing pro forma net loss per share, basic and diluted (unaudited)</td>
<td>5,714,378</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these financial statements.

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KARUNA THERAPEUTICS, INC.

STATEMENT OF REDEEMABLE CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS’ EQUITY (DEFICIT)

(In thousands, except share data)

<table>
<thead>
<tr>
<th></th>
<th>Series Seed Redeemable Convertible Preferred Stock</th>
<th>Series A Redeemable Convertible Preferred Stock</th>
<th>Series B Redeemable Convertible Preferred Stock</th>
<th>Common Stock</th>
<th>Additional Paid-in Capital</th>
<th>Accumulated Deficit</th>
<th>Total Stockholders (Deficit) Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares</td>
<td>Value</td>
<td>Shares</td>
<td>Value</td>
<td>Shares</td>
<td>Value</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance, December 31, 2016</td>
<td>4,412,500 $1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>$461</td>
<td>$(8,012)</td>
<td>$(7,551)</td>
</tr>
<tr>
<td>Cumulative effect adjustment of the adoption of Accounting Standards Update 2018-07 (Note 2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(1)</td>
<td>1</td>
</tr>
<tr>
<td>Shared-based compensation expense</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>215</td>
<td>215</td>
</tr>
<tr>
<td>Net loss</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(6,032)</td>
</tr>
<tr>
<td>Balance, December 31, 2017</td>
<td>4,412,500 1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>675</td>
<td>(14,043)</td>
<td>(13,368)</td>
</tr>
<tr>
<td>Issuance of Series A redeemable convertible preferred stock, net of issuance costs of $120</td>
<td>-</td>
<td>-</td>
<td>3,126,700</td>
<td>41,964</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Exercise of common warrants</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shared-based compensation expense</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>958</td>
<td>958</td>
</tr>
<tr>
<td>Net loss</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(17,512)</td>
</tr>
<tr>
<td>Balance, December 31, 2018</td>
<td>4,412,500 1</td>
<td>3,126,700</td>
<td>41,964</td>
<td>10</td>
<td>1,633</td>
<td>(31,555)</td>
<td>(29,922)</td>
</tr>
<tr>
<td>Issuance of Series B redeemable convertible preferred stock and corresponding conversion of debt (unaudited)</td>
<td>-</td>
<td>-</td>
<td>5,285,102</td>
<td>80,016</td>
<td>-</td>
<td>(547)</td>
<td>(547)</td>
</tr>
<tr>
<td>Exercise of common warrants (unaudited)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15,390</td>
<td>-</td>
<td>58</td>
</tr>
<tr>
<td>Conversion of redeemable convertible preferred shares into common shares (unaudited)</td>
<td>(4,412,500)</td>
<td>(1)</td>
<td>(3,126,700)</td>
<td>(41,964)</td>
<td>(5,285,102)</td>
<td>80,016</td>
<td>12,824,302</td>
</tr>
<tr>
<td>Pro Forma Balance, December 31, 2018 (unaudited)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12,839,702</td>
</tr>
<tr>
<td>The accompanying notes are an integral part of these financial statements</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>121,981</td>
</tr>
</tbody>
</table>

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KARUNA THERAPEUTICS, INC.
STATEMENTS OF CASH FLOWS
(In thousands)

<table>
<thead>
<tr>
<th>Year Ended December 31</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cash flows from operating activities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net loss</td>
<td>$(6,032)</td>
<td>$(17,512)</td>
</tr>
<tr>
<td>Adjustments to reconcile net loss to net cash used in operating activities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation and amortization expense</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Stock-based compensation expense</td>
<td>215</td>
<td>958</td>
</tr>
<tr>
<td>Non-cash interest expense</td>
<td>555</td>
<td>407</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>616</td>
<td>2,176</td>
</tr>
<tr>
<td>Change in fair value of derivative liability</td>
<td>55</td>
<td>444</td>
</tr>
<tr>
<td>Changes in operating assets and liabilities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepaid expenses and other current assets</td>
<td>(166)</td>
<td>(1,534)</td>
</tr>
<tr>
<td>Accounts payable</td>
<td>537</td>
<td>(529)</td>
</tr>
<tr>
<td>Accrued expenses</td>
<td>192</td>
<td>105</td>
</tr>
<tr>
<td>Deferred lease obligation</td>
<td>-</td>
<td>102</td>
</tr>
<tr>
<td>Net cash used in operating activities</td>
<td>(4,027)</td>
<td>(15,377)</td>
</tr>
</tbody>
</table>

**Cash flows from investing activities**

| Acquisition of property and equipment | (13) | (132) |
| Purchase of short-term investments | - | (4,983) |
| Net cash used in investing activities | (13) | (5,115) |

**Cash flows from financing activities**

| Proceeds from issuance of Series A redeemable convertible preferred stock, net of issuance cost | - | 15,877 |
| Proceeds from issuance of convertible notes | 4,250 | 11,700 |
| Net cash provided by financing activities | 4,250 | 27,577 |
| Net increase in cash, cash equivalents and restricted cash | 210 | 7,085 |
| Cash, cash equivalents and restricted cash at beginning of period | 1,732 | 1,942 |
| Cash, cash equivalents and restricted cash at end of period | $1,942 | $9,027 |

**Supplemental disclosures of cash flows information**

| Conversion of convertible notes, accrued interest and discount upon conversion to preferred stock | $ - | $26,087 |

*The accompanying notes are an integral part of these financial statements*
# Karuna Therapeutics, Inc.

Karuna Therapeutics, Inc. (the “Company,”) was incorporated under the laws of the State of Delaware in July 2009 as Karuna Pharmaceuticals, Inc. and is headquartered in Boston, Massachusetts. In March 2019, the Company changed its name to Karuna Therapeutics, Inc. The Company is focused on the development of novel therapies to address disabling neuropsychiatric conditions characterized by significant unmet medical need.

Since the Company’s inception, it has focused substantially all of its efforts and financial resources on organizing and staffing the company, acquiring and developing its technology, raising capital, building its intellectual property portfolio, undertaking preclinical studies and clinical trials and providing general and administrative support for these activities. The Company has not generated any product revenue related to its primary business purpose to date and is subject to a number of risks similar to those of other early stage companies, including dependence on key individuals, regulatory approval of products, uncertainty of market acceptance of products, competition from substitute products and larger companies, compliance with government regulations, protection of proprietary technology, dependence on third parties, product liability and the need to obtain adequate additional financing to fund the development of its product candidates.

## Liquidity

The Company's financial statements have been prepared on the basis of continuity of operations, realization of assets and the satisfaction of liabilities in the ordinary course of business. The Company experienced negative operating cash flows of $15.4 million for the year ended December 31, 2018 and had an accumulated deficit of $31.6 million as of December 31, 2018. The Company expects to continue to generate operating losses for the foreseeable future.

In March 2019, the Company issued 5,285,102 shares of Series B redeemable convertible preferred stock (the “Series B Preferred Stock”) (see Note 15). This included $75.0 million in gross proceeds (4,953,758 shares) and $5.0 million (331,344 shares) from the conversion of the debt outstanding at the time of the closing which had a principal value of $4.3 million. As of March 29, 2019, the issuance date of the financial statements for the year ended December 31, 2018, the Company expects that the proceeds from the sale of Series B Preferred Stock in March 2019, together with its cash, cash equivalents and short-term investments of $13.9 million as of December 31, 2018, will be sufficient to fund its operating expenses and capital expenditure requirements through at least 12 months from the date of issuance of these financial statements. The future viability of the Company beyond that point is dependent on its ability to raise additional capital to fund its operations.

The Company is seeking to complete an initial public offering (“IPO”) of its common stock. Upon the closing of a qualified IPO (as defined in the Company’s Certificate of Incorporation, as amended and restated) on specified terms, all of the Company’s outstanding redeemable convertible preferred stock will automatically convert into shares of common stock (see Note 6). In the event the Company does not complete an IPO, the Company expects to seek additional funding through private equity financings, debt financings, or other capital sources, including collaborations with other companies, or other strategic transactions. The Company may not be able to obtain funding on acceptable terms, or at all. The terms of any financing may adversely affect the holdings or the rights of the Company’s stockholders.

If the Company is unable to obtain funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or
commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations. Although management continues to pursue these plans, there is no assurance that the Company will be successful in obtaining sufficient funding on terms acceptable to the Company to fund continuing operations, if at all.

**Note 2. Summary of Significant Accounting Policies**

**Basis of Presentation and Use of Estimates**

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (“GAAP”). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States generally accepted accounting principles as found in the Accounting Standards Codification (“ASC”) and Accounting Standards Updates (“ASUs”) of the Financial Accounting Standards Board (“FASB”).

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting periods. Significant estimates and assumptions reflected in these financial statements include, but are not limited to, the accrual of research and development expenses, and the valuation of common stock, stock-based awards and liabilities associated with financial instruments and derivatives. Estimates are periodically reviewed in light of changes in circumstances, facts and experience. Actual results could differ from the Company’s estimates.

**Unaudited Pro Forma Information**

All of the Company’s redeemable convertible preferred stock will automatically convert into shares of common stock upon the closing of a qualified IPO. The unaudited pro forma balance sheet and statement of redeemable convertible preferred stock and stockholders’ equity (deficit) reflect the assumed conversion of all of the outstanding shares of Series Seed redeemable convertible preferred stock (“Series Seed Preferred Stock”) and Series A redeemable convertible preferred stock (“Series A Preferred Stock”) as of December 31, 2018 into shares of common stock. In addition, the pro forma balance sheet gives effect to (i) the funding of $1.6 million under a convertible note which was subsequently converted in the Series B financing, (ii) the sale and issuance of $80.0 million (5,285,102 shares) of the Company’s Series B Preferred Stock, inclusive of the conversion of outstanding convertible notes with a principal value of $5.0 million, on an as-converted basis, (iii) the exercise of a warrant to purchase 15,390 shares of the Company’s common stock resulting in proceeds of $0.1 million and (iv) the automatic conversion of all of the shares of Series B Preferred Stock into shares of common stock. See Note 15 for further discussion of subsequent events reflected in the unaudited pro forma financials.

In the accompanying statements of operations, the unaudited pro forma basic and diluted weighted average common shares outstanding used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the year ended December 31, 2018 gives effect to the automatic conversion upon the closing of the proposed IPO of all outstanding shares of redeemable convertible preferred stock as of December 31, 2018 into 7,539,200 shares of common stock as if the conversion had occurred on the later of January 1, 2018 or the issuance date of the redeemable convertible preferred stock. See Note 6 for further discussion of the Series Seed Preferred Stock and Series A Preferred Stock conversion features, as well as a discussion of their rights and preferences.
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Segments
The Company operates and manages its business as one reportable and operating segment, which is the business of research and development of therapies utilizing muscarinic cholinergic receptors to treat psychosis and cognitive impairment in numerous central nervous system disorders. The Company’s chief executive officer, who is the chief operating decision maker, reviews financial information on an aggregate basis for purposes of allocating resources and evaluating financial performance. All of the Company’s tangible assets are held in the United States.

Cash and Cash Equivalents
The Company considers all short-term, highly liquid investments with original maturities of 90 days or less at acquisition date to be cash equivalents.

Short-term Investments
The Company’s short-term investments are classified as available-for-sale and are carried at fair value with the unrealized gains and losses reported as a component of accumulated other comprehensive income (loss) in stockholders’ equity. There were no meaningful unrealized gains or losses recognized in 2018 on the short-term investments. Realized gains and losses and declines in value judged to be other than temporary are included as a component of other income (expense), net based on the specific identification method.

Concentration of Credit Risk
Cash, cash equivalents and short-term investments are the primary source of potential exposure for the Company to concentrations of credit risk. Periodically, the Company maintains deposits in financial institutions in excess of government insured limits. The Company deposits its cash in financial institutions that it believes have high quality and has not experienced any losses on such accounts and does not believe it is exposed to any significant credit risk on cash. The Company does not believe that it is subject to unusual credit risk beyond the normal credit risk associated with commercial banking relationships.

Concentration of Manufacturing Risk
The Company is dependent on third-party manufacturers to supply products for research and development activities in its programs. In particular, the Company relies and expects to continue to rely on a small number of manufacturers to supply it with its requirements for the active pharmaceutical ingredients and formulated drugs related to these programs. These programs could be adversely affected by a significant interruption in the supply of active pharmaceutical ingredients and formulated drugs.

Deferred Offering Costs
The Company capitalizes certain legal, professional accounting and other third-party fees that are directly associated with in-process equity financings as deferred offering costs until such financings are consummated. After consummation of the equity financing, these costs are recorded in stockholders’ equity (deficit) as a reduction of additional paid-in capital generated as a result of the offering. Should the in-process equity financing be abandoned, the deferred offering costs will be expensed immediately as a charge to operating expenses in the statements of operations. As of December 31, 2017 and 2018, the Company had not recorded any deferred offering costs.

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Fair Value of Financial Instruments

The Company's financial instruments consist of cash equivalents, short-term investments, accounts payable, accrued expenses, convertible notes and derivatives embedded within the convertible notes. The carrying amount of accounts payable and accrued expenses are considered a reasonable estimate of their fair value, due to the short-term maturity of these instruments. The Company's cash equivalents, short-term investments and derivative liabilities are carried at fair value, determined according to the fair value hierarchy described below (see Note 10).

The Company follows the guidance in FASB ASC 820, Fair Value Measurements and Disclosures, which defines fair value and establishes a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described below:

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.

Level 2: Valuations based on quoted prices in markets that are not active or for which all significant inputs are observable, either directly or indirectly.

Level 3: Prices or valuations that require inputs that are both significant to the fair value measurement and unobservable.

To the extent that valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Fair value is a market-based measure considered from the perspective of a market participant rather than an entity-specific measure. Therefore, even when market assumptions are not readily available, the Company's own assumptions reflect those that market participants would use in pricing the asset or liability at the measurement date. The Company uses prices and inputs that are current as of the measurement date, including during periods of market dislocation. In periods of market dislocation, the observability of prices and inputs may be reduced for many instruments. This condition could cause an instrument to be reclassified from Level 1 to Level 2 or Level 2 to Level 3.

Convertible Notes and Derivative Liabilities

In connection with the issuance of the Wellcome Trust Convertible Notes and the Convertible Notes (see Note 5), the Company has identified embedded derivatives, which are recorded as liabilities on the Company's balance sheets and are remeasured to fair value at each reporting date until the derivative is settled. Changes in the fair value of the derivative liabilities are recognized as change in fair value of derivative in the statements of operations. The fair value of the derivative liabilities are determined at each period end using a with and without method, which assesses the likelihood and timing of events that would result in either a conversion or change-of-control feature being triggered, as well as changes in the market conditions.

Upon issuance of the notes, each note was recorded at cost, net of the derivative liability. The discount on each note is amortized as interest expense to the date such note is expected to convert using the effective interest rate method and is reflected in the statements of operations as accretion of debt discount.
The Company classifies its derivative liabilities in the balance sheet as current or non-current based on its expectation of when the derivative will be settled, consistent with the assumptions used when determining the fair value of the derivative liabilities.

**Redeemable Convertible Preferred Stock**

The Company records all shares of redeemable convertible preferred stock at their respective fair values on the dates of issuance, net of issuance costs. The redeemable convertible preferred stock is recorded outside of permanent equity because upon the occurrence of certain deemed liquidation events, the majority of the holders can opt to redeem the shares at the liquidation preference and these events, including a merger, acquisition or sale of substantially all of the assets, are considered not solely within the Company's control. The Company has not adjusted the carrying values of the redeemable convertible preferred stock to its redemption value because it is uncertain whether or when a deemed liquidation event would occur. If a deemed liquidation event becomes probable, the carrying value will be adjusted to the redemption value at that time.

**Property and Equipment**

Property and equipment are stated at cost less accumulated depreciation and any accumulated impairment losses. Cost includes expenditure that is directly attributable to the acquisition of the asset. Depreciation is calculated using the straight-line method over the estimated useful lives of the related assets:

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Estimated Useful Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory equipment</td>
<td>5 years</td>
</tr>
<tr>
<td>Computer equipment</td>
<td>3-5 years</td>
</tr>
<tr>
<td>Leasehold improvements</td>
<td>Shorter of life of lease or estimated useful life</td>
</tr>
</tbody>
</table>

Depreciation methods, useful lives and residual values are reviewed at least annually and adjusted, if appropriate.

**Impairment of Long-lived Assets**

Long-lived assets consist of property and equipment. Long-lived assets to be held and used are tested for recoverability whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable. Factors that the Company considers in deciding when to perform an impairment review include significant underperformance of the business in relation to expectations, significant negative industry or economic trends and significant changes or planned changes in the use of the assets. If an impairment review is performed to evaluate a long-lived asset for recoverability, the Company compares forecasts of undiscounted cash flows expected to result from the use and eventual disposition of the long-lived asset to its carrying value. An impairment loss would be recognized when estimated undiscounted future cash flows expected to result from the use of an asset are less than its carrying amount. The impairment loss would be based on the excess of the carrying value of the impaired asset over its fair value, determined based on discounted cash flows. To date, the Company has not recorded any impairment losses on long-lived assets.

**Leases**

Leases are classified at their inception as either operating or capital leases based on the economic substance of the agreement. The Company recognizes rent expense for its operating leases, inclusive of rent escalation provisions and rent holidays, on a straight-line basis over the respective
lease term. Additionally, the Company recognizes tenant improvement allowances under the operating leases as a deferred lease obligation and amortizes the tenant improvement allowances as a reduction to rent expense on a straight-line basis over the respective lease term. At December 31, 2017 and 2018, no capital leases were recorded in the balance sheets.

**Research and Development Costs**

Research and development costs are expensed as incurred. Research and development costs include salaries and bonuses, stock compensation, employee benefits, consulting costs and external contract research and development and manufacturing expenses.

Upfront payments and milestone payments made for the licensing of technology are expensed as research and development in the period in which they are incurred. Advance payments for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses. The prepaid amounts are expensed as the related goods are delivered or the services are performed.

**Research Contract Costs and Accruals**

The Company accrues for estimated costs of research and development activities conducted by third-party service providers, which include the conduct of preclinical studies and clinical trials, and contract manufacturing activities. The Company records the estimated costs of research and development activities based upon the estimated amount of services provided and includes these costs in accrued liabilities in the balance sheets and within research and development expense in the statements of operations. When evaluating the adequacy of the accrued liabilities, the Company analyzes progress of the research studies or clinical trials and manufacturing activities, including the phase or completion of events, invoices received and contracted costs. Significant judgments and estimates may be made in determining the accrued balances at the end of any reporting period. Actual results could differ from the Company’s estimates. The Company’s historical accrual estimates have not been materially different from the actual costs.

**Patent Costs**

All patent-related costs incurred in connection with filing and prosecuting patent applications are expensed as incurred due to the uncertainty about the recovery of the expenditure. Amounts incurred are classified as general and administrative expenses.

**Stock-Based Compensation**

The Company measures all stock options and other stock-based awards based on the fair value on the date of the grant using the Black-Scholes option-pricing model and recognizes compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. The Company has mainly issued stock options with service-based vesting conditions and records the expense for these awards using the straight-line method. The Company has also issued stock options with performance-based vesting conditions and records the expense for these awards at the time that the achievement of the performance becomes highly probable or complete.

The Company classifies stock-based compensation expense in its statements of operations in the same manner in which the award recipient’s payroll costs are classified or in which the award recipients’ service payments are classified.

The Company recognizes adjustments to stock-based compensation expense for forfeitures as they occur. The fair value of each stock option grant is estimated on the date of grant using the Black
Scholes option-pricing model. The Company historically has been a private company and lacks company-specific historical and implied volatility information. Therefore, it estimates its expected stock volatility based on the historical volatility of a publicly traded set of peer companies and expects to do so until such time as it has adequate historical data regarding the volatility of its own traded stock price.

The expected term of the Company’s stock options has been determined utilizing the “simplified” method for awards that qualify as “plain-vanilla” options. The risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award. Expected dividend yield is based on the fact that the Company has never paid cash dividends and does not expect to pay any cash dividends in the foreseeable future.

Determination of Fair Value of Common Stock on Grant Dates

As there has been no public market for the Company’s equity instruments to date, the estimated fair value of the Company’s common stock has been determined by the board of directors as of the grant date, with input from management, considering the Company’s most recently available third-party valuations of common stock and the board of directors’ assessment of additional objective and subjective factors that it believed were relevant and which may have changed from the date of the most recent valuation through the date of the grant. These third-party valuations were performed in accordance with the guidance outlined in the American Institute of Certified Public Accountants’ Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation. The Company’s common stock valuations were prepared using either a Discounted Cash Flow Analysis (“DCF”), an option-pricing method (“OPM”), or a probability-weighted expected return method (“PWERM”), which use a combination of market approaches and an income approach to estimate the Company’s enterprise value. The DCF is based on management’s projection of future revenues and costs. The future cash flows are adjusted for the cost of capital and clinical risk of the program to arrive at a risk-adjusted present-day value of the future cash flows and fair value of equity. The OPM treats common securities and preferred securities as call options on the total equity value of the Company, with exercise prices based on the value thresholds at which the allocation among the various holders of a company’s securities changes. Under this method, the common and preferred stock have value only if the funds available for distribution to members are expected to exceed the value of the preferred security liquidation preference at the time of the liquidity event, such as a strategic sale or a merger. The PWERM is a scenario-based methodology that estimates the fair value of common and preferred stock based upon an analysis of future values for the company, assuming various outcomes. The common and preferred stock values are based on the probability-weighted present value of expected future investment returns considering each of the possible outcomes available as well as the rights of each class of common and preferred securities.

Income Taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are determined based on the difference between the financial statement and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to affect taxable income. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date. Valuation allowances are established when necessary to reduce deferred tax assets to the amounts expected to be realized.

The Company assesses all material positions taken in any income tax return, including all significant uncertain positions, in all tax years that are still subject to assessment or challenge by the relevant taxing authorities. Assessing an uncertain tax position begins with the initial determination of the positions sustainability and is measured at the largest amount of benefit that is greater than fifty
percent likely of being realized upon ultimate settlement. At each balance sheet date, unresolved uncertain tax positions must be
reassessed, and the Company will determine whether (i) the factors underlying the sustainability assertion have changed and (ii) the
amount of the recognized benefit is still appropriate. The recognition and measurement of tax benefits requires significant judgment.
Judgments concerning the recognition and measurement of a tax benefit might change as new information becomes available.

Net Loss Per Share

The Company follows the two-class method when computing net income (loss) per share, as the Company has issued shares that
meet the definition of participating securities. The two-class method determines net income (loss) per share for each class of common and
participating securities according to dividends declared or accumulated and participation rights in undistributed earnings. The two-class
method requires income available to common stockholders for the period to be allocated between common and participating securities
based upon their respective rights to receive dividends as if all income for the period had been distributed.

Basic net income (loss) per share attributable to common stockholders is computed by dividing the net income (loss) attributable to
common stockholders by the weighted average number of shares of common stock outstanding for the period. Diluted net income (loss)
attributable to common stockholders is computed by adjusting income (loss) attributable to common stockholders to reallocate
undistributed earnings based on the potential impact of dilutive securities, including outstanding stock options. Diluted net income (loss)
per share attributable to common stockholders is computed by dividing the diluted net income (loss) attributable to common stockholders
by the weighted average number of common shares outstanding for the period, including potential dilutive common shares assuming the
dilutive effect of outstanding stock options.

The Company's outstanding redeemable convertible preferred stock contractually entitle the holders of such shares to participate in
distributions but contractually does not require the holders of such shares to participate in losses of the Company. Accordingly, in periods
in which the Company reports a net loss attributable to common stockholders, diluted net loss per share attributable to common
stockholders is the same as basic net loss per share attributable to common stockholders, since dilutive common shares are not assumed
to have been issued if their effect is anti-dilutive.

The Company reported a net loss attributable to common stockholders for the years ended December 31, 2017 and 2018.

Comprehensive Loss

Comprehensive loss includes net loss as well as other changes in stockholders’ equity (deficit) that result from transactions and
economic events other than those with stockholders. There was no difference between net loss and comprehensive loss for the years
ended December 31, 2017 and 2018.

Recently Adopted Accounting Pronouncements

In August 2014, the FASB issued ASU 2014-15, Disclosure of Uncertainties about an Entity's Ability to Continue as a Going
Concern (“ASU 2014-15”). ASU 2014-15 requires management to evaluate relevant conditions, events, and certain management plans
that are known or reasonably knowable that, when considered in the aggregate, raise substantial doubt about the entity’s ability to
continue as a going concern within one year after the date that the financial statements are issued, for both annual and interim periods.
ASU 2014-15 also requires certain disclosures around management's
plans and evaluation, as well as the plans, if any, that are intended to mitigate those conditions or events that will alleviate the substantial doubt. ASU 2014-15 was effective for fiscal years ending after December 15, 2016. The Company adopted this guidance for the fiscal year ending December 31, 2017.

In May 2014, the Financial Accounting Standards Board issued Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers (Topic 606) (“ASC 606”), and further updated through ASU 2016-12, which amends the existing accounting standards for revenue recognition. For public business entities, this standard is effective for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period. For all other entities, this standard is effective for annual reporting periods beginning after December 15, 2018, and interim periods within annual periods beginning after December 15, 2019. Early adoption is permitted. Effective January 1, 2017, the Company adopted ASC 606, using the full retrospective method. The adoption did not have an impact on the Company’s financial statements as the Company has historically not had contracts with customers or recorded revenue to date.

In June 2018, the FASB issued Accounting Standards Update 2018-07, Compensation—Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting (“ASU 2018-07”), which expands the scope of Topic 718 to include all share-based payment transactions for acquiring goods and services from nonemployees. ASU 2018-07 specifies that Topic 718 applies to all share-based payment transactions in which the grantor acquires goods and services to be used or consumed in its own operations by issuing share-based payment awards. ASU 2018-07 also clarifies that Topic 718 does not apply to share-based payments used to effectively provide (1) financing to the issuer or (2) awards granted in conjunction with selling goods or services to customers as part of a contract accounted for under ASC 606. The transition method provided by ASU 2018-07 is a modified retrospective basis which recognizes a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. Effective January 1, 2017, the Company adopted ASU 2018-07, using the modified retrospective method. Management deems that non-employees who provide services to the Company have similar traits as employees with regard to their continued involvement in the Company, and therefore concluded that the adoption of ASU 2018-07 more fairly represented the results of the Company’s operations. The cumulative effect of the change on retained earnings for awards granted to non-employees as of January 1, 2017 was less than $0.1 million.

In March 2016, FASB issued ASU 2016-09, Stock Compensation—Improvements to Employee Share-Based Payment Accounting (“ASU 2016-09”). On January 1, 2017, the Company adopted the amendments to ASC 718, which simplify accounting for share-based payment transactions. Prior to this amendment, excess tax benefits resulting from the difference between the deduction for tax purposes and the compensation costs recognized for financial reporting were not recognized until the deduction reduced taxes payable. Under the new method, the Company recognizes excess tax benefits in the current accounting period. In addition, prior to January 1, 2017, the employee share-based compensation expense was recorded net of estimated forfeiture rates and subsequently adjusted at the vesting date, as appropriate. As part of the amendment, the Company has stopped estimating forfeitures and elected to recognize the actual forfeitures by reducing the employee share-based compensation expense in the same period as the forfeitures occur. The Company has adopted these changes in accounting method using the modified retrospective method under which the Company should recognize the cumulative effect adjustment to the opening accumulated deficit as of January 1, 2017. The cumulative effect of the changes as of January 1, 2017 for the adoption of ASU 2016-09 was immaterial. Hence, the Company did not recognize the cumulative effect adjustment in its financial statements.

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments. This guidance addresses specific cash
flow issues with the objective of reducing the diversity in practice for the treatment of these issues. The areas identified include: debt prepayment or debt extinguishment costs; settlement of zero-coupon debt instruments; contingent consideration payments made after a business combination; proceeds from the settlement of insurance claims; proceeds from the settlement of corporate-owned life insurance policies; distributions received from equity method investees; beneficial interests in securitization transactions; and application of the predominance principle with respect to separately identifiable cash flows. The Company adopted this new guidance beginning January 1, 2017, on a retrospective basis, which did not result in a material impact on its financial statements and related disclosures.

In November 2016, the FASB issued ASU 2016-18, Restricted Cash. The new standard requires restricted cash and restricted cash equivalents be included with cash and cash equivalents when reconciling the total beginning and ending amounts for the periods shown on the statement of cash flows. The Company has early adopted this new standard effective on January 1, 2018. The impact of the adoption was to reduce operating activities by the movement in restricted cash for each annual period presented, and to include cash, cash equivalents and restricted cash in a newly titled “Cash, cash equivalents, and restricted cash at beginning of year” and “Cash, cash equivalents, and restricted cash at the end of year” in the statements of cash flows.

In May 2017, the FASB issued ASU No. 2017-09, Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting (“ASU 2017-09”). This new guidance amends the scope of modification accounting for share-based payment awards. ASU 2017-09 provides guidance on the types of changes to the terms or conditions of share-based payment awards to which an entity would be required to apply modification accounting under ASC 718. Effective January 1, 2017, the Company adopted ASU No. 2017-09, using the full retrospective method and will be applied prospectively to an award modified on or after the adoption date. The cumulative effect of the changes as of January 1, 2017 for the adoption of ASU 2017-09 was immaterial. Hence, the Company did not recognize the cumulative effect adjustment in its financial statements.

Recently Issued Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, Leases (“ASU 2016-02”). ASU 2016-02 will require lessees to recognize most leases on their balance sheet as a right-of-use asset and a lease liability. Leases will be classified as either operating or finance, and classification will be based on criteria similar to current lease accounting, but without explicit bright lines. For public entities, the guidance is effective for annual reporting periods beginning after December 15, 2018 and for interim periods within those fiscal years. For non-public entities, the guidance is effective for annual reporting periods beginning after December 15, 2019. Early adoption is permitted for all entities. The Company is currently evaluating the impact that the adoption of ASU 2016-02 will have on its financial statements.

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Note 3. Property and Equipment, Net

Property and equipment, net, consisted of the following (in thousands):

<table>
<thead>
<tr>
<th>December 31,</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory equipment</td>
<td>$ 5</td>
<td>$ 31</td>
</tr>
<tr>
<td>Computer equipment</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Leasehold improvements</td>
<td>-</td>
<td>106</td>
</tr>
<tr>
<td>Total property and equipment</td>
<td>13</td>
<td>145</td>
</tr>
<tr>
<td>Less: accumulated depreciation</td>
<td>(1)</td>
<td>(7)</td>
</tr>
<tr>
<td>Property and equipment, net</td>
<td>$ 12</td>
<td>$ 138</td>
</tr>
</tbody>
</table>

Depreciation expense was less than $0.1 million for the years ended December 31, 2017 and 2018.

Note 4. Prepaid Expenses and Other Current Assets and Accrued Expenses

Prepaid expenses and other current assets consisted of the following (in thousands):

<table>
<thead>
<tr>
<th>December 31,</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepaid research and development expenses</td>
<td>$ 167</td>
<td>$ 1,686</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>Total prepaid expenses and other current assets</td>
<td>$ 175</td>
<td>$ 1,709</td>
</tr>
</tbody>
</table>

Accrued expenses consisted of the following (in thousands):

<table>
<thead>
<tr>
<th>December 31,</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accrued payroll and related expenses</td>
<td>$ 143</td>
<td>$ 311</td>
</tr>
<tr>
<td>Accrued research and development expenses</td>
<td>119</td>
<td>100</td>
</tr>
<tr>
<td>Professional fees</td>
<td>133</td>
<td>75</td>
</tr>
<tr>
<td>Other</td>
<td>38</td>
<td>52</td>
</tr>
<tr>
<td>Total accrued expenses</td>
<td>$ 433</td>
<td>$ 538</td>
</tr>
</tbody>
</table>

Note 5. Convertible Notes Payable

Wellcome Trust Convertible Notes

On July 31, 2015, the Company entered into a Company Funding Agreement (the "Funding Agreement") with The Wellcome Trust Limited ("Wellcome Trust"), a related party, under which the Company was eligible to receive up to $3.8 million in gross proceeds from the issuance of a convertible note (the “2015 Convertible Note”). As of December 31, 2017, the Company had received the full $3.8 million under the Funding Agreement. In June 2018, the Company entered into a second Company Funding Agreement with Wellcome Trust to receive up to $8.0 million in gross proceeds from the issuance of a convertible note (the “2018 Convertible Note”). The Company received $2.0 million of proceeds in July 2018 and another $2.7 million in November 2018. The 2015 Convertible Note and 2018 Convertible Note are together referred to as the Wellcome Trust Notes.
The Wellcome Trust Notes have a stated interest rate of 2% per annum above the three-month Dollar LIBOR rate, which is not payable until settlement of the principal. The notes are subject to redemption upon written demand by Wellcome Trust any time after the fifth anniversary of the effective date, resulting in their classification as long-term liabilities as of December 31, 2017 and 2018. The principal due under the Wellcome Trust Notes converts into the class of the Company's stock issued in the Company's next qualified financing or upon event of default at a discounted conversion price between 0% and 25% of the purchase price per share of such securities issued. The accrued interest in such a circumstance would be forgiven.

At inception, the Company concluded that the Wellcome Trust Notes contain a conversion option at a significant discount that was deemed to be an embedded derivative, which is required to be bifurcated and accounted for separately from the debt host. Upon issuance of the 2015 Convertible Note, the Company allocated a total of $0.5 million to the derivative as a debt discount, which was accreted through the conversion date of the note. The derivative associated with the issuance of the 2018 Convertible Note in July 2018 was assigned no value, as there was no discount recognized on conversion in connection with the closing of the Series A Preferred Stock financing.

In August 2018, all outstanding principal under the Wellcome Trust Notes was converted into Series A Preferred Stock.

In November 2018, the Company received an additional $2.7 million under the 2018 Convertible Note, $0.4 million of which was allocated to the derivative as a debt discount, which is being accreted to the expected conversion date of the note. There were no debt issuance costs associated with the Wellcome Trust Notes.

The Company recognized the following changes in the debt related to the Wellcome Trust Notes during the years ended December 31, 2017 and 2018 (in thousands):

<table>
<thead>
<tr>
<th>Financial statement impacted</th>
<th>Balance, December 31, 2016</th>
<th>Balance, December 31, 2017</th>
<th>Balance, August 1, 2018 (date of conversion)</th>
<th>Balance, December 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issuance of 2015 Convertible Note</td>
<td>$3,331</td>
<td>404</td>
<td>2,700</td>
<td>2,516</td>
</tr>
<tr>
<td>Allocation of proceeds to derivative liability</td>
<td>(71)</td>
<td>51</td>
<td>(375)</td>
<td></td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td>197</td>
<td>102</td>
<td></td>
<td>180</td>
</tr>
<tr>
<td>Accrued interest</td>
<td>124</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion of Wellcome Trust notes to Series A redeemable convertible preferred stock</td>
<td></td>
<td>(5,849)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest forgiven upon conversion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issuance of 2018 Convertible Note</td>
<td></td>
<td></td>
<td>2,000</td>
<td></td>
</tr>
<tr>
<td>Allocation of proceeds to derivative liability</td>
<td></td>
<td></td>
<td>(357)</td>
<td></td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td></td>
<td></td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Accrued interest</td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

**Convertible Notes**

From 2011 through 2016, the Company issued convertible notes with principal totaling $3.1 million (the “Convertible Notes”). Of this aggregate principal amount, $2.6 million of the
Convertible Notes were issued to PureTech Health LLC (“PureTech Health”), a related party (see Note 13). During the years ended December 31, 2017 and 2018, the Company issued Convertible Notes to PureTech Health with principal totaling $3.8 million and $7.0 million, respectively. There were no debt issuance costs associated with the Convertible Notes.

The Convertible Notes have a stated interest rate of 10% per annum which is not payable until the settlement of the principal. The notes mature upon written demand by the majority note holders. In the event of a default, the interest rate is 15% per annum. Principal and unpaid interest due under the notes convert on demand of a majority of note holders into the class of the Company’s stock issued in the Company’s next qualified financing at a conversion price between 0% to 25% discount off of the purchase price per share of such securities issued. Given that the convertible notes mature upon written demand by the majority note holders, they are classified as current liabilities in the balance sheet as of December 31, 2017.

The Company concluded that the Convertible Notes contained a conversion option at a significant premium that was deemed to be an embedded derivative, which is required to be bifurcated and accounted for separately from the debt host.

In August 2018, the outstanding Convertible Notes were converted to Series A Preferred Stock. The Company recognized the following changes in the debt related to the Convertible Notes during the years ended December 31, 2017 and 2018 (in thousands):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance, December 31, 2016</td>
<td>$3,903</td>
<td>Issuance of new notes</td>
<td>3,846</td>
<td>Allocation of proceeds to derivative liability</td>
<td>(925)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accretion to settlement value</td>
<td>419</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accrued interest</td>
<td>431</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance, December 31, 2017</td>
<td>7,674</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Issuance of new notes</td>
<td>7,000</td>
<td>Allocation of proceeds to derivative liability</td>
<td>(1,418)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accretion to settlement value</td>
<td>1,945</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accrued interest</td>
<td>630</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interest forgiven upon conversion</td>
<td>(47)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conversion of Convertible Notes to Series A redeemable convertible preferred stock</td>
<td>(15,784)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance, December 31, 2018</td>
<td>$-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 6. Redeemable Convertible Preferred Stock

Series Seed Redeemable Convertible Preferred Stock

Between 2009 and 2011, the Company authorized and issued 4,412,500 shares of Series Seed Preferred Stock at an issuance price of $0.0001 per share, for total proceeds of less than $0.1 million.

There were no issuance costs in connection with the Series Seed Preferred Stock issuance.

Series A Redeemable Convertible Preferred Stock

In August 2018, the Company authorized 3,126,700 shares of Series A Preferred Stock. The Company then issued 1,188,707 shares of Series A Preferred Stock at an issuance price of $13.46 per share resulting in gross proceeds of approximately $16.0 million. There were $0.1 million of issuance costs associated with the Series A Preferred Stock.
In conjunction with the August 2018 issuance of Series A Preferred Stock, all outstanding principal and accrued interest under the Wellcome Trust Notes and Convertible Notes converted to 1,937,993 shares of Series A Preferred Stock.

The Series Seed and Series A redeemable convertible preferred stock (together as “Preferred Stock”) have the following rights and preferences:

**Voting:** On any matter presented to the stockholders of the Company for their action or consideration at any meeting of stockholders of the Company, each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of common stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter.

**Dividends:** Prior to and in preference of any dividends declared for common stock of the Company, the Board of Directors may elect to declare dividends on each share of Preferred Stock.

**Liquidation preference:** In the event of any liquidation, dissolution or winding-up of the Company, the Preferred Stock shall be entitled to receive an amount per share equal to the greater of (i) the original issue price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of such class or series of Preferred Stock been converted into common stock, prior to any distributions being made to common stock. If upon liquidation, dissolution or winding up of the Company, the assets available for distribution are insufficient to pay the holders of Preferred Stock the full amount to which they are entitled, the Preferred Stock holders share ratably in any distribution of the assets.

**Conversion:** Each share of Preferred Stock is convertible at the option of the holder at any time after issuance into the number of fully paid and non-assessable shares of common stock as determined by dividing the original issue price of each series of Preferred Stock by the conversion price of each series in effect at time of the conversion. The initial conversion price is the respective original issue price, subject to adjustment in accordance with the anti-dilution provisions of the stock. Each share of Preferred Stock will automatically be converted into one share of common stock at the then effective conversion rate in the event of either (i) a qualified initial public offering that results in minimum gross proceeds to the Company of $50.0 million or (ii) the election of the holders of the then outstanding Preferred Stock. As of December 31, 2018, none of the outstanding shares of Preferred Stock had been converted into common stock.

**Redemption:** The Preferred Stock may be redeemed upon a Deemed Liquidation Event as defined in the Company's Certificate of Incorporation. The Preferred Stock may be redeemed at the greater of (i) the original issue price per share, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of such class or series of Preferred Stock been converted into common stock prior to the Deemed Liquidation Event. At December 31, 2018, the shares of Preferred Stock were not redeemable and the likelihood of an occurrence of a Deemed Liquidation Event was not deemed to be probable.

**Reissuance:** Shares of any Preferred Stock that are redeemed or converted will be retired or canceled and may not be reissued by the Company.

The original issuance price of the Preferred Stock was $1.00 per share and $13.46 per share for the Series Seed Preferred Stock and Series A Preferred Stock, respectively.
Note 7. Common Stock

As of December 31, 2018, the Company’s Certificate of Incorporation authorized the Company to issue 9,500,000 shares of common stock, $0.0001 par value per share.

The voting, dividend and liquidation rights of the holders of common stock are subject to and qualified by the rights, powers, and preferences of the holders of the shares of Preferred Stock. Holders of the common stock are entitled to one vote for each share of common stock held at all meetings of stockholders and written actions in lieu of meetings, provided, however, that except as otherwise required by law, holders of common stock as such shall not be entitled to vote on any amendment to the Company’s Certificate of Incorporation that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to the Company’s Certificate of Incorporation or pursuant to Delaware General Corporation Law.

Subject to the payment in full of all preferential dividends to which the holders of the Preferred Stock are entitled, the holders of common stock shall be entitled to receive dividends out of funds legally available. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company, after the payment or provision for payment of all debts and liabilities of the Company and all preferential amounts to which the holders of Preferred Stock are entitled with respect to the distribution of assets in liquidation, the holders of common stock shall be entitled to share ratably in the remaining assets of the Company available for distribution.

As of December 31, 2018, there were ten shares of common stock outstanding.

Note 8. Net Loss per Share and Unaudited Pro Forma Net Loss per Share

Net Loss per Share

To date, the Company has been funded solely through the issuance of convertible notes and Preferred Stock. As of December 31, 2017, the Company had no shares of common stock outstanding. On August 21, 2018, PureTech Health, a related party (see Note 9), exercised a warrant to purchase ten shares of common stock, resulting in a weighted-average number of common shares outstanding during the year ended December 31, 2018 of four shares and a net loss per share for this same period of $4.4 million.

The Company’s outstanding Preferred Stock contractually entitle the holders of such shares to participate in distributions but contractually does not require the holders of such shares to participate in losses of the Company. Accordingly, these shares have not been included in the denominator used to calculate net loss per share.

Common Stock Equivalents

The following common stock equivalents presented based on amounts outstanding at each period end, have been excluded from the calculation of diluted net loss per share because including them would have had an anti-dilutive impact:

<table>
<thead>
<tr>
<th>December 31,</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redeemable convertible preferred stock (as converted to common stock)</td>
<td>4,412,500</td>
<td>7,539,200</td>
</tr>
<tr>
<td>Stock options to purchase common stock</td>
<td>847,177</td>
<td>1,778,993</td>
</tr>
<tr>
<td>Warrants to purchase common stock</td>
<td>15,400</td>
<td>15,390</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,275,077</strong></td>
<td><strong>9,333,583</strong></td>
</tr>
</tbody>
</table>

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**Unaudited Pro Forma Net Loss per Share**

Unaudited pro forma basic and diluted net loss per share attributable to common stockholders was calculated as follows (in thousands, except share and per share amounts):

<table>
<thead>
<tr>
<th>Numerator:</th>
<th>Year Ended December 31, 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$(17,512)</td>
</tr>
<tr>
<td>Proforma adjustment to reflect automatic conversion of redeemable convertible preferred shares upon the closing of the proposed initial public offering</td>
<td>4</td>
</tr>
<tr>
<td>Pro forma weighted average common shares outstanding—basic and diluted</td>
<td>5,714,378</td>
</tr>
<tr>
<td>Pro forma net loss per share attributable to common shareholders—basic and diluted</td>
<td>$(3.06)</td>
</tr>
</tbody>
</table>

**Note 9. Stock-based Compensation**

**2009 Stock Incentive Plan**

In September 2009, the Company's board of directors approved the 2009 Stock Incentive Plan (the "2009 Plan") which provides for the grant of incentive stock options to employees and nonstatutory stock options to directors, consultants, and non-employees of the Company up to an aggregate of 1,000,000 shares of the Company's common stock. The board of directors approved increasing the aggregate shares to 1,087,500 on April 30, 2011. In August 2018, in conjunction with the issuance of Series A Preferred Stock, the Company approved an increase in the aggregate common shares issuable to 1,888,869. A total of 109,876 shares remained available for issuance under the 2009 Plan as of December 31, 2018. In March 2019, in conjunction with the issuance of Series B Preferred Stock, the Company approved to increase the aggregate common shares issuable to 3,011,580.

Options generally vest based on the grantee's continued service with the Company during a specified period following a grant as determined by the board of directors and expire ten years from the grant date. In general, awards typically vest in four years, but vesting conditions can vary based on the discretion of the Company's board of directors.
A summary of the Company’s stock option activity and related information is as follows:

<table>
<thead>
<tr>
<th>Date of Period</th>
<th>Number of Shares</th>
<th>Weighted-Average Exercise Price Per Share</th>
<th>Weighted-Average Remaining Contractual Term (Years)</th>
<th>Aggregate Intrinsic Value (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding as of December 31, 2016</td>
<td>734,427</td>
<td>$1.06</td>
<td>5.6</td>
<td>$4,425</td>
</tr>
<tr>
<td>Granted</td>
<td>112,750</td>
<td>7.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercised</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forfeited</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outstanding as of December 31, 2017</td>
<td>847,177</td>
<td>1.86</td>
<td>5.2</td>
<td>6,170</td>
</tr>
<tr>
<td>Granted</td>
<td>948,316</td>
<td>9.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercised</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forfeited</td>
<td>(16,500)</td>
<td>7.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outstanding as of December 31, 2018</td>
<td>1,778,993</td>
<td>5.83</td>
<td>7.1</td>
<td>6,420</td>
</tr>
<tr>
<td>Options vested and expected to vest as of December 31, 2018</td>
<td>1,778,993</td>
<td>$5.83</td>
<td>$7.1</td>
<td>$6,420</td>
</tr>
<tr>
<td>Options exercisable as of December 31, 2018</td>
<td>854,126</td>
<td>2.51</td>
<td>4.5</td>
<td>5,921</td>
</tr>
</tbody>
</table>

The aggregate intrinsic values of options outstanding, exercisable, vested and expected to vest were calculated as the difference between the exercise price of the options and the estimated fair value of the Company’s common stock, as determined by the Board of Directors, as of December 31, 2018.

As of December 31, 2018, there was $3.8 million of unrecognized compensation cost, which is expected to be recognized over a weighted-average period of 2.1 years.

The fair value of all option activity was estimated at the date of grant using the Black-Scholes model with the following assumptions:

<table>
<thead>
<tr>
<th>Year Ended December 31</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair value of options</td>
<td>$3.49 - $3.52</td>
<td>$4.49 - $5.49</td>
</tr>
<tr>
<td>Fair value of common stock</td>
<td>$7.08</td>
<td>$9.14 - $9.44</td>
</tr>
<tr>
<td>Expected term (in years)</td>
<td>6.03 - 6.16</td>
<td>5.65 - 9.34</td>
</tr>
<tr>
<td>Expected volatility</td>
<td>49.41% - 50.35%</td>
<td>45.57% - 48.84%</td>
</tr>
<tr>
<td>Risk-free interest rate</td>
<td>1.84% - 2.13%</td>
<td>2.69% - 3.04%</td>
</tr>
<tr>
<td>Expected dividend yield</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**Warrants**

In October 2016, PureTech Health, a related party, agreed to provide management services to the Company in exchange for a warrant to purchase up to 15,400 shares of the Company’s common stock. The warrant vests monthly as services are performed over a 24-month period and has a purchase price of $3.79 per share. The total expense for the years ended December 31, 2017 and 2018 for the warrant was less than $0.1 million. As of December 31, 2018, there was $0 of unrecognized compensation cost related to the warrants, as the warrant was fully vested.

In August 2018, PureTech Health exercised the warrant to purchase 10 shares resulting in proceeds to the Company of less than $0.1 million.
Stock-based Compensation Expense

Stock-based compensation expense is classified in the statements of operations for the years ended December 31, 2017 and 2018 as follows (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31,</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>$ 49</td>
<td>$ 107</td>
<td></td>
</tr>
<tr>
<td>General and administrative</td>
<td>131</td>
<td>851</td>
<td></td>
</tr>
<tr>
<td>Total stock based compensation expense</td>
<td>$ 180</td>
<td>$ 956</td>
<td></td>
</tr>
</tbody>
</table>

Note 10. Fair Value of Financial Assets and Liabilities

The following table presents information about the Company's assets and liabilities as of December 31, 2017 and 2018 that are measured at fair value on a recurring basis and indicates the level of the fair value hierarchy utilized to determine such fair values (in thousands):

<table>
<thead>
<tr>
<th>Fair Value Measurement at December 31, 2018 Using</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash equivalents (US Treasuries)</td>
<td>$ 5,042</td>
<td>-</td>
<td>-</td>
<td>$ 5,042</td>
</tr>
<tr>
<td>Short-term investments</td>
<td>4,983</td>
<td>-</td>
<td>-</td>
<td>4,983</td>
</tr>
<tr>
<td>Total</td>
<td>$10,025</td>
<td>-</td>
<td>-</td>
<td>$10,025</td>
</tr>
<tr>
<td>Liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derivative instrument</td>
<td>-</td>
<td>-</td>
<td>$ 389</td>
<td>$ 389</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>$ 389</td>
<td>$ 389</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fair Value Measurement at December 31, 2017 Using</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derivative instrument</td>
<td>-</td>
<td>-</td>
<td>$2,606</td>
<td>$ 2,606</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>$2,606</td>
<td>$ 2,606</td>
</tr>
</tbody>
</table>

The estimated fair value and amortized cost of the Company's short-term investments by contractual maturity are summarized as follows (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>Amortized Cost</th>
<th>Unrealized Gains</th>
<th>Unrealized Losses</th>
<th>Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due in one year or less</td>
<td>$ 4,984</td>
<td>-</td>
<td>$(1)</td>
<td>$ 4,983</td>
</tr>
<tr>
<td>Total</td>
<td>$ 4,984</td>
<td>-</td>
<td>$(1)</td>
<td>$ 4,983</td>
</tr>
</tbody>
</table>
The derivative liability is considered a Level 3 liability because its fair value measurement is based, in part, on significant inputs not observed in the market. The Company determined the fair value of the liability as described in Note 5. Any reasonable changes in the assumptions used in the valuation could materially affect the financial results of the Company. The Company recognized the following changes in the fair value of derivative liabilities during the years ended December 31, 2017 and 2018 (in thousands):

<table>
<thead>
<tr>
<th>Balance, December 31, 2016</th>
<th>$ 1,555</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td>996</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>55</td>
</tr>
<tr>
<td>Balance, December 31, 2017</td>
<td>2,606</td>
</tr>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td>1,418</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>430</td>
</tr>
<tr>
<td>Conversion of convertible debt to Series A preferred stock</td>
<td>(4,454)</td>
</tr>
<tr>
<td>Balance, August 1, 2018 (date of conversion)</td>
<td>-</td>
</tr>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td>375</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>14</td>
</tr>
<tr>
<td>Balance, December 31, 2018</td>
<td>$ 389</td>
</tr>
</tbody>
</table>

**Note 11. Commitments and Contingencies**

**Leases**

The Company entered into a 51 month lease for office space in Boston, Massachusetts that began in December 2018 and expires in February 2023. The Company is required to maintain a cash balance of $0.1 million to secure a letter of credit associated with this lease. The amount was classified as restricted cash in the balance sheet at December 31, 2018.

The Company recorded rent expense of less than $0.1 million during the year ended December 31, 2018. Future minimum lease payments under non-cancelable operating lease agreements as of December 31, 2018, are as follows (in thousands):  

<table>
<thead>
<tr>
<th>Year Ending December 31,</th>
<th>Minimum Lease Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$ 335</td>
</tr>
<tr>
<td>2020</td>
<td>499</td>
</tr>
<tr>
<td>2021</td>
<td>506</td>
</tr>
<tr>
<td>2022</td>
<td>514</td>
</tr>
<tr>
<td>2023</td>
<td>86</td>
</tr>
<tr>
<td>Total</td>
<td>$ 1,940</td>
</tr>
</tbody>
</table>

**Intellectual Property License with PureTech Health**

In March 2011, the Company entered into a royalty-bearing exclusive patent license agreement with PureTech Health, a related party, granting the Company rights to research, develop, make, use, sell, and lease technology covered by two then-pending patent applications (the “Patent License”). The two patents pending related to methods and compositions for treatment of disorders ameliorated by muscarinic receptor activation. The Company paid no initial upfront costs upon signing the agreement. Under the agreement, of products covered by the patents, the Company will owe PureTech Health a low single digit percentage running royalty of annual net sales by the Company. Additionally, upon certain clinical and regulatory approval events, the Company will owe PureTech amounts in the form of milestone payments, totaling $10.0 million.
The Company incurred no expenses related to the Patent License provided by PureTech Health during the years ended December 31, 2017 and 2018. The Company had no outstanding liabilities to PureTech Health related to the Patent License at December 31, 2017 and 2018.

Intellectual Property License with Eli Lilly and Company

In May 2012, the Company entered into an agreement with Eli Lilly and Company to obtain rights to data, regulatory filings and patents (now expired) related to xanomeline. The Company paid an initial upfront payment of $0.1 million upon signing of the agreement, which was expensed when incurred. Upon certain regulatory approval events and other sales achievements, the Company will owe Eli Lilly and Company additional amounts in the form of milestone payments of up to $70.0 million and tiered royalties ranging from the low to mid single digits on sales. As of December 31, 2018, no milestones have been reached, and accordingly, no milestone payments have been made.

Indemnification

In the normal course of business, the Company enters into contracts and agreements that contain a variety of representations and warranties and provide for general indemnifications. The Company's exposure under these agreements is unknown because it involves claims that may be made against the Company in the future but have not yet been made. To date, the Company has not paid any claims or been required to defend any action related to its indemnification obligations. However, the Company may incur charges in the future as a result of these indemnification obligations.

Contingencies

From time to time, the Company may have certain contingent liabilities that arise in the ordinary course of its business activities. The Company accrues a liability for such matters when it is probable that future expenditures will be made, and such expenditures can be reasonably estimated.

Litigation

The Company is not a party to any litigation and does not have contingency reserves established for any litigation liabilities as of December 31, 2018.

Note 12. Income Taxes

On December 22, 2017, the Tax Cuts and Jobs Act (the “TCJA”) was signed into United States law. In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (SAB 118), which allowed the Company to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. The Company’s provisional estimate associated with the reduction in the U.S. federal corporate tax rate from 35% to 21% impacted the change in valuation allowance and change in tax rate component of the Company’s effective tax rate reconciliation as well as its ending deferred tax assets, and valuation allowance in the 2017 deferred tax footnote disclosure. In the fourth quarter of 2018, the Company completed the analysis to determine the effect of the TCJA and recorded no adjustments.

During the years ended December 31, 2017 and 2018, the Company recorded no income tax benefit for the net operating losses incurred or for the research and development tax credits generated in each year, due to the full valuation allowance maintained against the Company’s net deferred tax assets.
A reconciliation of the differences between the effective tax rates of the Company for the years ended December 31, 2017 and 2018, respectively, and the U.S. federal statutory tax rate are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Year Ended December 31</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Statutory tax rate</td>
<td></td>
<td>34.0%</td>
<td>21.0%</td>
</tr>
<tr>
<td>State taxes, net of federal</td>
<td></td>
<td>4.1</td>
<td>5.0</td>
</tr>
<tr>
<td>benefit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share-based compensation</td>
<td></td>
<td>-0.6</td>
<td>-1.0</td>
</tr>
<tr>
<td>Change in derivative liability</td>
<td></td>
<td>-0.3</td>
<td>-0.5</td>
</tr>
<tr>
<td>Non-deductible interest expense</td>
<td></td>
<td>-6.6</td>
<td>-3.1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>0.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Tax credits</td>
<td></td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Change in valuation allowance</td>
<td></td>
<td>-10.0</td>
<td>-24.4</td>
</tr>
<tr>
<td>Impact of 2018 tax rate changes on temporary differences</td>
<td>-20.8</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Effective income tax rate</td>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Significant components of the Company's deferred tax assets and liabilities at December 31, 2017 and 2018 are as follows (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>December 31,</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>Deferred tax assets:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating tax losses</td>
<td>$ 2,665</td>
<td>$ 6,288</td>
<td></td>
</tr>
<tr>
<td>Tax credit carryforwards</td>
<td>-</td>
<td>537</td>
<td></td>
</tr>
<tr>
<td>Accrued expenses</td>
<td>66</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Share-based compensation</td>
<td>131</td>
<td>166</td>
<td></td>
</tr>
<tr>
<td>Deferred tax assets</td>
<td>2,862</td>
<td>7,125</td>
<td></td>
</tr>
<tr>
<td>Valuation allowance</td>
<td>(2,860)</td>
<td>(7,122)</td>
<td></td>
</tr>
</tbody>
</table>

Deferred tax liabilities:
- Depreciation: (2) (3)
- Deferred tax liabilities: (2) (3)

Deferred income taxes reflect the net tax effect of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amount used for income tax purposes. The Company applied the separate return method for allocation of current and deferred tax expense.

Until August 1, 2018, the Company filed federal and state taxes as part of a controlled group, PureTech Health, a related party, as it met the requirements to be included in the controlled group filing. The Company has not recorded any deferred tax assets for Research and Development tax credits for the period from inception through August 1, 2018 at which point the Company exited the controlled group. The Company believes that some of its activities do qualify for the credit during that time. Under Section §41 of the Internal Revenue Code of 1986, as amended (the “IRC”), Research and Development tax credits are required to be computed on a controlled group basis and as such, without additional input from companies outside of the Company’s control, the Company cannot reasonably estimate its share of the overall credit. As a result, further analysis must be performed to determine the amount of the consolidated credit allocable to the Company. The Company has excluded from the

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deferred tax table above tax credits that were generated in periods prior to August 2018 as PureTech Health has not completed an analysis to determine the portion that would be available to the Company.

The Company is still required to file tax returns on a combined basis with PureTech Health in certain state jurisdictions. At December 31, 2018, the Company had federal net operating loss carryforwards totaling $23.0 million, of which $9.7 million begin to expire in 2029 and $13.3 million can be carried forward indefinitely. At December 31, 2018, the Company had state net operating loss carryforwards totaling $22.9 million which begin to expire in 2029. In addition, the Company has federal research credits of $0.5 million and state research credits of less than $0.1 million which expire in 2039 and 2033, respectively.

Management has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating loss carryforwards and tax credit carryforwards. Under the applicable accounting standards, management has considered the Company's history of losses and concluded that it is more likely than not that the Company will not recognize the benefits of deferred tax assets. Accordingly, a full valuation allowance has been established against the net deferred tax assets at December 31, 2018. The valuation allowance increased by $4.3 million during the year ended December 31, 2018 which primarily relates to the current year operating loss and tax credits generated.

Under the provisions of the IRC, the net operating loss and tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. Net operating loss and tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50%, as defined under Sections 382 and 383 of the IRC, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future taxable income or tax liabilities. The amount of the annual limitation is determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has completed financings since its inception which may have resulted in a change in control as defined by Section 382 and 383 of the IRC, and it may complete future financings that could result in a change in control in the future. The Company completed a Section 382 study through December 31, 2018 and concluded that it experienced an ownership change during 2014 but has not experienced any subsequent ownership changes. Based on the results of this analysis, the Company does not expect the future utilization of net operating loss carryforwards to be materially limited.

The Company accounts for uncertain tax positions pursuant to ASC 740 which prescribes a recognition threshold and measurement process for financial statement recognition of uncertain tax positions taken or expected to be taken in a tax return. If the tax position meets this threshold, the benefit to be recognized is measured as the tax benefit having the highest likelihood of being realized upon ultimate settlement with the taxing authority. As of December 31, 2018, the Company has not conducted a study of research and development tax credit carryforwards; however, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against the Company’s research and development tax credits and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the balance sheets or statements of operations if an adjustment was required. The Company does not expect any material change in unrecognized tax benefits within the next twelve months.
The Company is subject to taxation in the United States federal and certain state jurisdictions. The Company has incurred operating losses since inception, and therefore, the losses in all periods may be adjusted by taxing jurisdictions in future periods in which they are utilized.

Note 13. Related Party Transactions

**PureTech Health Management Consulting Services and Overhead Agreement**

The Company engages PureTech Health, a related party, to provide, among other things, management expertise, strategic advice, administrative support, computer and telecommunications services and office infrastructure. In exchange for providing such services, the Company pays PureTech Health a monthly fee. In addition, PureTech Health periodically invoices the Company for out-of-pocket expenses reasonably incurred in connection with providing such business services.

The Company incurred general and administrative costs for management services provided by PureTech Health totaling $0.2 million in each of the years ended December 31, 2017 and 2018. The Company had outstanding current liabilities to PureTech Health of $0.7 million and $0.1 million at December 31, 2017 and 2018, respectively, which are recorded as accounts payable in the balance sheet.

**Note 14. 401(k) Savings Plan**

The Company has a 401(k) retirement plan in which substantially all U.S. employees are eligible to participate. Eligible employees may elect to contribute up to the maximum limits, as set by the Internal Revenue Service, of their eligible compensation. The total contribution matching expense for the Company was less than $0.1 million for each of the years ended December 31, 2017 and 2018.

**Note 15. Subsequent Events**

On March 1, 2019, the Company received $1.6 million from the issuance of convertible notes under the 2018 Wellcome Trust Note, which were subsequently converted to Series B preferred stock in conjunction with the Series B stock purchase agreement discussed below.

On March 15, 2019, the Company entered into a Series B stock purchase agreement and issued 4,492,500 shares, or $68.0 million, of Series B Preferred Stock (the “Series B Financing”), of which $63.0 million of cash proceeds was received from new investors. All convertible notes outstanding at the time of the closing, which had original principal values of $4.3 million, were converted into 331,344 shares, or $5.0 million, of Series B Preferred Stock. As of March 15, 2019, the Company's certificate of incorporation, as amended and restated, (the “Certificate of Incorporation”), authorized the Company to issue 12,031,700 shares of Preferred Stock, of which 4,412,500 shares have been designated as Series Seed Preferred Stock, 3,126,700 shares have been designated as Series A Preferred Stock, and 4,492,500 shares have been designated as Series B Preferred Stock. In conjunction with the Series B Financing, the 2009 Stock Incentive Plan was amended to increase the number of shares reserved for issuance by 1,122,711 shares to 3,011,580 shares.

On March 19, 2019, the Company issued 15,390 shares of common stock to PureTech Health upon exercise of remaining shares under the warrants issued to it, representing all of the outstanding warrants, resulting in proceeds to the Company of $0.1 million.

On March 28, 2019, the Company entered into an Amended and Restated Series B stock purchase agreement, authorizing the Company to issue up to 930,345 additional shares of Series B preferred stock, of which 792,602 shares were issued resulting in gross proceeds of $12.0 million. As
of March 28, 2019, the Certificate of Incorporation authorized the Company to issue 12,962,045 shares of Preferred Stock, of which
4,412,500 shares have been designated as Series Seed Preferred Stock, 3,126,700 shares have been designated as Series A Preferred
Stock, and 5,422,845 shares have been designated as Series B Preferred Stock. All of the Company's authorized Series Seed Preferred
Stock and Series A Preferred Stock, and 5,285,102 shares of Series B Preferred Stock, were outstanding as of March 28, 2019.

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<table>
<thead>
<tr>
<th>Assets</th>
<th>December 31, 2018</th>
<th>March 31, 2019 Actual</th>
<th>Pro Forma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash and cash equivalents</td>
<td>$8,904</td>
<td>$84,275</td>
<td>$85,843</td>
</tr>
<tr>
<td>Short-term investments</td>
<td>4,983</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Deferred offering costs</td>
<td>-</td>
<td>626</td>
<td>626</td>
</tr>
<tr>
<td>Prepaid expenses and other current assets</td>
<td>1,709</td>
<td>231</td>
<td>231</td>
</tr>
<tr>
<td>Total current assets</td>
<td>$15,596</td>
<td>85,132</td>
<td>86,700</td>
</tr>
<tr>
<td>Restricted cash</td>
<td>123</td>
<td>123</td>
<td>123</td>
</tr>
<tr>
<td>Property and equipment, net</td>
<td>138</td>
<td>145</td>
<td>145</td>
</tr>
<tr>
<td>Total assets</td>
<td>$15,857</td>
<td>$85,400</td>
<td>$86,968</td>
</tr>
</tbody>
</table>

| Liabilities, Redeemable Convertible Preferred Stock and Stockholders’ Deficit | | | |
| Accounts payable (includes $112 and $27 at December 31, 2018 and March 31, 2019 respectively, due to related parties) | $269 | $854 | $854 |
| Accrued expenses | 538 | 1,293 | 1,293 |
| Deferred lease obligation, short term portion | - | 18 | 18 |
| Derivative liability | 389 | - | - |
| Total current liabilities | 1,196 | 2,165 | 2,165 |

| Non-current convertible notes, net of discount | 2,516 | - | - |
| Deferred lease obligation, long term portion | 102 | 194 | 194 |
| Total liabilities | 3,814 | 2,359 | 2,359 |

| Commitments and Contingencies (Note 10) | | | |
| Redeemable convertible preferred stock | | | |
| Redeemable convertible preferred stock, Series Seed, $0.0001 par value; 4,412,500 shares authorized and outstanding at December 31, 2018 and March 31, 2019; no shares issued and outstanding pro forma; liquidation preference of $4,413 as of December 31, 2018 and March 31, 2019 | 1 | 1 | - |
| Redeemable convertible preferred stock, Series A, $0.0001 par value; 3,126,700 shares authorized and outstanding at December 31, 2018 and March 31, 2019; no shares issued and outstanding pro forma; liquidation preference of $42,085 as of December 31, 2018 and March 31, 2019 | 41,964 | 41,964 | - |
| Redeemable convertible preferred stock, Series B, $0.0001 par value; zero and 5,422,845 shares authorized at December 31, 2018 and March 31, 2019, respectively; zero and 5,285,102 shares issued and outstanding at December 31, 2018 and March 31, 2019, respectively; no shares issued and outstanding pro forma; liquidation preference of $80,016 as of March 31, 2019 | - | 79,841 | - |

| Stockholders’ equity (deficit): | | | |
| Common stock, $0.0001 par value; 9,500,000, 16,000,000, and 16,000,000 shares authorized at December 31, 2018, March 31, 2019, and March 31, 2019 pro forma, respectively; zero, 10 and 13,088,421 shares issued and outstanding at December 31, 2017, 2018, and 2018 pro forma, respectively | - | - | 1 |
| Additional paid-in capital | 1,633 | 4,795 | 129,843 |
| Accumulated deficit | (31,955) | (43,560) | (45,235) |
| Total stockholders’ equity (deficit) | (29,922) | (38,765) | 84,609 |
| Total liabilities, redeemable convertible preferred stock and stockholders’ equity (deficit) | $15,857 | $85,400 | $86,968 |

The accompanying notes are an integral part of these financial statements.
KARUNA THERAPEUTICS, INC.
STATEMENTS OF OPERATIONS
(In thousands, except share and per share data)
(unaudited)

<table>
<thead>
<tr>
<th>Revenue</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating expenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and development</td>
<td>$1,224</td>
<td>$6,967</td>
</tr>
<tr>
<td>General and administrative</td>
<td>236</td>
<td>4,606</td>
</tr>
<tr>
<td>Total operating expenses</td>
<td>1,460</td>
<td>11,573</td>
</tr>
<tr>
<td>Loss from operations</td>
<td>(1,460)</td>
<td>(11,573)</td>
</tr>
<tr>
<td>Other income (expense):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest (expense) income (Note 4)</td>
<td>(281)</td>
<td>11</td>
</tr>
<tr>
<td>Interest income</td>
<td>-</td>
<td>115</td>
</tr>
<tr>
<td>Accretion of debt discount</td>
<td>(587)</td>
<td>(423)</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>(80)</td>
<td>(135)</td>
</tr>
<tr>
<td>Total other income (expense), net</td>
<td>(948)</td>
<td>(432)</td>
</tr>
<tr>
<td>Net loss before income taxes</td>
<td>(2,408)</td>
<td>(12,005)</td>
</tr>
<tr>
<td>Income tax provision</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$ (2,408)</td>
<td>$ (12,005)</td>
</tr>
<tr>
<td>Net loss per share, basic and diluted</td>
<td>$ (2,408)</td>
<td>$ (12,005)</td>
</tr>
</tbody>
</table>

Weighted average common shares outstanding used in computing net loss per share, basic and diluted: 2,062

Pro forma net loss per share, basic and diluted: $ (1.43)

Weighted average common shares outstanding used in computing pro forma net loss per share, basic and diluted: 8,366,349

The accompanying notes are an integral part of these financial statements

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KARUNA THERAPEUTICS, INC.
STATEMENT OF REDEEMABLE CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS’ EQUITY (DEFICIT)
(In thousands, except share data)
(unaudited)

<table>
<thead>
<tr>
<th>Series Seed Redeemable Convertible Preferred Stock</th>
<th>Series A Redeemable Convertible Preferred Stock</th>
<th>Series B Redeemable Convertible Preferred Stock</th>
<th>Common Stock</th>
<th>Additional Paid-in Capital</th>
<th>Accumulated Deficit</th>
<th>Total Stockholders’ Equity (Deficit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares</td>
<td>Value</td>
<td>Shares</td>
<td>Value</td>
<td>Shares</td>
<td>Value</td>
<td>Shares</td>
</tr>
<tr>
<td>Balance, December 31, 2017</td>
<td></td>
<td>4,412,500 $ 1</td>
<td>- $ -</td>
<td>- $ -</td>
<td>675 $</td>
<td>(14,043)</td>
</tr>
<tr>
<td>Shared-based compensation expense</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- 54</td>
<td>- 54</td>
</tr>
<tr>
<td>Net loss</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Balance, March 31, 2018</td>
<td></td>
<td>4,412,500 $ 1</td>
<td>3,126,700</td>
<td>41,964</td>
<td>10</td>
<td>1,633</td>
</tr>
<tr>
<td>Issuance of Series B redeemable convertible preferred stock, net of issuance costs of $175</td>
<td></td>
<td></td>
<td>5,285,102</td>
<td>79,841</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Exercise of common warrants</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>15,390</td>
<td>58</td>
</tr>
<tr>
<td>Shared-based compensation expense</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3,104</td>
</tr>
<tr>
<td>Net loss</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Balance, March 31, 2019</td>
<td></td>
<td>4,412,500 $ 1</td>
<td>3,126,700</td>
<td>5,285,102   79,841</td>
<td>15,400</td>
<td>4,795</td>
</tr>
<tr>
<td>Issuance of Series B redeemable convertible preferred stock (Note 2)</td>
<td></td>
<td></td>
<td>137,743</td>
<td>2,085</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Exercise of common options</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>30,000</td>
<td>4</td>
</tr>
<tr>
<td>Vesting of restricted stock units</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>80,976</td>
<td>1,154</td>
</tr>
<tr>
<td>Conversion of redeemable convertible preferred shares into common shares</td>
<td></td>
<td>(4,412,500) (1)</td>
<td>(3,126,700)</td>
<td>(41,964) (5,422,845) (81,926)</td>
<td>12,962,045</td>
<td>123,890</td>
</tr>
<tr>
<td>Pro Forma Balance, March 31, 2019</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13,088,421</td>
<td>1 $ 129,843</td>
</tr>
</tbody>
</table>

The accompanying notes are an integral part of these financial statements.

F-33
KARUNA THERAPEUTICS, INC.
STATEMENTS OF CASH FLOWS
(In thousands)
( unaudited)

<table>
<thead>
<tr>
<th>Three Months Ended March 31</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
</table>

**Cash flows from operating activities**

- **Net loss**
  - $(2,408)
  - $(12,005)

  **Adjustments to reconcile net loss to net cash used in operating activities:**
  - **Depreciation and amortization expense**
    - 1
    - 10
  - **Stock-based compensation expense**
    - 54
    - 3,104
  - **Non-cash interest expense (income)**
    - 281
    - (11)
  - **Interest income**
    - -
    - (17)
  - **Accretion of debt discount**
    - 587
    - 423
  - **Change in fair value of derivative liability**
    - 80
    - 135

- **Changes in operating assets and liabilities:**
  - **Prepaid expenses and other current assets**
    - 46
    - 1,478
  - **Accounts payable**
    - 868
    - 585
  - **Accrued expenses**
    - (210)
    - 74
  - **Deferred lease obligation**
    - -
    - 110

  **Net cash used in operating activities**
  - $(701)
  - $(6,114)

**Cash flows from investing activities**

- **Acquisition of property and equipment**
  - -
  - (17)
- **Maturities of short-term investments**
  - -
  - 5,000

  **Net cash provided by investing activities**
  - -
  - 4,983

**Cash flows from financing activities**

- **Proceeds from exercise of warrant**
  - -
  - 58
- **Payment of deferred offering costs**
  - -
  - (97)
- **Proceeds from issuance of Series B redeemable convertible preferred stock, net of issuance cost**
  - -
  - 74,977
- **Proceeds from issuance of convertible notes**
  - 3,000
  - 1,564

  **Net cash provided by financing activities**
  - 3,000
  - 76,502

**Net increase in cash, cash equivalents and restricted cash**

- 2,299
- 75,371

**Cash, cash equivalents and restricted cash at beginning of period**

- 1,942
- 9,027

**Cash, cash equivalents and restricted cash at end of period**

- $4,241
- $84,398

**Supplemental disclosures of cash flows information**

- **Conversion of convertible notes, accrued interest and discount upon conversion to preferred stock**
  - $ -
  - $5,016
- **Deferred offering costs included in accrued expenses**
  - $ -
  - $529

*The accompanying notes are an integral part of these financial statements*
NOTES TO FINANCIAL STATEMENTS
(unaudited)

Note 1. Nature of the Business

Karuna Therapeutics, Inc. (the “Company”) was incorporated under the laws of the State of Delaware in July 2009 as Karuna Pharmaceuticals, Inc. and is headquartered in Boston, Massachusetts. In March 2019, the Company changed its name to Karuna Therapeutics, Inc. The Company is focused on the development of novel therapies to address disabling neuropsychiatric conditions characterized by significant unmet medical need.

Since the Company’s inception, it has focused substantially all of its efforts and financial resources on organizing and staffing the company, acquiring and developing its technology, raising capital, building its intellectual property portfolio, undertaking preclinical studies and clinical trials and providing general and administrative support for these activities. The Company has not generated any product revenue related to its primary business purpose to date and is subject to a number of risks similar to those of other early stage companies, including dependence on key individuals, regulatory approval of products, uncertainty of market acceptance of products, competition from substitute products and larger companies, compliance with government regulations, protection of proprietary technology, dependence on third parties, product liability and the need to obtain adequate additional financing to fund the development of its product candidates.

Liquidity

The Company’s financial statements have been prepared on the basis of continuity of operations, realization of assets and the satisfaction of liabilities in the ordinary course of business. The Company experienced negative operating cash flows of $6.1 million for the three months ended March 31, 2019 and had an accumulated deficit of $43.6 million as of March 31, 2019. The Company expects to continue to generate operating losses for the foreseeable future.

As of May 22, 2019, the issuance date of the financial statements for the three months ended March 31, 2019, the Company expects that its cash and cash equivalents of $84.3 million as of March 31, 2019, will be sufficient to fund its operating expenses and capital expenditure requirements through at least 12 months from the date of issuance of these financial statements. The future viability of the Company beyond that point is dependent on its ability to raise additional capital to fund its operations.

The Company is seeking to complete an initial public offering (“IPO”) of its common stock. Upon the closing of a qualified IPO (as defined in the Company’s Certificate of Incorporation, as amended and restated) on specified terms, all of the Company’s outstanding redeemable convertible preferred stock will automatically convert into shares of common stock (see Note 5). In the event the Company does not complete an IPO, the Company expects to seek additional funding through private equity financings, debt financings, or other capital sources, including collaborations with other companies, or other strategic transactions. The Company may not be able to obtain funding on acceptable terms, or at all. The terms of any financing may adversely affect the holdings or the rights of the Company’s stockholders.

If the Company is unable to obtain funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations. Although management continues to pursue these plans, there is no assurance that the Company will be successful in obtaining sufficient funding on terms acceptable to the Company to fund continuing operations, if at all.
Note 2. Summary of Significant Accounting Policies

Unaudited Interim Financial Information

The accompanying balance sheet as of March 31, 2019, the statements of operations and cash flows for the three months ended March 31, 2018 and 2019, and the statements of redeemable convertible preferred stock and stockholders’ equity (deficit) for the three months ended March 31, 2018 and 2019 are unaudited. The unaudited interim financial statements have been prepared on the same basis as the audited annual financial statements and, in the opinion of management, reflect all adjustments, which include only normal recurring adjustments, necessary for the fair statement of the Company’s financial position as of March 31, 2019 and the results of its operations and its cash flows for the three months ended March 31, 2018 and 2019. The financial data and other information disclosed in these notes related to the three months ended March 31, 2018 and 2019 are unaudited. The results for the three months ended March 31, 2019 are not necessarily indicative of results to be expected for the year ending December 31, 2019, any other interim periods, or any future year or period.

Unaudited Pro Forma Information

All of the Company's redeemable convertible preferred stock will automatically convert into shares of common stock upon the closing of a qualified IPO. The accompanying unaudited pro forma balance sheet and statement of redeemable convertible preferred stock and stockholders’ equity (deficit) reflect the assumed conversion of all of the outstanding shares of Series Seed redeemable convertible preferred stock and Series A redeemable convertible preferred stock (“Series A Preferred Stock”) and Series B redeemable convertible preferred stock (“Series B Preferred Stock”) as of March 31, 2019 into shares of common stock. In addition, the pro forma balance sheet gives effect to (i) the exercise of an outstanding option for 30,000 shares of common stock resulting in proceeds of less than $0.1 million, (ii) the funding of $1.6 million in April 2019 under a convertible note which was subsequently converted into 137,743 shares of Series B Preferred Stock at a discount, (iii) the automatic conversion of the 137,743 shares of Series B Preferred Stock issued in April 2019 into shares of common stock upon the closing of the proposed IPO and (iv) the future issuance of 80,976 shares of common stock underlying fully vested restricted stock units the Company issued in May 2019, which the Company is obligated to deliver no later than March 15, 2020. See Note 13 for further discussion of subsequent events reflected in the unaudited pro forma financials.

In the accompanying statements of operations, the unaudited pro forma basic and diluted weighted average common shares outstanding used in the calculation of unaudited pro forma basic and diluted net loss per share attributable to common stockholders for the three months ended March 31, 2019 gives effect to the automatic conversion upon the closing of the proposed IPO of all outstanding shares of redeemable convertible preferred stock as of March 31, 2019 into 12,839,072 shares of common stock as if the conversion had occurred on the later of January 1, 2019 or the issuance date of the redeemable convertible preferred stock. The unaudited pro forma basic and diluted weighted average common shares outstanding calculation does not take into effect the proforma adjustments listed above that took place subsequent to March 31, 2019. See Note 5 for further discussion of the Series Seed Preferred Stock, Series A Preferred Stock and Series B Preferred Stock conversion features, as well as a discussion of their rights and preferences.

Note 3. Prepaid Expenses and Other Current Assets and Accrued Expenses

Prepaid expenses and other current assets consisted of the following (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2018</th>
<th>March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepaid research and development expenses</td>
<td>$1,686</td>
<td>$185</td>
</tr>
<tr>
<td>Other</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td><strong>Total prepaid expenses and other current assets</strong></td>
<td><strong>$1,709</strong></td>
<td><strong>$231</strong></td>
</tr>
</tbody>
</table>

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Accrued expenses consisted of the following (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2018</th>
<th>March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accrued payroll and related expenses</td>
<td>$ 311</td>
<td>$ 252</td>
</tr>
<tr>
<td>Accrued research and development expenses</td>
<td>100</td>
<td>159</td>
</tr>
<tr>
<td>Professional fees</td>
<td>75</td>
<td>862</td>
</tr>
<tr>
<td>Other</td>
<td>52</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total accrued expenses</strong></td>
<td><strong>$ 538</strong></td>
<td><strong>$ 1,293</strong></td>
</tr>
</tbody>
</table>

Note 4. Convertible Notes Payable

Wellcome Trust Convertible Notes

In June 2018, the Company entered into a second Company Funding Agreement with Wellcome Trust to receive up to $8.0 million in gross proceeds from the issuance of a convertible note (the “2018 Convertible Note”). The Company received $2.0 million of proceeds in July 2018, $2.7 million in November 2018 and $1.6 million in March 2019.

The 2018 Convertible Note has a stated interest rate of 2% per annum above the three-month Dollar LIBOR rate, which is not payable until settlement of the principal. The note is subject to redemption upon written demand by Wellcome Trust any time after the fifth anniversary of the effective date, resulting in their classification as long-term liabilities as of December 31, 2018 and March 31, 2019. The principal due under the 2018 Convertible Note converts into the class of the Company's stock issued in the Company's next qualified financing or upon event of default at a discounted conversion price between 0% and 25% of the purchase price per share of such securities issued. The accrued interest in such a circumstance would be forgiven.
At inception, the Company concluded that the 2018 Convertible Note contained a conversion option at a significant discount that was deemed to be an embedded derivative, which is required to be bifurcated and accounted for separately from the debt host. In November 2018, the Company received $2.7 million under the 2018 Convertible Note, $0.4 million of which was allocated to the derivative as a debt discount. In March 2019, the Company received an additional $1.6 million under the 2018 Convertible Note, $0.2 million of which was allocated to the derivative as a debt discount. These funds were converted to Series B Preferred Stock in March 2019 at a 15% discount, at which point the debt discount was fully accreted. There were no debt issuance costs associated with the 2018 Convertible Note. The Company recognized the following changes in the debt related to the 2018 Convertible Note during the year ended December 31, 2018 as well as the three months ended March 31, 2018 and 2019 (in thousands):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accretion to settlement value</td>
<td>$ 3,985</td>
<td>$ 4,049</td>
<td>$ 2,000</td>
<td>$ 2,516</td>
<td>$ -</td>
</tr>
<tr>
<td>Accrued interest</td>
<td>25</td>
<td>39</td>
<td>26</td>
<td>180</td>
<td>11</td>
</tr>
<tr>
<td>Issuance of 2018 Convertible Note</td>
<td>2,000</td>
<td></td>
<td>2,700</td>
<td>1,564</td>
<td></td>
</tr>
<tr>
<td>Allocation of proceeds to derivative liability</td>
<td>(375)</td>
<td></td>
<td>(375)</td>
<td>(228)</td>
<td></td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td>63</td>
<td></td>
<td>180</td>
<td>423</td>
<td></td>
</tr>
<tr>
<td>Accrued interest</td>
<td>39</td>
<td></td>
<td>11</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Interest forgiven upon conversion</td>
<td>(289)</td>
<td></td>
<td>(289)</td>
<td>(40)</td>
<td></td>
</tr>
<tr>
<td>Conversion of 2018 Convertible Note to redeemable convertible preferred stock</td>
<td>(5,849)</td>
<td></td>
<td>(5,849)</td>
<td>(4,264)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$ 6,124</td>
<td>$ 9,794</td>
<td>$ 7,738</td>
<td>$ 6,299</td>
<td>$ -</td>
</tr>
</tbody>
</table>

Convertible Notes

Since inception, the Company has issued $14.0 million of convertible notes (the “Convertible Notes”), of which $13.5 million was issued to PureTech Health LLC (“PureTech Health”), a related party (see Note 11). There were no debt issuance costs associated with the Convertible Notes.

The Company concluded that the Convertible Notes contained a conversion option at a significant premium that was deemed to be an embedded derivative, which is required to be bifurcated and accounted for separately from the debt host.

In August 2018, the outstanding Convertible Notes were converted to Series A Preferred Stock.
The Company recognized the following changes in the debt related to the Convertible Notes during the three months ended March 31, 2018 (in thousands):

<table>
<thead>
<tr>
<th>Financial statement impacted</th>
<th>Balance, December 31, 2017</th>
<th>Issuance of new notes</th>
<th>3,000</th>
<th>Balance sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation of proceeds to derivative liability</td>
<td></td>
<td>(722)</td>
<td></td>
<td>Balance sheet</td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td></td>
<td>562</td>
<td></td>
<td>Statement of operations</td>
</tr>
<tr>
<td>Accrued interest</td>
<td></td>
<td>242</td>
<td></td>
<td>Statement of operations</td>
</tr>
<tr>
<td><strong>Balance, March 31, 2018</strong></td>
<td></td>
<td><strong>10,756</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issuance of new notes</td>
<td></td>
<td>4,000</td>
<td></td>
<td>Balance sheet</td>
</tr>
<tr>
<td>Allocation of proceeds to derivative liability</td>
<td></td>
<td>(696)</td>
<td></td>
<td>Balance sheet</td>
</tr>
<tr>
<td>Accretion to settlement value</td>
<td></td>
<td>1,383</td>
<td></td>
<td>Statement of operations</td>
</tr>
<tr>
<td>Accrued interest</td>
<td></td>
<td>388</td>
<td></td>
<td>Statement of operations</td>
</tr>
<tr>
<td>Interest forgiven upon conversion</td>
<td></td>
<td>(47)</td>
<td></td>
<td>Statement of operations</td>
</tr>
<tr>
<td>Conversion of Convertible Notes to redeemable convertible preferred stock</td>
<td></td>
<td>(15,784)</td>
<td></td>
<td>Balance sheet</td>
</tr>
<tr>
<td><strong>Balance, December 31, 2018</strong></td>
<td></td>
<td><strong>-</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There were no outstanding Convertible Notes as of March 31, 2019.

**Note 5. Redeemable Convertible Preferred Stock**

**Series Seed Redeemable Convertible Preferred Stock**

Between 2009 and 2011, the Company authorized and issued 4,412,500 shares of Series Seed Preferred Stock at an issuance price of $0.0001 per share, for total proceeds of less than $0.1 million.

There were no issuance costs in connection with the Series Seed Preferred Stock issuance.

**Series A Redeemable Convertible Preferred Stock**

In August 2018, the Company authorized 3,126,700 shares of Series A Preferred Stock. The Company then issued 1,188,707 shares of Series A Preferred Stock at an issuance price of $13.46 per share resulting in gross proceeds of approximately $16.0 million. There were $0.1 million of issuance costs associated with the Series A Preferred Stock.

In conjunction with the August 2018 issuance of Series A Preferred Stock, all outstanding principal and accrued interest under the Wellcome Trust Notes and Convertible Notes converted to 1,937,993 shares of Series A Preferred Stock.

**Series B Redeemable Convertible Preferred Stock**

In March 2019, the Company authorized 5,422,845 shares of Series B Preferred Stock. The Company then issued 4,953,758 shares of Series B Preferred Stock at an issuance price of $15.14 per share resulting in gross proceeds of approximately $75.0 million. There were $0.2 million of issuance costs associated with the Series B Preferred Stock.

In conjunction with the March 2019 issuance of Series B Preferred Stock, all outstanding principal and accrued interest under the Wellcome Trust Notes converted to 331,344 shares of Series B Preferred Stock.

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As of March 31, 2019, there are 137,743 unissued shares of Series B Preferred Stock.

The Series Seed, Series A and Series B redeemable convertible preferred stock (together as “Preferred Stock”) have the following rights and preferences:

**Voting:** On any matter presented to the stockholders of the Company for their action or consideration at any meeting of stockholders of the Company, each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of common stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter.

**Dividends:** Prior to and in preference of any dividends declared for common stock of the Company, the Board of Directors may elect to declare dividends on each share of Preferred Stock.

**Liquidation preference:** In the event of any liquidation, dissolution or winding-up of the Company, the Preferred Stock shall be entitled to receive an amount per share equal to the greater of (i) the original issue price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of such class or series of Preferred Stock been converted into common stock, prior to any distributions being made to common stock. If upon liquidation, dissolution or winding up of the Company, the assets available for distribution are insufficient to pay the holders of Preferred Stock the full amount to which they are entitled, the Preferred Stock holders share ratably in any distribution of the assets.

**Conversion:** Each share of Preferred Stock is convertible at the option of the holder at any time after issuance into the number of fully paid and non-assessable shares of common stock as determined by dividing the original issue price of each series of Preferred Stock by the conversion price of each series in effect at time of the conversion. The initial conversion price is the respective original issue price, subject to adjustment in accordance with the anti-dilution provisions of the stock. Each share of Preferred Stock will automatically be converted into one share of common stock at the then effective conversion rate in the event of either (i) a qualified initial public offering that results in minimum gross proceeds to the Company of $50.0 million or (ii) the election of the holders of the then outstanding Preferred Stock. As of March 31, 2019, none of the outstanding shares of Preferred Stock had been converted into common stock.

**Redemption:** The Preferred Stock may be redeemed upon a Deemed Liquidation Event as defined in the Company’s Certificate of Incorporation. The Preferred Stock may be redeemed at the greater of (i) the original issue price per share, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of such class or series of Preferred Stock been converted into common stock prior to the Deemed Liquidation Event. At March 31, 2019, the shares of Preferred Stock were not redeemable and the likelihood of an occurrence of a Deemed Liquidation Event was not deemed to be probable.

**Reissuance:** Shares of any Preferred Stock that are redeemed or converted will be retired or canceled and may not be reissued by the Company.

The original issuance price of the Preferred Stock was $1.00 per share, $13.46 per share and $15.14 per share for the Series Seed Preferred Stock, Series A Preferred Stock and Series B Preferred Stock, respectively.

**Note 6. Common Stock**

As of March 31, 2019, the Company’s Certificate of Incorporation authorized the Company to issue 16,000,000 shares of common stock, $0.0001 par value per share.

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The voting, dividend and liquidation rights of the holders of common stock are subject to and qualified by the rights, powers, and preferences of the holders of the shares of Preferred Stock. Holders of the common stock are entitled to one vote for each share of common stock held at all meetings of stockholders and written actions in lieu of meetings, provided, however, that except as otherwise required by law, holders of common stock as such shall not be entitled to vote on any amendment to the Company’s Certificate of Incorporation that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to the Company’s Certificate of Incorporation or pursuant to Delaware General Corporation Law.

Subject to the payment in full of all preferential dividends to which the holders of the Preferred Stock are entitled, the holders of common stock shall be entitled to receive dividends out of funds legally available. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company, after the payment or provision for payment of all debts and liabilities of the Company and all preferential amounts to which the holders of Preferred Stock are entitled with respect to the distribution of assets in liquidation, the holders of common stock shall be entitled to share ratably in the remaining assets of the Company available for distribution.

As of March 31, 2019, there were 15,400 shares of common stock outstanding.

**Note 7. Net Loss per Share and Unaudited Pro Forma Net Loss per Share**

**Net Loss per Share**

As of March 31, 2018, there were no shares of common stock outstanding. As of December 31, 2018, the Company had 10 shares of common stock outstanding. On March 18, 2019, PureTech Health, a related party, exercised a warrant to purchase 15,390 shares of common stock (see Note 8), resulting in a weighted-average number of common shares outstanding during the three months ended March 31, 2019 of 2,062 shares and a net loss per share for this same period of $5,822. The Company’s outstanding shares of Preferred Stock contractually entitle the holders of such shares to participate in distributions but contractually does not require the holders of such shares to participate in losses of the Company. Accordingly, these shares have not been included in the denominator used to calculate net loss per share.

**Common Stock Equivalents**

The following common stock equivalents presented based on amounts outstanding at each period end, have been excluded from the calculation of diluted net loss per share because including them would have had an anti-dilutive impact:

<table>
<thead>
<tr>
<th>Common Stock Equivalents</th>
<th>March 31, 2018</th>
<th>March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redeemable convertible preferred stock (as converted to common stock)</td>
<td>4,412,500</td>
<td>12,824,302</td>
</tr>
<tr>
<td>Stock options to purchase common stock</td>
<td>830,677</td>
<td>2,891,851</td>
</tr>
<tr>
<td>Warrants to purchase common stock</td>
<td>15,400</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,258,577</strong></td>
<td><strong>15,716,153</strong></td>
</tr>
</tbody>
</table>

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Unaudited Pro Forma Net Loss per Share

Unaudited pro forma basic and diluted net loss per share attributable to common stockholders was calculated as follows (in thousands, except share and per share amounts):

<table>
<thead>
<tr>
<th>Numerator:</th>
<th>Three Months Ended March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net loss attributable to common stockholders</td>
<td>$(12,005)</td>
</tr>
<tr>
<td>Weighted average common shares outstanding—basic and diluted</td>
<td>2,062</td>
</tr>
<tr>
<td>Pro forma adjustment to reflect automatic conversion of redeemable convertible preferred shares upon the closing of the proposed initial public offering</td>
<td>8,364,287</td>
</tr>
<tr>
<td>Pro forma weighted average common shares outstanding—basic and diluted</td>
<td>8,366,349</td>
</tr>
<tr>
<td>Pro forma net loss per share attributable to common shareholders—basic and diluted</td>
<td>$(1.43)</td>
</tr>
</tbody>
</table>

Note 8. Stock-based Compensation

2009 Stock Incentive Plan

In September 2009, the Company's board of directors approved the 2009 Stock Incentive Plan (the “2009 Plan”) which provides for the grant of incentive stock options to employees and nonstatutory stock options to directors, consultants, and non-employees of the Company up to an aggregate of 1,000,000 shares of the Company's common stock. The board of directors approved increasing the aggregate shares to 1,087,500 on April 30, 2011. In August 2018, in conjunction with the issuance of Series A Preferred Stock, the Company approved an increase in the aggregate common shares issuable to 1,888,869. In March 2019, in conjunction with the issuance of Series B Preferred Stock, the Company approved to increase the aggregate common shares issuable to 3,011,580. A total of 119,729 shares remained available for issuance under the 2009 Plan as of March 31, 2019.

Options generally vest based on the grantee's continued service with the Company during a specified period following a grant as determined by the board of directors and expire ten years from the grant date. In general, awards typically vest in four years, but vesting conditions can vary based on the discretion of the Company's board of directors.

A summary of the Company's stock option activity and related information is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Number of Shares</th>
<th>Weighted-Average Exercise Price Per Share</th>
<th>Weighted-Average Remaining Contractual Term (Years)</th>
<th>Aggregate Intrinsic Value (in thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding as of December 31, 2018</td>
<td>1,778,993</td>
<td>$5.83</td>
<td>7.1</td>
<td>$6,420</td>
</tr>
<tr>
<td>Granted</td>
<td>1,194,785</td>
<td>11.95</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Exercised</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Forfeited</td>
<td>(81,927)</td>
<td>0.14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Outstanding as of March 31, 2019</td>
<td>2,891,851</td>
<td>8.52</td>
<td>8.3</td>
<td>9,918</td>
</tr>
<tr>
<td>Options vested and expected to vest as of March 31, 2019</td>
<td>2,891,851</td>
<td>8.52</td>
<td>8.3</td>
<td>9,918</td>
</tr>
<tr>
<td>Options exercisable as of March 31, 2019</td>
<td>1,408,566</td>
<td>6.20</td>
<td>6.8</td>
<td>8,102</td>
</tr>
</tbody>
</table>
The aggregate intrinsic values of options outstanding, exercisable, vested and expected to vest were calculated as the difference between the exercise price of the options and the estimated fair value of the Company’s common stock, as determined by the Board of Directors, as of March 31, 2019.

As of March 31, 2019, there was $7.1 million of unrecognized compensation cost, which is expected to be recognized over a weighted-average period of 2.7 years.

The fair value of all option activity was estimated at the date of grant using the Black-Scholes model with the following assumptions:

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair value of options</td>
<td>$4.99 - $5.53</td>
</tr>
<tr>
<td>Fair value of common stock</td>
<td>$11.95</td>
</tr>
<tr>
<td>Expected term (in years)</td>
<td>5.09 - 6.16</td>
</tr>
<tr>
<td>Expected volatility</td>
<td>44.21% - 44.41%</td>
</tr>
<tr>
<td>Risk-free interest rate</td>
<td>2.23% - 2.44%</td>
</tr>
<tr>
<td>Expected dividend yield</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

There were no stock options granted during the three months ended March 31, 2018.

**Warrants**

In October 2016, PureTech Health, a related party, agreed to provide management services to the Company in exchange for a warrant to purchase up to 15,400 shares of the Company’s common stock. The warrant vests monthly as services are performed over a 24-month period and has a purchase price of $3.79 per share. The total expense for the three months ended March 31, 2018 for the warrant was less than $0.1 million. The warrant was fully vested as of October 2018.

In August 2018, PureTech Health exercised the warrant to purchase 10 shares resulting in proceeds to the Company of less than $0.1 million. In March 2019, PureTech Health exercised the warrant to purchase the remaining 15,390 shares resulting in proceeds to the Company of $0.1 million. There are no outstanding warrants as of March 31, 2019.

**Stock-based Compensation Expense**

Stock-based compensation expense is classified in the statements of operations for the three months ended March 31, 2018 and 2019 as follows (in thousands):

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ended March 31, 2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research and development</td>
<td>$25</td>
<td>$80</td>
</tr>
<tr>
<td>General and administrative</td>
<td>20</td>
<td>3,024</td>
</tr>
<tr>
<td>Total stock based compensation expense</td>
<td>$45</td>
<td>$3,104</td>
</tr>
</tbody>
</table>

The following table presents information about the Company’s assets and liabilities as of December 31, 2018 that are measured at fair value on a recurring basis and indicates the level of the fair value hierarchy utilized to determine such fair values (in thousands):

<table>
<thead>
<tr>
<th>Fair Value Measurement at December 31, 2018 Using</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash equivalents (US Treasuries)</td>
<td>$5,042</td>
<td>-</td>
<td>-</td>
<td>$5,042</td>
</tr>
<tr>
<td>Short-term investments</td>
<td>4,983</td>
<td>-</td>
<td>-</td>
<td>4,983</td>
</tr>
<tr>
<td>Total</td>
<td>$10,025</td>
<td>-</td>
<td>-</td>
<td>$10,025</td>
</tr>
<tr>
<td><strong>Liabilities:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derivative instrument</td>
<td>-</td>
<td>-</td>
<td>$389</td>
<td>$389</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>$389</td>
<td>$389</td>
</tr>
</tbody>
</table>

There were no financial instruments held at fair value as of March 31, 2019.

The estimated fair value and amortized cost of the Company’s short-term investments by contractual maturity are summarized as follows (in thousands):

| Due in one year or less                        | $4,984 | -      | $(1)   | $4,983|
| Total                                          | $4,984 | -      | $(1)   | $4,983|

There were no short-term investments held as of March 31, 2019.

The derivative liability is considered a Level 3 liability because its fair value measurement is based, in part, on significant inputs not observed in the market. Any reasonable changes in the assumptions used in the valuation could materially affect the financial results of the Company. The Company recognized the following changes in the fair value of derivative liabilities during the year ended December 31, 2018 and the three months ended March 31, 2019 (in thousands):

<table>
<thead>
<tr>
<th>December 31, 2018</th>
<th>Amortized Cost</th>
<th>Unrealized Gains</th>
<th>Unrealized Losses</th>
<th>Fair Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance, December 31, 2017</td>
<td>$2,606</td>
<td>722</td>
<td>-</td>
<td>$2,606</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>80</td>
<td></td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>Balance, March 31, 2018</td>
<td>$3,488</td>
<td>696</td>
<td>350</td>
<td>$3,488</td>
</tr>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td></td>
<td></td>
<td></td>
<td>696</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>350</td>
<td></td>
<td></td>
<td>350</td>
</tr>
<tr>
<td>Conversion of convertible debt to Series A preferred stock</td>
<td></td>
<td></td>
<td>$(4,454)</td>
<td></td>
</tr>
<tr>
<td>Balance, August 1, 2018 (date of conversion)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td></td>
<td></td>
<td></td>
<td>375</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>14</td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Balance, December 31, 2018</td>
<td>$389</td>
<td>228</td>
<td>135</td>
<td>$389</td>
</tr>
<tr>
<td>Allocation of note issuance proceeds to derivative</td>
<td></td>
<td></td>
<td></td>
<td>228</td>
</tr>
<tr>
<td>Change in fair value of derivative</td>
<td>135</td>
<td></td>
<td></td>
<td>135</td>
</tr>
<tr>
<td>Conversion of convertible debt to Series B preferred stock</td>
<td></td>
<td></td>
<td>$(752)</td>
<td></td>
</tr>
<tr>
<td>Balance, March 31, 2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note 10. Commitments and Contingencies

Leases

The Company entered into a 51 month lease for office space in Boston, Massachusetts that began in December 2018 and expires in February 2023. The Company is required to maintain a cash balance of $0.1 million to secure a letter of credit associated with this lease. The amount was classified as restricted cash in the balance sheet at December 31, 2018 and March 31, 2019.

The Company recorded rent expense of $0.1 million during the three months ended March 31, 2019.

Future minimum lease payments under non-cancelable operating lease agreements as of March 31, 2019, are as follows (in thousands):

<table>
<thead>
<tr>
<th>As of March 31</th>
<th>Minimum Lease Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>$459</td>
</tr>
<tr>
<td>1 to 2 years</td>
<td>501</td>
</tr>
<tr>
<td>2 to 3 years</td>
<td>508</td>
</tr>
<tr>
<td>3 to 4 years</td>
<td>472</td>
</tr>
<tr>
<td>4 to 5 years</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$1,940</td>
</tr>
</tbody>
</table>

Intellectual Property License with PureTech Health

In March 2011, the Company entered into a royalty-bearing exclusive patent license agreement with PureTech Health, a related party, granting the Company rights to research, develop, make, use, sell, and lease technology covered by two then-pending patent applications (the “Patent License”). The two patents pending related to methods and compositions for treatment of disorders ameliorated by muscarinic receptor activation. The Company paid no initial upfront costs upon signing the agreement. Under the agreement, of products covered by the patents, the Company will owe PureTech Health a low single digit percentage running royalty of annual net sales by the Company. Additionally, upon certain clinical and regulatory approval events, the Company will owe PureTech amounts in the form of milestone payments, totaling $10.0 million.

The Company incurred no expenses related to the Patent License provided by PureTech Health during the three months ended March 31, 2018 and 2019. The Company had no outstanding liabilities to PureTech Health related to the Patent License at December 31, 2018 and March 31, 2019.

Intellectual Property License with Eli Lilly and Company

In May 2012, the Company entered into an agreement with Eli Lilly and Company to obtain rights to data, regulatory filings and patents (now expired) related to xanomeline. The Company paid an initial upfront payment of $0.1 million upon signing of the agreement, which was expensed when incurred. Upon certain regulatory approval events and other sales achievements, the Company will owe Eli Lilly and Company additional amounts in the form of milestone payments of up to $70.0 million and tiered royalties ranging from the low to mid single digits on sales. As of March 31, 2019, no milestones have been reached, and accordingly, no milestone payments have been made.

Indemnification

In the normal course of business, the Company enters into contracts and agreements that contain a variety of representations and warranties and provide for general indemnifications. The
Company’s exposure under these agreements is unknown because it involves claims that may be made against the Company in the future but have not yet been made. To date, the Company has not paid any claims or been required to defend any action related to its indemnification obligations. However, the Company may incur charges in the future as a result of these indemnification obligations.

**Contingencies**

From time to time, the Company may have certain contingent liabilities that arise in the ordinary course of its business activities. The Company accrues a liability for such matters when it is probable that future expenditures will be made, and such expenditures can be reasonably estimated.

**Litigation**

The Company is not a party to any litigation and does not have contingency reserves established for any litigation liabilities as of March 31, 2019.

**Note 11. Related Party Transactions**

**PureTech Health Management Consulting Services and Overhead Agreement**

The Company engages PureTech Health, a related party, to provide, among other things, management expertise, strategic advice, administrative support, computer and telecommunications services and office infrastructure. In exchange for providing such services, the Company pays PureTech Health a monthly fee. In addition, PureTech Health periodically invoices the Company for out-of-pocket expenses reasonably incurred in connection with providing such business services.

The Company incurred general and administrative costs for management services provided by PureTech Health totaling less than $0.1 million in each of the three months ended March 31, 2018 and 2019. The Company had outstanding current liabilities to PureTech Health of $0.1 million and less than $0.1 million at December 31, 2018 and March 31, 2019, respectively, which are recorded as accounts payable in the balance sheet.

**Note 12. 401(k) Savings Plan**

The Company has a 401(k) retirement plan in which substantially all U.S. employees are eligible to participate. Eligible employees may elect to contribute up to the maximum limits, as set by the Internal Revenue Service, of their eligible compensation. The total contribution matching expense for the Company was less than $0.1 million for each of the three months ended March 31, 2018 and 2019.

**Note 13. Subsequent Events**

On April 5, 2019, the Company received $1.6 million of proceeds under the 2018 Convertible Note. This note was subsequently converted into 137,743 shares of Series B preferred stock on April 8, 2019, which represents a 25% discount to the principal amount received, in accordance with the 2018 Convertible Note.
Shares
Common Stock

Goldman Sachs & Co. LLC       Citigroup       Wells Fargo Securities
Wedbush PacGrow

Through and including _, 2019 (the 25th day after the date of this prospectus), all dealers effecting transactions in these securities, whether or not participating in this offering, may be required to deliver a prospectus. This is in addition to a dealer’s obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.
**Item 13. Other Expenses of Issuance and Distribution.**

The following table sets forth the expenses to be incurred in connection with the offering described in this Registration Statement, other than underwriting discounts and commissions, all of which will be paid by us. All amounts are estimates except the Securities and Exchange Commission's registration fee, the Financial Industry Regulatory Authority, Inc. filing fee and the Nasdaq listing fee.

<table>
<thead>
<tr>
<th>Expense</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securities and Exchange Commission registration fee</td>
<td>$9,090</td>
</tr>
<tr>
<td>Financial Industry Regulatory Authority, Inc. filing fee</td>
<td>11,750</td>
</tr>
<tr>
<td>Nasdaq listing fee</td>
<td>125,000</td>
</tr>
<tr>
<td>Accountants’ fees and expenses</td>
<td>*</td>
</tr>
<tr>
<td>Legal fees and expenses</td>
<td>*</td>
</tr>
<tr>
<td>Transfer Agent’s fees and expenses</td>
<td>*</td>
</tr>
<tr>
<td>Printing and engraving expenses</td>
<td>*</td>
</tr>
<tr>
<td>Miscellaneous fees and expenses</td>
<td>*</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>$*</td>
</tr>
</tbody>
</table>

* To be filed by amendment.

**Item 14. Indemnification of Directors and Officers.**

Section 145 of the Delaware General Corporation Law, or the DGCL, authorizes a corporation to indemnify its directors and officers against liabilities arising out of actions, suits and proceedings to which they are made or threatened to be made a party by reason of the fact that they have served or are currently serving as a director or officer to a corporation. The indemnity may cover expenses (including attorneys’ fees) judgments, fines and amounts paid in settlement actually and reasonably incurred by the director or officer in connection with any such action, suit or proceeding if the director or officer acted in good faith and in a manner the director or officer reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe the director or officer’s conduct was unlawful. Section 145 permits corporations to pay expenses (including attorneys’ fees) incurred by directors and officers in advance of the final disposition of such action, suit or proceeding upon receipt of an undertaking by or on behalf of such director or officer to repay such amount if it shall ultimately be determined that such director or officer is not entitled to be indemnified by the corporation as authorized in Section 145. In addition, Section 145 provides that a corporation has the power to purchase and maintain insurance on behalf of its directors and officers against any liability asserted against them and incurred by them in their capacity as a director or officer, or arising out of their status as such, whether or not the corporation would have the power to indemnify the director or officer against such liability under Section 145.

We have adopted provisions in both our certificate of incorporation and bylaws to be in effect upon the completion of this offering that limit or eliminate the personal liability of our directors to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended. Consequently, a director will not be personally liable to us or our stockholders for monetary damages or breach of fiduciary duty as a director, except for liability for:

- any breach of the director’s duty of loyalty to us or our stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;

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any unlawful payments related to dividends or unlawful stock purchases, redemptions or other distributions; or
any transaction from which the director derived an improper personal benefit.

These limitations of liability do not alter director liability under the federal securities laws and do not affect the availability of equitable remedies such as an injunction or rescission.

In addition, our bylaws provide that:

- we will indemnify our directors, officers and, in the discretion of our board of directors, certain employees to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended; and
- we will advance reasonable expenses, including attorneys' fees, to our directors and, in the discretion of our board of directors, to our officers and certain employees, in connection with legal proceedings relating to their service for or on behalf of us, subject to limited exceptions.

We have entered into indemnification agreements with each of our directors and intend to enter into such agreements with certain of our executive officers. These agreements provide that we will indemnify each of our directors, certain of our executive officers and, at times, their affiliates to the fullest extent permitted by Delaware law. We will advance expenses, including attorneys' fees (but excluding judgments, fines and settlement amounts), to each indemnified director, executive officer or affiliate in connection with any proceeding in which indemnification is available and we will indemnify our directors and officers for any action or proceeding arising out of that person's services as a director or officer brought on behalf of us or in furtherance of our rights. Additionally, certain of our directors or officers may have certain rights to indemnification, advancement of expenses or insurance provided by their affiliates or other third parties, which indemnification relates to and might apply to the same proceedings arising out of such director's or officer's services as a director referenced herein. Nonetheless, we have agreed in the indemnification agreements that our obligations to those same directors or officers are primary and any obligation of such affiliates or other third parties to advance expenses or to provide indemnification for the expenses or liabilities incurred by those directors are secondary.

We also maintain general liability insurance which covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers, including liabilities under the Securities Act.

The underwriting agreement filed as Exhibit 1.1 to this registration statement provides for indemnification of us and our directors and officers by the underwriters against certain liabilities under the Securities Act and the Exchange Act.

**Item 15. Recent Sales of Unregistered Securities.**

Set forth below is information regarding shares of our common stock and shares of our preferred stock issued, warrants issued, and stock options granted, by us within the past three years that were not registered under the Securities Act. Included is the consideration, if any, we received for such shares and options and information relating to the section of the Securities Act, or rule of the Securities and Exchange Commission, under which exemption from registration was claimed.

**(a) Issuance of Convertible Debt**

On August 31, 2017, we issued a convertible promissory note to PureTech Health LLC in the principal amount of $345,819. On the same date, we issued a second convertible promissory note to PureTech Health LLC in the principal amount of up to $6.5 million.
In July 2015, we entered into a company funding agreement, or the 2015 Wellcome Funding Agreement, with The Wellcome Trust Limited, or Wellcome Trust, pursuant to which we were eligible to receive $3.8 million in gross proceeds upon the achievement of specified milestones. In June 2018, we entered into another company funding agreement with Wellcome Trust, or the 2018 Wellcome Funding Agreement, pursuant to which Wellcome Trust may loan us an aggregate of $8.0 million in installments upon the occurrence of certain milestones related to our Phase 2 clinical trial. The 2015 Wellcome Funding Agreement and 2018 Wellcome Funding Agreement are together referred to as the Wellcome Funding Agreements. Interest does not accrue on the outstanding principal under the Wellcome Funding Agreements. The outstanding principal is convertible upon certain events, including equity financings, and the discount applied to conversion of the outstanding principal upon an equity financing adjusts based on when such conversion occurs, with increasing discounts applied as time elapses from the effective date of the agreement. As of the closing of our Series A preferred stock financing, we had drawn down $2.0 million pursuant to the Wellcome Funding Agreement, all of which converted into Series A preferred stock in the financing, as further described below. No discount was applied to such conversion due to the fact that the financing closed within three months of the effective date of the Wellcome Funding Agreements.

We drew down an additional $2.7 million, $1.6 million and $1.6 million in November 2018, March 2019 and April 2019, respectively, under the Wellcome Funding Agreements, all of which converted into Series B preferred stock in our Series B preferred stock financing at either a 25% or 15% discount, as further described below.

No underwriters were involved in the foregoing issuances of securities. The securities described in this section (a) of Item 15 were issued to investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) under the Securities Act and Regulation D promulgated thereunder relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. The recipients of securities in the transactions described above represented that they were accredited investors and were acquiring the securities for their own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time and appropriate legends were affixed to the instruments representing such securities issued in such transactions.

(b) Issuance of Capital Stock.

In August 2018, we issued and sold 3,126,700 shares of Series A preferred stock in our Series A preferred stock financing at a price of $13.46 per share for an aggregate purchase price of approximately $42.1 million. Included in this amount was approximately $19.1 million of outstanding principal and interest on convertible promissory notes issued between May 2011 and June 2018, including the 2017 Notes, and the outstanding principal amount loaned to us pursuant to the Wellcome Funding Agreements, all of which converted into Series A preferred stock in this financing at a discount in accordance with their terms.

On July 31, 2018, we issued ten shares of common stock to PureTech Health upon its partial exercise of the PureTech Warrant (as further described below). On March 18, 2019, we issued 15,390 shares of common stock to PureTech Health upon its exercise of the remaining shares under the PureTech Warrant.

In March and April 2019, we issued and sold an aggregate of 5,422,845 shares of Series B preferred stock at a price per share of $15.14, for an aggregate purchase price of approximately $82.1 million. Included in this amount was approximately $5.8 million of outstanding principal loaned to us subsequent to the Series A financing pursuant to the Wellcome Funding Agreements, which converted into Series B preferred stock in this financing at either a 25% or 15% discount in accordance with the terms of the Wellcome Funding Agreements.
On April 17, 2019, we issued 30,000 shares of common stock upon the exercise of an option.

On May 16, 2019, we issued 80,976 fully vested restricted stock units with respect to 80,976 shares of common stock.

No underwriters were involved in the foregoing issuances of securities. The securities described in this section (b) of Item 15 were issued to investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) under the Securities Act and Regulation D promulgated thereunder relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. The recipients of securities in the transactions described above represented that they were accredited investors and were acquiring the securities for their own account for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that they could bear the risks of the investment and could hold the securities for an indefinite period of time and appropriate legends were affixed to the instruments representing such securities issued in such transactions.

(c) Stock Option Grants and Option Exercises.

From May 2, 2016 and through the date of this registration statement, we granted options to purchase an aggregate of 2,434,488 shares of common stock, with exercise prices ranging from $3.79 to $11.95 per share, to employees and consultants pursuant to our 2009 stock incentive plan. On April 17, 2019, we issued 30,000 shares of common stock upon the exercise of an option. None of the remaining options have been exercised.

No underwriters were involved in the foregoing issuances of securities. The issuances of stock options described in this paragraph (c) of Item 15 were issued pursuant to written compensatory plans or arrangements with our employees, directors, consultants and advisors, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act, or pursuant to Section 4(a)(2) under the Securities Act, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. All recipients either received adequate information about us or had access, through employment or other relationships, to such information.

(d) Warrant Grant

On October 12, 2016, we issued a warrant to purchase 15,400 shares of common stock at a price of $3.79 per share to PureTech Health LLC.

No underwriters were involved in the foregoing issuance of securities. The issuances of the warrant described in this paragraph (d) of Item 15 was issued in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(2) under the Securities Act relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. The recipient of securities in the transaction described above represented that it was an accredited investor and was acquiring the securities for its own account for investment purposes only and not with a view to the public resale or distribution thereof and that it could bear the risks of the investment and could hold the securities for an indefinite period of time and appropriate legends were affixed to the instruments representing such securities issued in such transactions.

All of the securities described in paragraphs (a), (b), (c) and (d) of this Item 15 are deemed restricted securities for purposes of the Securities Act. All of the certificates representing such securities included appropriate legends setting forth that the securities have not been registered and the applicable restrictions on transfer.

(a) Exhibits.

The exhibits to the registration statement are listed in the Exhibit Index attached hereto and incorporated by reference herein.

(b) Financial Statement Schedules.

No financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or the related notes.
<table>
<thead>
<tr>
<th>Exhibit Number</th>
<th>Description of Exhibit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1*</td>
<td>Form of Underwriting Agreement</td>
</tr>
<tr>
<td>3.1</td>
<td>Second Amended and Restated Certificate of Incorporation of the Registrant (as currently in effect)</td>
</tr>
<tr>
<td>3.2</td>
<td>Bylaws of the Registrant (as currently in effect)</td>
</tr>
<tr>
<td>3.3</td>
<td>Form of Restated Certificate of Incorporation of the Registrant (to be effective upon the closing of this offering)</td>
</tr>
<tr>
<td>3.4</td>
<td>Form of Amended and Restated Bylaws of the Registrant (to be effective upon the closing of this offering)</td>
</tr>
<tr>
<td>4.1*</td>
<td>Specimen stock certificate evidencing the shares of common stock</td>
</tr>
<tr>
<td>4.2</td>
<td>Amended and Restated Investors' Rights Agreement, dated as of March 15, 2019, among the Registrant and the other parties thereto</td>
</tr>
<tr>
<td>5.1*</td>
<td>Opinion of Goodwin Procter LLP</td>
</tr>
<tr>
<td>10.1#</td>
<td>2009 Stock Incentive Plan, as amended, and forms of award agreements thereunder</td>
</tr>
<tr>
<td>10.2*</td>
<td>2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.3#</td>
<td>Form of Incentive Stock Option Agreement under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.4#</td>
<td>Form of Non-Qualified Stock Option Agreement for Company Employees under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.5#</td>
<td>Form of Non-Qualified Stock Option Agreement for Non-Employee Directors under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.6#</td>
<td>Form of Restricted Stock Award Agreement under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.7#</td>
<td>Form of Restricted Stock Unit Award Agreement for Company Employees under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.8#</td>
<td>Form of Restricted Stock Unit Award Agreement for Non-Employee Directors under the Registrant's 2019 Stock Option and Incentive Plan</td>
</tr>
<tr>
<td>10.9#</td>
<td>2019 Employee Stock Purchase Plan</td>
</tr>
<tr>
<td>10.10+</td>
<td>License Agreement, dated as of May 9, 2012, by and between the Registrant and Eli Lilly and Company</td>
</tr>
<tr>
<td>10.11+</td>
<td>Exclusive Patent License Agreement, dated as of March 4, 2011, as amended on February 1, 2013 and February 25, 2015, by and between the Registrant and PureTech Health LLC</td>
</tr>
<tr>
<td>10.12</td>
<td>Office Lease, dated as of November 2, 2018, by and between the Registrant and T-C 33 Arch Street LLC</td>
</tr>
<tr>
<td>10.14#</td>
<td>Employment Agreement, between the Registrant and Steven Paul (to be entered into in connection with this offering)</td>
</tr>
<tr>
<td>10.15#</td>
<td>Employment Agreement, between the Registrant and Andrew Miller (to be entered into in connection with this offering)</td>
</tr>
<tr>
<td>Exhibit Number</td>
<td>Description of Exhibit</td>
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</tr>
<tr>
<td>10.16#</td>
<td>Employment Agreement, between the Registrant and Stephen Brannan (to be entered into in connection with this offering)</td>
</tr>
<tr>
<td>10.17#</td>
<td>Form of Director Indemnification Agreement</td>
</tr>
<tr>
<td>10.18#</td>
<td>Form of Officer Indemnification Agreement</td>
</tr>
<tr>
<td>10.19#</td>
<td>Senior Executive Cash Incentive Bonus Plan</td>
</tr>
<tr>
<td>23.1</td>
<td>Consent of KPMG LLP, independent registered public accounting firm</td>
</tr>
<tr>
<td>23.2*</td>
<td>Consent of Goodwin Procter LLP (included in Exhibit 5.1)</td>
</tr>
<tr>
<td>24.1</td>
<td>Power of Attorney (included on signature page)</td>
</tr>
<tr>
<td>99.1</td>
<td>Consent of James Healy to be named as director</td>
</tr>
<tr>
<td>99.2</td>
<td>Consent of Atul Pande to be named as director</td>
</tr>
</tbody>
</table>

* To be filed by amendment.
+ Certain portions of this exhibit will be omitted because they are not material and would likely cause competitive harm to the registrant if disclosed.
# Indicates a management contract or any compensatory plan, contract or arrangement.

**Item 17. Undertakings.**

(a) The undersigned registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement, certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

(b) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

(c) The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Boston, Commonwealth of Massachusetts, on this 31st day of May, 2019.

KARUNA THERAPEUTICS, INC.

By: /s/ Steven Paul
Steven Paul, M.D.
Chief Executive Officer and President

Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Steven Paul and Troy Ignelzi and each of them, his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution for him and in his name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this registration statement, and any subsequent registration statements pursuant to Rule 462 of the Securities Act and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that each of said attorney-in-fact or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>/s/ Steven Paul</td>
<td>Chief Executive Officer, President and Chairman (principal executive officer)</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Steven Paul, M.D.</td>
<td></td>
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</tr>
<tr>
<td>/s/ Troy Ignelzi</td>
<td>Chief Financial Officer (principal financial officer and principal accounting officer)</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Troy Ignelzi</td>
<td></td>
<td></td>
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<tr>
<td>/s/ Bharat Chowria</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Bharat Chowria, J.D., Ph.D.</td>
<td></td>
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</tr>
<tr>
<td>/s/ Eric Elenko</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Eric Elenko, Ph.D.</td>
<td></td>
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<tr>
<td>/s/ Edmund Harrigan</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Edmund Harrigan, M.D.</td>
<td></td>
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<tr>
<td>/s/ Jeffrey Jonas</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Jeffrey Jonas, M.D.</td>
<td></td>
<td></td>
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<tr>
<td>/s/ Joep Muijers</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Joep Muijers, Ph.D.</td>
<td></td>
<td></td>
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<tr>
<td>/s/ Robert Nelsen</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Robert Nelsen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/s/ Heather Preston</td>
<td>Director</td>
<td>May 31, 2019</td>
</tr>
<tr>
<td>Heather Preston, M.D.</td>
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</tbody>
</table>
SECOND AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
KARUNA PHARMACEUTICALS, INC.
(Pursuant to Sections 242 and 245 of the
General Corporation Law of the State of Delaware)

Karuna Pharmaceuticals, Inc., a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the “General Corporation Law”),

DOES HEREBY CERTIFY:

1. That the name of this corporation is Karuna Pharmaceuticals, Inc., and that this corporation was originally incorporated pursuant to the General Corporation Law on July 24, 2009 under the name Karuna Pharmaceuticals, Inc. The corporation filed an Amended and Restated Certificate of Incorporation on August 1, 2018 (the “Certificate of Incorporation”).

2. That the Board of Directors of this corporation duly adopted resolutions proposing to amend and restate the Certificate of Incorporation of this corporation, declaring said amendment and restatement to be advisable and in the best interests of this corporation and its stockholders, and authorizing the appropriate officers of this corporation to solicit the consent of the stockholders therefor, which resolution setting forth the proposed amendment and restatement is as follows:

   RESOLVED, that the Certificate of Incorporation of this corporation be amended and restated in its entirety to read as follows:

   FIRST: The name of this corporation is Karuna Therapeutics, Inc. (the “Corporation”).

   SECOND: The address of the Corporation’s registered office in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle 19801. The name of its registered agent at such address is The Corporation Trust Company.

   THIRD: The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law.

   FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) 16,000,000 shares of Common Stock, $0.0001 par value per share (“Common Stock”) and (ii) 12,031,700 shares of Preferred Stock, $0.0001 par value per share (“Preferred Stock”), 4,412,500 of which shares are designated as Series Seed Preferred Stock (“Series Seed Preferred Stock”), 3,126,700 of which shares are designated as Series A Preferred Stock (“Series A Preferred Stock”), and 4,492,500 of which shares are designated as Series B Preferred Stock (“Series B Preferred Stock”).
The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth herein.

2. Voting. The holders of the Common Stock are entitled to one vote for each share of Common Stock held at all meetings of stockholders (and written actions in lieu of meetings); provided, however, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Second Amended and Restated Certificate of Incorporation that relates solely to the terms of one or more outstanding class or series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to this Second Amended and Restated Certificate of Incorporation or pursuant to the General Corporation Law. There shall be no cumulative voting. The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by (in addition to any vote of the holders of one or more class or series of Preferred Stock that may be required by the terms of this Second Amended and Restated Certificate of Incorporation) the affirmative vote of the holders of shares of capital stock of the Corporation representing a majority of the votes represented by all outstanding shares of capital stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law.

B. PREFERRED STOCK

The rights, preferences, powers and privileges granted to and imposed on the Preferred Stock are set forth below. Unless otherwise indicated, references to “sections” or “subsections” in this Part B of this Article Fourth refer to sections and subsections of Part B of this Article Fourth.

1. Dividends.

The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock) unless (in addition to the obtaining of any consents required elsewhere in this Second Amended and Restated Certificate of Incorporation) the holders of the Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Preferred Stock in an amount at least equal to (i) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Preferred Stock as would equal the product of (A) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (B) the number of shares of Common Stock issuable upon conversion of a share of such class or series of Preferred Stock, in each case calculated on the record date for determination of holders entitled to receive such dividend or (ii) in the case of a dividend on any class or series that is not convertible into Common Stock, at a
rate per share of Preferred Stock determined by (A) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (B) multiplying such fraction by an amount equal to the Applicable Original Issue Price (as defined below); provided that, if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of such class or series of Preferred Stock pursuant to this Section 1 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest dividend for such class or series of Preferred Stock. The “Series Seed Original Issue Price” shall mean $1.00 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series Seed Preferred Stock. The “Series A Original Issue Price” shall mean $13.46 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock. The “Series B Original Issue Price” shall mean $15.14 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series B Preferred Stock. The “Applicable Original Issue Price” shall mean, (i) with respect to the Series Seed Preferred Stock, the Series Seed Original Issue Price, (ii) with respect to the Series A Preferred Stock, the Series A Original Issue Price, and, (iii) with respect to the Series B Preferred Stock, the Series B Original Issue Price.

2. Liquidation, Dissolution or Winding Up: Certain Mergers, Consolidations and Asset Sales.

2.1 Preferential Payments to Holders of Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of each class or series of Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, and in the event of a Deemed Liquidation Event (as defined below), the holders of shares of each class or series of Preferred Stock then outstanding shall be entitled to be paid out of the consideration payable to stockholders in such Deemed Liquidation Event or out of the Available Proceeds (as defined below), as applicable, before any payment shall be made to the holders of Common Stock by reason of their ownership thereof, an amount per share equal to the greater of (i) the Applicable Original Issue Price, plus any dividends declared but unpaid thereon, or (ii) such amount per share as would have been payable had all shares of such class or series of Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (the amount payable pursuant to this sentence is hereinafter referred to as the “Preferred Liquidation Amount”). If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of each class or series of Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of each class or series of Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.
2.2 Distribution of Remaining Assets. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, after the payment in full of all Preferred Liquidation Amounts required to be paid to the holders of shares of Preferred Stock, the remaining assets of the Corporation available for distribution to its stockholders or, in the case of a Deemed Liquidation Event, the consideration not payable to the holders of shares of Preferred Stock pursuant to Section 2.1 or the remaining Available Proceeds, as the case may be, shall be distributed among the holders of shares of Common Stock, pro rata based on the number of shares held by each such holder.

2.3 Deemed Liquidation Events.

2.3.1 Definition. Each of the following events shall be considered a “Deemed Liquidation Event” unless the holders of a majority of the shares of Series A Preferred Stock and Series B Preferred Stock then outstanding, voting together as a single class on an as-converted basis (collectively, the “Requisite Preferred Holders”), elect otherwise by written notice sent to the Corporation at least 20 days prior to the effective date of any such event:

(a) a merger or consolidation in which
   (i) the Corporation is a constituent party or
   (ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation,

except any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (1) the surviving corporation; or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation (provided that, for the purpose of this Subsection 2.3.1, all shares of Common Stock issuable upon exercise of Options (as defined below) outstanding immediately prior to such merger or consolidation or upon conversion of Convertible Securities (as defined below) outstanding immediately prior to such merger or consolidation shall be deemed to be outstanding immediately prior to such merger or consolidation and, if applicable, converted or exchanged in such merger or consolidation on the same terms as the actual outstanding shares of Common Stock are converted or exchanged); or

(b) (1) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of the Corporation of all or substantially all the assets or intellectual property of the Corporation and its subsidiaries taken as a whole, or (2) the sale or disposition (whether by merger, consolidation or otherwise, and whether in a single transaction or a series of related transactions) of one or more subsidiaries of the Corporation if substantially all of the assets of the Corporation and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Corporation.
2.3.2 Effecting a Deemed Liquidation Event.

(a) The Corporation shall not have the power to effect a Deemed Liquidation Event referred to in Subsection 2.3.1(a)(i) unless the agreement or plan of merger or consolidation for such transaction (the “Merger Agreement”) provides that the consideration payable to the stockholders of the Corporation in such Deemed Liquidation Event shall be paid to the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2.

(b) In the event of a Deemed Liquidation Event referred to in Subsection 2.3.1(a)(ii) or 2.3.1(b), if the Corporation does not effect a dissolution of the Corporation under the General Corporation Law within ninety (90) days after such Deemed Liquidation Event, then (i) the Corporation shall send a written notice to each holder of Preferred Stock no later than the ninetieth (90th) day after the Deemed Liquidation Event advising such holders of their right (and the requirements to be met to secure such right) pursuant to the terms of the following clause; (ii) to require the redemption of such shares of Preferred Stock, and (iii) if the Requisite Preferred Holders so request in a written instrument delivered to the Corporation not later than one hundred twenty (120) days after such Deemed Liquidation Event, the Corporation shall use the consideration received by the Corporation for such Deemed Liquidation Event (net of any retained liabilities associated with the assets sold or technology licensed, as determined in good faith by the Board of Directors of the Corporation), together with any other assets of the Corporation available for distribution to its stockholders, and to no other corporate purpose unless permitted by Delaware law governing distributions to stockholders (the “Available Proceeds”), on the one hundred fiftieth (150th) day after such Deemed Liquidation Event, to redeem all outstanding shares of Preferred Stock at a price per share equal to the Preferred Liquidation Amount. Notwithstanding the foregoing, in the event of a redemption pursuant to the preceding sentence, if the Available Proceeds are not sufficient to redeem all outstanding shares of Preferred Stock, the Corporation shall redeem a pro rata portion of each holder’s shares of Preferred Stock to the fullest extent of such Available Proceeds, based on the respective amounts which would otherwise be payable in respect of the shares to be redeemed if the Available Proceeds were sufficient to redeem all such shares, and shall redeem the remaining shares as soon as it may lawfully do so under Delaware law governing distributions to stockholders.

(c) The following provisions shall apply to the redemption of the Preferred Stock pursuant to Subsection 2.3.2(b):

(i) **Redemption Notice.** The Corporation shall send written notice of the redemption (the “Redemption Notice”) to each holder of record of Preferred Stock not less than 20 days prior to the redemption date (the “Redemption Date”). Each Redemption Notice shall state:
(1) the number of shares of Preferred Stock held by the holder that the Corporation shall redeem on the Redemption Date specified in the Redemption Notice;

(2) the Redemption Date and the price at which the shares of the applicable class or series of Preferred Stock will be redeemed;

(3) the date upon which the holder’s right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(4) that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Preferred Stock to be redeemed.

(ii) Rights Subsequent to Redemption. If the Redemption Notice shall have been duly given, and if on the applicable Redemption Date the Redemption Price payable upon redemption of the shares of Preferred Stock to be redeemed on such Redemption Date is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor in a timely manner, then notwithstanding that the certificates evidencing any of the shares of Preferred Stock so called for redemption shall not have been surrendered, all rights with respect to such shares shall forthwith after the Redemption Date terminate, except only the right of the holders to receive the Redemption Price without interest upon surrender of their certificate or certificates therefor.

(d) Prior to the distribution or redemption provided for in Subsection 2.3.2(b), the Corporation shall not expend or dissipate the consideration received for such Deemed Liquidation Event, except to discharge expenses incurred in connection with such Deemed Liquidation Event.

2.3.3 Amount Deemed Paid or Distributed. The amount deemed paid or distributed to the holders of capital stock of the Corporation upon any such merger, consolidation, sale, transfer, exclusive license, other disposition or redemption shall be the cash or the value of the property, rights or securities to be paid or distributed to such holders pursuant to such Deemed Liquidation Event. The value of such property, rights or securities shall be determined in good faith by the Board of Directors of the Corporation.

2.3.4 Allocation of Escrow and Contingent Consideration. In the event of a Deemed Liquidation Event pursuant to Subsection 2.3.1(a)(i), if any portion of the consideration payable to the stockholders of the Corporation is payable only upon satisfaction of contingencies (the “Additional Consideration”), the Merger Agreement shall provide that (a)
the portion of such consideration that is not Additional Consideration (such portion, the “Initial Consideration”) shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2 as if the Initial Consideration were the only consideration payable in connection with such Deemed Liquidation Event; and (b) any Additional Consideration which becomes payable to the stockholders of the Corporation upon satisfaction of such contingencies shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2 after taking into account the previous payment of the Initial Consideration as part of the same transaction. For the purposes of this Subsection 2.3.4, consideration placed into escrow or retained as a holdback to be available for satisfaction of indemnification or similar obligations in connection with such Deemed Liquidation Event shall be deemed to be Additional Consideration.


3.1 General. On any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of Common Stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of this Second Amended and Restated Certificate of Incorporation, holders of Preferred Stock shall vote together with the holders of Common Stock as a single class on an as-converted to Common Stock basis.

3.2 Election of Directors. The holders of record of the shares of Series B Preferred Stock, exclusively and as a separate class, shall be entitled to elect one (1) director of the Corporation, the holders of record of the shares of Series A Preferred Stock, exclusively and as a separate class, shall be entitled to elect one (1) director of the Corporation and the holders of record of the shares of Series Seed Preferred Stock, exclusively and as a separate class, shall be entitled to elect three (3) directors of the Corporation. Any director elected as provided in the preceding sentence may be removed without cause by, and only by, the affirmative vote of the holders of the shares of the class or series of capital stock entitled to elect such director or directors, given either at a special meeting of such stockholders duly called for that purpose or pursuant to a written consent of stockholders. If the holders of shares of Series B Preferred Stock, Series A Preferred Stock or Series Seed Preferred Stock, as the case may be, fail to elect a sufficient number of directors to fill all directorships for which they are entitled to elect directors, voting exclusively and as a separate class, pursuant to the first sentence of this Subsection 3.2, then any directorship not so filled shall remain vacant until such time as the holders of the Series B Preferred Stock, Series A Preferred Stock or Series Seed Preferred Stock, as the case may be, elect a person to fill such directorship by vote or written consent in lieu of a meeting; and no such directorship may be filled by stockholders of the Corporation other than by the stockholders of the Corporation that are entitled to elect a person to fill such directorship, voting exclusively and as a separate class. The holders of record of the shares of Common Stock and of any other class or series of voting stock (including the Preferred Stock), exclusively and voting together as a single class on an as-converted to Common Stock basis, shall be entitled to elect the balance of the total number of directors of the Corporation. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director. Except as otherwise provided in this Subsection 3.2, a vacancy in any directorship filled by the holders of any class or series shall be filled only by vote or written consent in lieu of a meeting of the holders of such class or series or by any remaining director or directors elected by the holders of such class or series pursuant to this Subsection 3.2.
3.3 Preferred Stock Protective Provisions. So long as at least 3,075,425 shares of Preferred Stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Preferred Stock) are outstanding, the Corporation shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or this Second Amended and Restated Certificate of Incorporation) the written consent or affirmative vote of the Requisite Preferred Holders, given in writing or by vote at a meeting, and any such act or transaction entered into without such consent or vote shall be null and void ab initio, and of no force or effect:

3.3.1 liquidate, dissolve or wind-up the business and affairs of the Corporation, effect any merger, reorganization or consolidation or any other Deemed Liquidation Event, or consent to any of the foregoing;

3.3.2 amend, alter or repeal any provision of this Second Amended and Restated Certificate of Incorporation or Bylaws of the Corporation;

3.3.3 create, or authorize the creation of, or issue or obligate itself to issue shares of, any additional class or series of capital stock unless the same ranks junior to each outstanding class or series of Preferred Stock with respect to the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends and rights of redemption, change the authorized number of shares of any class or series of capital stock of the Corporation, or change the authorized number of shares of any additional class or series of capital stock;

3.3.4 (i) reclassify, alter or amend any existing security of the Corporation that is pari passu with the Preferred Stock in respect of the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends or rights of redemption, if such reclassification, alteration or amendment would render such other security senior to the Preferred Stock in respect of any such right, preference, or privilege or (ii) reclassify, alter or amend any existing security of the Corporation that is junior to the Preferred Stock in respect of the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends or rights of redemption, if such reclassification, alteration or amendment would render such other security senior or pari passu to any outstanding class or series of Preferred Stock in respect of any such right, preference, or privilege;

3.3.5 purchase or redeem (or permit any subsidiary to purchase or redeem) or pay or declare any dividend or make any distribution on, any shares of capital stock of the Corporation other than (i) redemptions of or dividends or distributions on the Preferred Stock as expressly authorized herein and (ii) dividends or other distributions payable on the Common Stock solely in the form of additional shares of Common Stock and (iii) repurchases of stock from former employees, officers, directors, consultants or other persons who performed services for the Corporation or any subsidiary in connection with the cessation of such employment or service at a price no greater than the original purchase price thereof;
3.3.6 create or authorize the creation of any debt security other than equipment leases or bank lines of credit;

3.3.7 create, or authorize the creation of, or issue, or authorize the issuance of any debt security or create any lien or security interest (except for purchase money liens or statutory liens of landlords, mechanics, materialmen, workmen, warehousemen and other similar persons arising or incurred in the ordinary course of business) or incur other indebtedness for borrowed money, including but not limited to obligations and contingent obligations under guarantees, or permit any subsidiary to take any such action with respect to any debt security lien, security interest or other indebtedness for borrowed money, other than equipment leases, bank lines of credit or trade payables incurred in the ordinary course;

3.3.8 create, or hold capital stock in, any subsidiary that is not wholly owned (either directly or through one or more other subsidiaries) by the Corporation, or sell, transfer or otherwise dispose of any capital stock of any direct or indirect subsidiary of the Corporation, or permit any direct or indirect subsidiary to sell, lease, transfer, exclusively license or otherwise dispose (in a single transaction or series of related transactions) of all or substantially all of the assets of such subsidiary;

3.3.9 sell, assign, transfer, license, pledge or encumber any material technology or intellectual property of the Corporation, other than licenses granted in the ordinary course of business;

3.3.10 enter into any corporate strategic relationship involving the payment, contribution, or assignment by the Corporation or to the Corporation of money or assets greater than $100,000;

3.3.11 increase or decrease the authorized number of directors constituting the Board of Directors; or

3.3.12 amend any of the provisions of this Section 3.3.

4. Optional Conversion.

The holders of the Preferred Stock shall have conversion rights as follows (the “Conversion Rights”):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and non-assessable shares of Common Stock as is determined by dividing the Applicable Original Issue Price by the Applicable Conversion Price (as defined below) in effect at the time of conversion. The “Series Seed Conversion Price” shall initially be equal to the Series Seed Original Issue Price. The “Series A Conversion Price” shall initially be equal to the Series A Original Issue Price. The “Series B Conversion Price” shall initially be equal to the Series B Original Issue Price. The “Applicable Conversion Price” shall mean, (i) with respect to the Series Seed Preferred Stock, the Series Seed Conversion Price, (ii) with respect to the Series A Preferred Stock, the Series A Conversion Price, and, (iii) with respect to the Series B Preferred Stock, the Series B Conversion Price. Each such initial Applicable Conversion Price, and the rate at which shares of such class or series of Preferred Stock, may be converted into shares of Common Stock, shall be subject to adjustment as provided below.
4.1.2 Termination of Conversion Rights. In the event of a liquidation, dissolution or winding up of the Corporation or a Deemed Liquidation Event, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Preferred Stock.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of any shares of Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the fair market value of a share of Common Stock as determined in good faith by the Board of Directors of the Corporation. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Preferred Stock to voluntarily convert shares of Preferred Stock into shares of Common Stock, such holder shall (a) provide written notice to the Corporation's transfer agent at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent) that such holder elects to convert all or any number of such holder’s shares of Preferred Stock and, if applicable, any event on which such conversion is contingent and (b), if such holder’s shares are certificated, surrender the certificate or certificates for such shares of Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent). Such notice shall state such holder’s name or the names of the nominees in which such holder wishes the shares of Common Stock to be issued. If required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such notice and, if applicable, certificates (or lost certificate affidavit and agreement) shall be the time of conversion (the “Conversion Time”), and the shares of Common Stock issuable upon conversion of the specified shares shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time (i) issue and deliver to such holder of Preferred Stock, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and a certificate for the number (if any) of the shares of the applicable class or series of Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) pay all declared but unpaid dividends on the shares of Preferred Stock converted.
4.3.2 **Reservation of Shares.** The Corporation shall at all times when the Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to this Second Amended and Restated Certificate of Incorporation. Before taking any action which would cause an adjustment reducing an Applicable Conversion Price below the then par value of the shares of Common Stock issuable upon conversion of such class or series of Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and non-assessable shares of Common Stock at such adjusted Applicable Conversion Price.

4.3.3 **Effect of Conversion.** All shares of Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in **Subsection 4.2** and to receive payment of any dividends declared but unpaid thereon. Any shares of Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock, and all applicable series of Preferred Stock, accordingly.

4.3.4 **No Further Adjustment.** Upon any such conversion, no adjustment to the Applicable Conversion Price shall be made for any declared but unpaid dividends on the applicable class or series of Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 **Taxes.** The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Preferred Stock pursuant to this **Section 4.** The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.
4.4 Adjustments to Applicable Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth, the following definitions shall apply:

(a) “Option” shall mean any right, option or warrant to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) “Series B Original Issue Date” shall mean the date on which the first share of Series B Preferred Stock was issued.

(c) “Convertible Securities” shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) “Additional Shares of Common Stock” shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.4.3 below, deemed to be issued) by the Corporation after the Series B Original Issue Date, other than (1) the following shares of Common Stock and (2) shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (clauses (1) and (2), collectively, “Exempted Securities”):

(i) shares of Common Stock, Options or Convertible Securities issued as a dividend or distribution on Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7 or 4.8;

(iii) shares of Common Stock or Options issued to employees or directors of, or consultants or advisors to, the Corporation or any of its subsidiaries pursuant to any plan, agreement or arrangement approved by the Board of Directors of the Corporation;

(iv) shares of Common Stock or Convertible Securities actually issued upon the exercise of Options or shares of Common Stock actually issued upon the conversion or exchange of Convertible Securities, in each case provided such issuance is pursuant to the terms of such Option or Convertible Security;
(v) shares of Common Stock, Options or Convertible Securities issued to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or real property leasing transaction approved by the Board of Directors of the Corporation;

(vi) shares of Common Stock, Options or Convertible Securities issued to suppliers or third party service providers in connection with the provision of goods or services pursuant to transactions approved by the Board of Directors of the Corporation;

(vii) shares of Common Stock, Options or Convertible Securities issued pursuant to the acquisition of another corporation by the Corporation by merger, purchase of substantially all of the assets or other reorganization or to a joint venture agreement, provided that such issuances are approved by the Board of Directors of the Corporation; or

(viii) shares of Common Stock, Options or Convertible Securities issued in connection with sponsored research, collaboration, technology license, development, or other similar agreements or strategic partnerships approved by the Board of Directors of the Corporation.

4.4.2 No Adjustment of Applicable Conversion Price. No adjustment to any Applicable Conversion Price shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives written notice from (i) in the case of the Series Seed Preferred Stock, a majority of the outstanding shares of Series Seed Preferred Stock, (ii) in the case of the Series A Preferred Stock, a majority of the outstanding shares of Series A Preferred Stock, and (iii) in the case of the Series B Preferred Stock, a majority of the outstanding shares of Series B Preferred Stock, in each such case agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.
(a) If the Corporation at any time or from time to time after the Series B Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to an Applicable Conversion Price pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Corporation upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, each Applicable Conversion Price computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Applicable Conversion Price as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing any Applicable Conversion Price to an amount which exceeds the lower of (i) such Applicable Conversion Price in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) such Applicable Conversion Price that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to an Applicable Conversion Price pursuant to the terms of Subsection 4.4.4 (either because the consideration per share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject thereto was equal to or greater than such Applicable Conversion Price then in effect, or because such Option or Convertible Security was issued before the Series B Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any decrease in the consideration payable to the Corporation upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.3(a) shall be deemed to have been issued effective upon such increase or decrease becoming effective.
(d) Upon the expiration or termination of any unexercised Option or unconverted or unexchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to an Applicable Conversion Price pursuant to the terms of Subsection 4.4.4, such Applicable Conversion Price shall be readjusted to such Applicable Conversion Price as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to adjustment based upon subsequent events, any adjustment to an Applicable Conversion Price provided for in this Subsection 4.4.3 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.3). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to an Applicable Conversion Price that would result under the terms of this Subsection 4.4.3 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to such Applicable Conversion Price that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Applicable Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Corporation shall at any time after the Series B Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.3), without consideration or for a consideration per share less than an Applicable Conversion Price in effect immediately prior to such issuance or deemed issuance, then such Applicable Conversion Price shall be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the following formula:

\[ CP_2 = CP_1 \times \frac{A + B}{A + C} \]

For purposes of the foregoing formula, the following definitions shall apply:

(a) “\( CP_2 \)” shall mean such Applicable Conversion Price in effect immediately after such issuance or deemed issuance of Additional Shares of Common Stock

(b) “\( CP_1 \)” shall mean such Applicable Conversion Price in effect immediately prior to such issuance or deemed issuance of Additional Shares of Common Stock;
(c) “A” shall mean the number of shares of Common Stock outstanding immediately prior to such issuance or deemed issuance of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issuance or deemed issuance or upon conversion or exchange of Convertible Securities (including the Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) “B” shall mean the number of shares of Common Stock that would have been issued or deemed issued if such Additional Shares of Common Stock had been issued at a price per share equal to CP₁ (determined by dividing the aggregate consideration received by the Corporation in respect of such issue by CP₁); and

(e) “C” shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Corporation for the issuance or deemed issuance of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property. Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Corporation, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors of the Corporation; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Corporation for consideration which covers both, be the proportion of such consideration so received, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors of the Corporation.

(b) Options and Convertible Securities. The consideration per share received by the Corporation for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.3, relating to Options and Convertible Securities, shall be determined by dividing:
(i) The total amount, if any, received or receivable by the Corporation as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Corporation upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities, by

(ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Corporation shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an adjustment to an Applicable Conversion Price pursuant to the terms of Subsection 4.4.4, then, upon the final such issuance, such Applicable Conversion Price shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series B Original Issue Date effect a subdivision of the outstanding Common Stock, each Applicable Conversion Price in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such class or series of Preferred Stock shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series B Original Issue Date combine the outstanding shares of Common Stock, each Applicable Conversion Price in effect immediately before the combination shall be proportionately increased so that the number of shares of Common Stock issuable on conversion of each share of such class or series of Preferred Stock shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.
4.6 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event each Applicable Conversion Price in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying such Applicable Conversion Price then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, each Applicable Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter such Applicable Conversion Price shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) that no such adjustment shall be made if the holders of each class or series of Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Section 1 do not apply to such dividend or distribution, then and in each such event the holders of each class or series of Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of such class or series of Preferred Stock had been converted into Common Stock on the date of such event.
4.8 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.3, if there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not a class or series of Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.5, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of such class or series of Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of such class or series of Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors of the Corporation) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of such class or series of Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the any Applicable Conversion Price) shall thereafter be applicable, nearly as reasonably as may be, in relation to any securities or other property thereafter deliverable upon the conversion of such class or series of Preferred Stock. For the avoidance of doubt, nothing in this Subsection 4.8 shall be construed as preventing the holders of Preferred Stock from seeking any appraisal rights to which they are otherwise entitled under the DGCL in connection with a merger triggering an adjustment hereunder, nor shall this Subsection 4.8 be deemed conclusive evidence of the fair value of the shares of any class or series of Preferred Stock in any such appraisal proceeding.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of any Applicable Conversion Price pursuant to this Section 4, the Corporation at its own expense shall, as promptly as reasonably practicable but in any event not later than ten (10) days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of such adjusted or readjusted class or series of Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which such class or series of Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Preferred Stock (but in any event not later than ten (10) days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Applicable Conversion Price with respect to such shares then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of such shares of Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any Deemed Liquidation Event; or
5. Mandatory Conversion.

5.1 Trigger Events. Upon either (a) the closing of the sale of shares of Common Stock to the public in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, resulting in at least $50 million of gross proceeds to the Corporation and in connection with such offering the Common Stock is listed for trading on the Nasdaq Stock Market, the New York Stock Exchange or another nationally recognized exchange or marketplace (whether in the United States or a foreign jurisdiction) (a “Qualified IPO”) or (b) the date and time, or the occurrence of an event, specified by vote or written consent of the Requisite Preferred Holders (the time of such closing or the date and time specified or the time of the event specified in such vote or written consent is referred to herein as the “Mandatory Conversion Time”), then (i) all outstanding shares of Preferred Stock shall automatically be converted into shares of Common Stock, at the then effective conversion rate as calculated pursuant to Subsection 4.1.1, and (ii) such shares may not be reissued by the Corporation.

5.2 Procedural Requirements. All holders of record of shares of Preferred Stock shall be sent written notice of the Mandatory Conversion Time and the place designated for mandatory conversion of all such shares of Preferred Stock pursuant to this Section 5. Such notice need not be sent in advance of the occurrence of the Mandatory Conversion Time. Upon receipt of such notice, each holder of shares of Preferred Stock in certificated form shall surrender his, her or its certificate or certificates for all such shares (or, if such holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation at the place designated in such notice. If so required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. All rights with respect to the Preferred Stock converted pursuant to Subsection 5.1, including the rights, if any, to receive notices and vote (other than as a holder of Common Stock), will terminate at the Mandatory Conversion Time (notwithstanding the failure of the
holder or holders thereof to surrender any certificates at or prior to such time), except only the rights of the holders thereof, upon surrender of any certificate or certificates of such holders (or lost certificate affidavit and agreement) thereto, to receive the items provided for in the next sentence of this Subsection 5.2. As soon as practicable after the Mandatory Conversion Time and, if applicable, the surrender of any certificate or certificates (or lost certificate affidavit and agreement) for shares of Preferred Stock, the Corporation shall (a) issue and deliver to such holder, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable on such conversion in accordance with the provisions hereof and (b) pay cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and the payment of any declared but unpaid dividends on the shares of Preferred Stock converted. Such converted Preferred Stock shall be retired and cancelled and may not be reissued as shares of such class or series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of such class or series of Preferred Stock and all Preferred Stock, accordingly.

6. Redemption. Except as set forth in Section 2.3, the shares of Preferred Stock shall not be mandatorily redeemable.

7. Redeemed or Otherwise Acquired Shares. Any shares of Preferred Stock that are redeemed or otherwise acquired by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Preferred Stock following redemption.

8. Waiver. Unless a different vote is specified herein, any of the rights, powers, preferences and other terms of the Preferred Stock set forth herein may be waived on behalf of all holders of Preferred Stock by the affirmative written consent or vote of the Requisite Preferred Holders.

9. Notices. Any notice required or permitted by the provisions of this Article Fourth to be given to a holder of shares of Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

FIFTH: Subject to any additional vote required by this Second Amended and Restated Certificate of Incorporation or Bylaws, in furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to make, repeal, alter, amend and rescind any or all of the Bylaws of the Corporation.

SIXTH: Subject to any additional vote required by this Second Amended and Restated Certificate of Incorporation, the number of directors of the Corporation shall be determined in the manner set forth in the Bylaws of the Corporation. Each director shall be entitled to one vote on each matter presented to the Board of Directors.

SEVENTH: Elections of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.
EIGHTH: Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may be kept outside the State of Delaware at such place or places as may be designated from time to time by the Board of Directors or in the Bylaws of the Corporation.

NINTH: To the fullest extent permitted by law, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the General Corporation Law or any other law of the State of Delaware is amended after approval by the stockholders of this Article Ninth to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law as so amended.

Any repeal or modification of the foregoing provisions of this Article Ninth by the stockholders of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of, or increase the liability of any director of the Corporation with respect to any acts or omissions of such director occurring prior to, such repeal or modification.

TENTH: The following indemnification provisions shall apply to the persons enumerated below.

1. Right to Indemnification of Directors and Officers. The Corporation shall indemnify and hold harmless, to the fullest extent permitted by applicable law as it presently exists or may hereafter be amended, any person (an “Indemnified Person”) who was or is made or is threatened to be made a party or is otherwise involved in any action, suit or proceeding, whether civil, criminal, administrative or investigative (a “Proceeding”), by reason of the fact that such person, or a person for whom such person is the legal representative, is or was a director or officer of the Corporation or, while a director or officer of the Corporation, is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation or of a partnership, joint venture, limited liability company, trust, enterprise or nonprofit entity, including service with respect to employee benefit plans, against all liability and loss suffered and expenses (including attorneys’ fees) reasonably incurred by such Indemnified Person in such Proceeding. Notwithstanding the preceding sentence, except as otherwise provided in Section 3 of this Article Tenth, the Corporation shall be required to indemnify an Indemnified Person in connection with a Proceeding (or part thereof) commenced by such Indemnified Person only if the commencement of such Proceeding (or part thereof) by the Indemnified Person was authorized in advance by the Board of Directors.

2. Prepayment of Expenses of Directors and Officers. The Corporation shall pay the expenses (including attorneys’ fees) incurred by an Indemnified Person in defending any Proceeding in advance of its final disposition, provided, however, that, to the extent required by law, such payment of expenses in advance of the final disposition of the Proceeding shall be made only upon receipt of an undertaking by the Indemnified Person to repay all amounts advanced if it should be ultimately determined that the Indemnified Person is not entitled to be indemnified under this Article Tenth or otherwise.
3. **Claims by Directors and Officers.** If a claim for indemnification or advancement of expenses under this Article Tenth is not paid in full within thirty (30) days after a written claim therefor by the Indemnified Person has been received by the Corporation, the Indemnified Person may file suit to recover the unpaid amount of such claim and, if successful in whole or in part, shall be entitled to be paid the expense of prosecuting such claim. In any such action the Corporation shall have the burden of proving that the Indemnified Person is not entitled to the requested indemnification or advancement of expenses under applicable law.

4. **Indemnification of Employees and Agents.** The Corporation may indemnify and advance expenses to any person who was or is made or is threatened to be made or is otherwise involved in any Proceeding by reason of the fact that such person, or a person for whom such person is the legal representative, is or was an employee or agent of the Corporation or, while an employee or agent of the Corporation, is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation or of a partnership, joint venture, limited liability company, trust, enterprise or nonprofit entity, including service with respect to employee benefit plans, against all liability and loss suffered and expenses (including attorneys’ fees) reasonably incurred by such person in connection with such Proceeding. The ultimate determination of entitlement to indemnification of persons who are non-director or officer employees or agents shall be made in such manner as is determined by the Board of Directors in its sole discretion. Notwithstanding the foregoing sentence, the Corporation shall not be required to indemnify a person in connection with a Proceeding initiated by such person if the Proceeding was not authorized in advance by the Board of Directors.

5. **Advancement of Expenses of Employees and Agents.** The Corporation may pay the expenses (including attorneys’ fees) incurred by an employee or agent in defending any Proceeding in advance of its final disposition on such terms and conditions as may be determined by the Board of Directors.

6. **Non-Exclusivity of Rights.** The rights conferred on any person by this Article Tenth shall not be exclusive of any other rights which such person may have or hereafter acquire under any statute, provision of this Second Amended and Restated Certificate of Incorporation, the Bylaws of the Corporation, agreement, or pursuant to any vote of stockholders or disinterested directors or otherwise.

7. **Other Indemnification.** The Corporation’s obligation, if any, to indemnify any person who was or is serving at its request as a director, officer or employee of another Corporation, partnership, limited liability company, joint venture, trust, organization or other enterprise shall be reduced by any amount such person may collect as indemnification from such other Corporation, partnership, limited liability company, joint venture, trust, organization or other enterprise.

8. **Insurance.** The Board of Directors may, to the full extent permitted by applicable law as it presently exists, or may hereafter be amended from time to time, authorize an appropriate officer or officers to purchase and maintain at the Corporation’s expense insurance: (a) to indemnify the Corporation for any obligation which it incurs as a result of the indemnification of directors, officers and employees under the provisions of this Article Tenth; and (b) to indemnify or insure directors, officers and employees against liability in instances in which they may not otherwise be indemnified by the Corporation under the provisions of this Article Tenth.
9. Amendment or Repeal. Any repeal or modification of the foregoing provisions of this Article Tenth shall not adversely affect any right or protection hereunder of any person in respect of any act or omission occurring prior to the time of such repeal or modification. The rights provided hereunder shall inure to the benefit of any Indemnified Person and such person’s heirs, executors and administrators.

ELEVENTH: The Corporation renounces, to the fullest extent permitted by law, any interest or expectancy of the Corporation in, or in being offered an opportunity to participate in, any Excluded Opportunity. An “Excluded Opportunity” is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of (i) any director of the Corporation who is not an employee of the Corporation or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director, stockholder, employee or agent of any such holder, other than someone who is an employee of the Corporation or any of its subsidiaries (collectively, “Covered Persons”), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person’s capacity as a director of the Corporation. Any repeal or modification of this Article Eleventh will only be prospective and will not affect the rights under this Article Eleventh in effect at the time of the occurrence of any actions or omissions to act giving rise to liability. Notwithstanding anything to the contrary contained elsewhere in this Second Amended and Restated Certificate of Incorporation, the affirmative vote of the Requisite Preferred Holders will be required to amend or repeal, or to adopt any provisions inconsistent with this Article Eleventh.

TWELFTH: Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery in the State of Delaware shall be the sole and exclusive forum for any stockholder (including a beneficial owner) to bring (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation’s stockholders, (iii) any action asserting a claim against the Corporation, its directors, officers or employees arising pursuant to any provision of the Delaware General Corporation Law or the Corporation’s certificate of incorporation or bylaws or (iv) any action asserting a claim against the Corporation, its directors, officers or employees governed by the internal affairs doctrine, except for, as to each of (i) through (iv) above, any claim as to which the Court of Chancery determines that there is an indispensable party not subject to the jurisdiction of the Court of Chancery (and the indispensable party does not consent to the personal jurisdiction of the Court of Chancery within ten days following such determination), which is vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery, or for which the Court of Chancery does not have subject matter jurisdiction. If any provision or provisions of this Article Twelfth shall be held to be invalid, illegal or unenforceable as applied to any person or entity or circumstance for any reason whatsoever, then, to the fullest extent permitted by law, the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Article Twelfth (including, without limitation, each portion of any sentence of this Article Twelfth containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) and the application of such provision to other persons or entities and circumstances shall not in any way be affected or impaired thereby.

* * *
3. That the foregoing amendment and restatement was approved by the holders of the requisite number of shares of this corporation in accordance with Section 228 of the General Corporation Law.

4. That this Second Amended and Restated Certificate of Incorporation, which restates and integrates and further amends the provisions of this Corporation’s Certificate of Incorporation, has been duly adopted in accordance with Sections 242 and 245 of the General Corporation Law.
IN WITNESS WHEREOF, this Second Amended and Restated Certificate of Incorporation has been executed by a duly authorized officer of this corporation on this 15th day of March, 2019.

KARUNA PHARMACEUTICALS, INC.

By: /s/ Andrew Miller
Name: Andrew Miller
Title: Chief Operating Officer

[Signature Page to Second Amended and Restated Certificate of Incorporation]
CERTIFICATE OF AMENDMENT
TO THE
SECOND AMENDED AND RESTATED CERTIFICATE OF INCORPORATION
OF
KARUNA THERAPEUTICS, INC.

Karuna Therapeutics, Inc. (the “Corporation”), a corporation duly organized and existing under the General Corporation Law of the State of Delaware (the “General Corporation Law”), does hereby certify that:

1. The name of the Corporation is Karuna Therapeutics, Inc.

2. The date on which the Certificate of Incorporation of the Corporation was originally filed with the Secretary of State of the State of Delaware is July 24, 2009, under the name of Karuna Pharmaceuticals, Inc.

3. The Second Amended and Restated Certificate of Incorporation of the Corporation (the “Restated Certificate”) was filed with the Secretary of State of Delaware on March 15, 2019.

4. Article Fourth of the Restated Certificate is hereby amended and restated to read in its entirety as follows:

   FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) 16,000,000 shares of Common Stock, $0.0001 par value per share (“Common Stock”) and (ii) 12,962,045 shares of Preferred Stock, $0.0001 par value per share (“Preferred Stock”), 4,412,500 of which shares are designated as Series Seed Preferred Stock (“Series Seed Preferred Stock”), 3,126,700 of which shares are designated as Series A Preferred Stock (“Series A Preferred Stock”), and 5,422,845 of which shares are designated as Series B Preferred Stock (“Series B Preferred Stock”).

5. The amendment of the Restated Certificate herein certified has been duly adopted by the Board of Directors of the Corporation in accordance with the provisions of Sections 242 of the General Corporation Law, and was duly adopted by the written consent of the stockholders of the Corporation in accordance with the applicable provisions of Sections 228 and 242 of the General Corporation Law.
IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to the Second Amended and Restated Certificate of Incorporation, to be executed by its duly authorized officer on this 28th day of March, 2019.

/s/ Andrew Miller  
Andrew Miller, Chief Operating Officer
BY-LAWS

OF

KARUNA PHARMACEUTICALS, INC.
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ARTICLE I

STOCKHOLDERS

1.1 Place of Meetings. All meetings of stockholders shall be held at such place as may be designated from time to time by the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President or, if not so designated, at the principal office of the corporation. The Board of Directors may, in its sole discretion, determine that a meeting shall not be held at any place, but may instead be held solely by means of remote communication in a manner consistent with the General Corporation Law of the State of Delaware.

1.2 Annual Meeting. The annual meeting of stockholders for the election of directors and for the transaction of such other business as may properly be brought before the meeting shall be held on a date and at a time designated by the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President (which date shall not be a legal holiday in the place where the meeting is to be held).

1.3 Special Meetings. Special meetings of stockholders for any purpose or purposes may be called at any time by only the Board of Directors, the Chairman of the Board, the Chief Executive Officer or the President, and may not be called by any other person or persons. The Board of Directors may postpone or reschedule any previously scheduled special meeting of stockholders. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting.

1.4 Notice of Meetings. Except as otherwise provided by law, notice of each meeting of stockholders, whether annual or special, shall be given not less than 10 nor more than 60 days before the date of the meeting to each stockholder entitled to vote at such meeting. Without limiting the manner by which notice otherwise may be given to stockholders, any notice shall be effective if given by a form of electronic transmission consented to (in a manner consistent with the General Corporation Law of the State of Delaware) by the stockholder to whom the notice is given. The notices of all meetings shall state the place, if any, date and time of the meeting and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such meeting. The notice of a special meeting shall state, in addition, the purpose or purposes for which the meeting is called. If notice is given by mail, such notice shall be deemed given when deposited in the United States mail, postage prepaid, directed to the stockholder at such stockholder’s address as it appears on the records of the corporation. If notice is given by electronic transmission, such notice shall be deemed given at the time specified in Section 232 of the General Corporation Law of the State of Delaware.

1.5 Voting List. The Secretary shall prepare, at least 10 days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, for a period of at least 10 days prior to the meeting: (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of the meeting, or (b) during ordinary business hours, at the principal place of business of the corporation. If the meeting is to
be held at a physical location (and not solely by means of remote communication), then the list shall be produced and kept at the time and place of the meeting during the whole time thereof, and may be inspected by any stockholder who is present. If the meeting is to be held solely by means of remote communication, then the list shall also be open to the examination of any stockholder during the whole time of the meeting on a reasonably accessible electronic network, and the information required to access such list shall be provided with the notice of the meeting. The list shall presumptively determine the identity of the stockholders entitled to vote at the meeting and the number of shares held by each of them.

1.6 Quorum. Except as otherwise provided by law, the Certificate of Incorporation or these By-laws, the holders of a majority in voting power of the shares of the capital stock of the corporation issued and outstanding and entitled to vote at the meeting, present in person, present by means of remote communication in a manner, if any, authorized by the Board of Directors in its sole discretion, or represented by proxy, shall constitute a quorum for the transaction of business; provided, however, that where a separate vote by a class or classes or series of capital stock is required by law or the Certificate of Incorporation, the holders of a majority in voting power of the shares of such class or classes or series of the capital stock of the corporation issued and outstanding and entitled to vote on such matter, present in person, present by means of remote communication in a manner, if any, authorized by the Board of Directors in its sole discretion, or represented by proxy, shall constitute a quorum entitled to take action with respect to the vote on such matter. A quorum, once established at a meeting, shall not be broken by the withdrawal of enough votes to leave less than a quorum.

1.7 Adjournments. Any meeting of stockholders may be adjourned from time to time to any other time and to any other place at which a meeting of stockholders may be held under these By-laws by the chairman of the meeting or by the stockholders present or represented at the meeting and entitled to vote, although less than a quorum. It shall not be necessary to notify any stockholder of any adjournment of less than 30 days if the time and place, if any, of the adjourned meeting, and the means of remote communication, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting, are announced at the meeting at which adjournment is taken, unless after the adjournment a new record date is fixed for the adjourned meeting. At the adjourned meeting, the corporation may transact any business which might have been transacted at the original meeting.

1.8 Voting and Proxies. Each stockholder shall have one vote for each share of stock entitled to vote held of record by such stockholder and a proportionate vote for each fractional share so held, unless otherwise provided by law or the Certificate of Incorporation. Each stockholder of record entitled to vote at a meeting of stockholders, or to express consent or dissent to corporate action without a meeting, may vote or express such consent or dissent in person (including by means of remote communications, if any, by which stockholders may be deemed to be present in person and vote at such meeting) or may authorize another person or persons to vote or act for such stockholder by a proxy executed or transmitted in a manner permitted by the General Corporation Law of the State of Delaware by the stockholder or such stockholder’s authorized agent and delivered (including by electronic transmission) to the Secretary of the corporation. No such proxy shall be voted or acted upon after three years from the date of its execution, unless the proxy expressly provides for a longer period.
1.9 Action at Meeting. When a quorum is present at any meeting, any matter other than the election of directors to be voted upon by the stockholders at such meeting shall be decided by the vote of the holders of shares of stock having a majority in voting power of the votes cast by the holders of all of the shares of stock present or represented at the meeting and voting affirmatively or negatively on such matter (or if there are two or more classes or series of stock entitled to vote as separate classes, then in the case of each such class or series, the holders of a majority in voting power of the shares of stock of that class or series present or represented at the meeting and voting affirmatively or negatively on such matter), except when a different vote is required by law, the Certificate of Incorporation or these By-laws. When a quorum is present at any meeting, any election by stockholders of directors shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election.

1.10 Conduct of Meetings.

(a) Chairman of Meeting. Meetings of stockholders shall be presided over by the Chairman of the Board, if any, or in the Chairman's absence by the Vice Chairman of the Board, if any, or in the Vice Chairman's absence by the Chief Executive Officer, or in the Chief Executive Officer's absence, by the President, or in the President's absence by a Vice President, or in the absence of all of the foregoing persons by a chairman designated by the Board of Directors, or in the absence of such designation by a chairman chosen by vote of the stockholders at the meeting. The Secretary shall act as secretary of the meeting, but in the Secretary's absence the chairman of the meeting may appoint any person to act as secretary of the meeting.

(b) Rules, Regulations and Procedures. The Board of Directors may adopt by resolution such rules, regulations and procedures for the conduct of any meeting of stockholders of the corporation as it shall deem appropriate including, without limitation, such guidelines and procedures as it may deem appropriate regarding the participation by means of remote communication of stockholders and proxyholders not physically present at a meeting. Except to the extent inconsistent with such rules, regulations and procedures as adopted by the Board of Directors, the chairman of any meeting of stockholders shall have the right and authority to prescribe such rules, regulations and procedures and to do all such acts as, in the judgment of such chairman, are appropriate for the proper conduct of the meeting. Such rules, regulations or procedures, whether adopted by the Board of Directors or prescribed by the chairman of the meeting, may include, without limitation, the following: (i) the establishment of an agenda or order of business for the meeting; (ii) rules and procedures for maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders of record of the corporation, their duly authorized and constituted proxies or such other persons as shall be determined; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; and (v) limitations on the time allotted to questions or comments by participants. Unless and to the extent determined by the Board of Directors or the chairman of the meeting, meetings of stockholders shall not be required to be held in accordance with the rules of parliamentary procedure.
1.11 Action without Meeting.

(a) Taking of Action by Consent. Any action required or permitted to be taken at any annual or special meeting of stockholders of the corporation may be taken without a meeting, without prior notice and without a vote, if a consent in writing, setting forth the action so taken, is signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote on such action were present and voted. Except as otherwise provided by the Certificate of Incorporation, stockholders may act by written consent to elect directors; provided, however, that, if such consent is less than unanimous, such action by written consent may be in lieu of holding an annual meeting only if all of the directorships to which directors could be elected at an annual meeting held at the effective time of such action are vacant and are filled by such action.

(b) Electronic Transmission of Consents. A telegram, cablegram or other electronic transmission consenting to an action to be taken and transmitted by a stockholder or proxyholder, or by a person or persons authorized to act for a stockholder or proxyholder, shall be deemed to be written, signed and dated for the purposes of this section, provided that any such telegram, cablegram or other electronic transmission is delivered with information from which the corporation can determine (i) that the telegram, cablegram or other electronic transmission was transmitted by the stockholder or proxyholder or by a person or persons authorized to act for the stockholder or proxyholder and (ii) the date on which such stockholder or proxyholder or authorized person or persons transmitted such telegram, cablegram or electronic transmission. The date on which such telegram, cablegram or electronic transmission is transmitted shall be deemed to be the date on which such consent was signed. No consent given by telegram, cablegram or other electronic transmission shall be deemed to have been delivered until such consent is reproduced in paper form and until such paper form shall be delivered to the corporation by delivery to its registered office in the State of Delaware, its principal place of business or an officer or agent of the corporation having custody of the book in which proceedings of meetings of stockholders are recorded. Delivery made to a corporation’s registered office shall be made by hand or by certified or registered mail, return receipt requested. Notwithstanding the foregoing limitations on delivery, consents given by telegram, cablegram or other electronic transmission may be otherwise delivered to the principal place of business of the corporation or to an officer or agent of the corporation having custody of the book in which proceedings of meetings of stockholders are recorded if, to the extent and in the manner provided by resolution of the Board of Directors. Any copy, facsimile or other reliable reproduction of a consent in writing may be substituted or used in lieu of the original writing for any and all purposes for which the original writing could be used, provided that such copy, facsimile or other reproduction shall be a complete reproduction of the entire original writing.

(c) Notice of Taking of Corporate Action. Prompt notice of the taking of corporate action without a meeting by less than unanimous written consent shall be given to those stockholders who have not consented in writing and who, if the action had been taken at a meeting, would have been entitled to notice of the meeting if the record date for such meeting had been the date that written consents signed by a sufficient number of holders to take the action were delivered to the corporation.
ARTICLE II

DIRECTORS

2.1 General Powers. The business and affairs of the corporation shall be managed by or under the direction of a Board of Directors, who may exercise all of the powers of the corporation except as otherwise provided by law or the Certificate of Incorporation.

2.2 Number, Election and Qualification. Subject to the rights of holders of any series of Preferred Stock to elect directors, the number of directors of the corporation shall be established from time to time by the stockholders or the Board of Directors. The directors shall be elected at the annual meeting of stockholders by such stockholders as have the right to vote on such election. Election of directors need not be by written ballot. Directors need not be stockholders of the corporation.

2.3 Chairman of the Board; Vice Chairman of the Board. The Board of Directors may appoint from its members a Chairman of the Board and a Vice Chairman of the Board, neither of whom need be an employee or officer of the corporation. If the Board of Directors appoints a Chairman of the Board, such Chairman shall perform such duties and possess such powers as are assigned by the Board of Directors and, if the Chairman of the Board is also designated as the corporation's Chief Executive Officer, shall have the powers and duties of the Chief Executive Officer prescribed in Section 3.7 of these By-laws. If the Board of Directors appoints a Vice Chairman of the Board, such Vice Chairman shall perform such duties and possess such powers as are assigned by the Board of Directors. Unless otherwise provided by the Board of Directors, the Chairman of the Board or, in the Chairman’s absence, the Vice Chairman of the Board, if any, shall preside at all meetings of the Board of Directors.

2.4 Tenure. Each director shall hold office until the next annual meeting of stockholders and until a successor is elected and qualified, or until such director’s earlier death, resignation or removal.

2.5 Quorum. The greater of (a) a majority of the directors at any time in office and (b) one-third of the number of directors fixed pursuant to Section 2.2 of these By-laws shall constitute a quorum of the Board of Directors. If at any meeting of the Board of Directors there shall be less than such a quorum, a majority of the directors present may adjourn the meeting from time to time without further notice other than announcement at the meeting, until a quorum shall be present.

2.6 Action at Meeting. Every act or decision done or made by a majority of the directors present at a meeting of the Board of Directors duly held at which a quorum is present shall be regarded as the act of the Board of Directors, unless a greater number is required by law or by the Certificate of Incorporation.

2.7 Removal. Except as otherwise provided by the General Corporation Law of the State of Delaware, any one or more or all of the directors of the corporation may be removed, with or without cause, by the holders of a majority of the shares then entitled to vote at an election of directors, except that the directors elected by the holders of a particular class or series of stock may be removed without cause only by vote of the holders of a majority of the outstanding shares of such class or series.
2.8 Vacancies. Subject to the rights of holders of any series of Preferred Stock to elect directors, unless and until filled by the stockholders, any vacancy or newly-created directorship on the Board of Directors, however occurring, may be filled by vote of a majority of the directors then in office, although less than a quorum, or by a sole remaining director. A director elected to fill a vacancy shall be elected for the unexpired term of such director’s predecessor in office, and a director chosen to fill a position resulting from a newly-created directorship shall hold office until the next annual meeting of stockholders and until a successor is elected and qualified, or until such director’s earlier death, resignation or removal.

2.9 Resignation. Any director may resign by delivering a resignation in writing or by electronic transmission to the corporation at its principal office or to the Chairman of the Board, the Chief Executive Officer, the President or the Secretary. Such resignation shall be effective upon delivery unless it is specified to be effective at some later time or upon the happening of some later event.

2.10 Regular Meetings. Regular meetings of the Board of Directors may be held without notice at such time and place as shall be determined from time to time by the Board of Directors; provided that any director who is absent when such a determination is made shall be given notice of the determination. A regular meeting of the Board of Directors may be held without notice immediately after and at the same place as the annual meeting of stockholders.

2.11 Special Meetings. Special meetings of the Board of Directors may be held at any time and place designated in a call by the Chairman of the Board, the Chief Executive Officer, the President, two or more directors, or by one director in the event that there is only a single director in office.

2.12 Notice of Special Meetings. Notice of the date, place, if any, and time of any special meeting of directors shall be given to each director by the Secretary or by the officer or one of the directors calling the meeting. Notice shall be duly given to each director (a) in person or by telephone at least 24 hours in advance of the meeting, (b) by sending written notice by reputable overnight courier, telecopy, facsimile or electronic transmission, or delivering written notice by hand, to such director’s last known business, home or electronic transmission address at least 48 hours in advance of the meeting, or (c) by sending written notice by first-class mail to such director’s last known business or home address at least 72 hours in advance of the meeting. A notice or waiver of notice of a meeting of the Board of Directors need not specify the purposes of the meeting.

2.13 Meetings by Conference Communications Equipment. Directors may participate in meetings of the Board of Directors or any committee thereof by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and participation by such means shall constitute presence in person at such meeting.
2.14 **Action by Consent.** Any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting, if all members of the Board of Directors or committee, as the case may be, consent to the action in writing or by electronic transmission, and the written consents or electronic transmissions are filed with the minutes of proceedings of the Board of Directors or committee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form.

2.15 **Committees.** The Board of Directors may designate one or more committees, each committee to consist of one or more of the directors of the corporation with such lawfully delegable powers and duties as the Board of Directors thereby confers, to serve at the pleasure of the Board of Directors. The Board of Directors may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members of the committee present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in the place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board of Directors and subject to the provisions of law, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the corporation and may authorize the seal of the corporation to be affixed to all papers which may require it. Each such committee shall keep minutes and make such reports as the Board of Directors may from time to time request. Except as the Board of Directors may otherwise determine, any committee may make rules for the conduct of its business, but unless otherwise provided by the directors or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided in these By-laws for the Board of Directors. Except as otherwise provided in the Certificate of Incorporation, these By-laws, or the resolution of the Board of Directors designating the committee, a committee may create one or more subcommittees, each subcommittee to consist of one or more members of the committee, and delegate to a subcommittee any or all of the powers and authority of the committee.

2.16 **Compensation of Directors.** Directors may be paid such compensation for their services and such reimbursement for expenses of attendance at meetings as the Board of Directors may from time to time determine. No such payment shall preclude any director from serving the corporation or any of its parent or subsidiary entities in any other capacity and receiving compensation for such service.

**ARTICLE III**

**OFFICERS**

3.1 **Titles.** The officers of the corporation shall consist of a Chief Executive Officer, a President, a Secretary, a Treasurer and such other officers with such other titles as the Board of Directors shall determine, including one or more Vice Presidents, Assistant Treasurers and Assistant Secretaries. The Board of Directors may appoint such other officers as it may deem appropriate.
3.2 **Election.** The Chief Executive Officer, President, Treasurer and Secretary shall be elected annually by the Board of Directors at its first meeting following the annual meeting of stockholders. Other officers may be appointed by the Board of Directors at such meeting or at any other meeting.

3.3 **Qualification.** No officer need be a stockholder. Any two or more offices may be held by the same person.

3.4 **Tenure.** Except as otherwise provided by law, by the Certificate of Incorporation or by these By-laws, each officer shall hold office until such officer’s successor is elected and qualified, unless a different term is specified in the resolution electing or appointing such officer, or until such officer’s earlier death, resignation or removal.

3.5 **Resignation and Removal.** Any officer may resign by delivering a written resignation to the corporation at its principal office or to the Chief Executive Officer, the President or the Secretary. Such resignation shall be effective upon receipt unless it is specified to be effective at some later time or upon the happening of some later event. Any officer may be removed at any time, with or without cause, by vote of a majority of the directors then in office. Except as the Board of Directors may otherwise determine, no officer who resigns or is removed shall have any right to any compensation as an officer for any period following such officer’s resignation or removal, or any right to damages on account of such removal, whether such officer’s compensation be by the month or by the year or otherwise, unless such compensation is expressly provided for in a duly authorized written agreement with the corporation.

3.6 **Vacancies.** The Board of Directors may fill any vacancy occurring in any office for any reason and may, in its discretion, leave unfilled for such period as it may determine any offices other than those of Chief Executive Officer, President, Treasurer and Secretary. Each such successor shall hold office for the unexpired term of such officer’s predecessor and until a successor is elected and qualified, or until such officer’s earlier death, resignation or removal.

3.7 **President; Chief Executive Officer.** Unless the Board of Directors has designated another person as the corporation’s Chief Executive Officer, the President shall be the Chief Executive Officer of the corporation. The Chief Executive Officer shall have general charge and supervision of the business of the corporation subject to the direction of the Board of Directors, and shall perform all duties and have all powers that are commonly incident to the office of chief executive or that are delegated to such officer by the Board of Directors. The President shall perform such other duties and shall have such other powers as the Board of Directors or the Chief Executive Officer (if the President is not the Chief Executive Officer) may from time to time prescribe. In the event of the absence, inability or refusal to act of the Chief Executive Officer or the President (if the President is not the Chief Executive Officer), the Vice President (or if there shall be more than one, the Vice Presidents in the order determined by the Board of Directors) shall perform the duties of the Chief Executive Officer and when so performing such duties shall have all the powers of and be subject to all the restrictions upon the Chief Executive Officer.

3.8 **Vice Presidents.** Each Vice President shall perform such duties and possess such powers as the Board of Directors or the Chief Executive Officer may from time to time prescribe. The Board of Directors may assign to any Vice President the title of Executive Vice President, Senior Vice President or any other title selected by the Board of Directors.
3.9 Secretary and Assistant Secretaries. The Secretary shall perform such duties and shall have such powers as the Board of Directors or the Chief Executive Officer may from time to time prescribe. In addition, the Secretary shall perform such duties and have such powers as are incident to the office of the secretary, including without limitation the duty and power to give notices of all meetings of stockholders and special meetings of the Board of Directors, to attend all meetings of stockholders and the Board of Directors and keep a record of the proceedings, to maintain a stock ledger and prepare lists of stockholders and their addresses as required, to be custodian of corporate records and the corporate seal and to affix and attest to the same on documents.

Any Assistant Secretary shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Secretary may from time to time prescribe. In the event of the absence, inability or refusal to act of the Secretary, the Assistant Secretary (or if there shall be more than one, the Assistant Secretaries in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Secretary.

In the absence of the Secretary or any Assistant Secretary at any meeting of stockholders or directors, the chairman of the meeting shall designate a temporary secretary to keep a record of the meeting.

3.10 Treasurer and Assistant Treasurers. The Treasurer shall perform such duties and shall have such powers as may from time to time be assigned by the Board of Directors or the Chief Executive Officer. In addition, the Treasurer shall perform such duties and have such powers as are incident to the office of treasurer, including without limitation the duty and power to keep and be responsible for all funds and securities of the corporation, to deposit funds of the corporation in depositories selected in accordance with these By-laws, to disburse such funds as ordered by the Board of Directors, to make proper accounts of such funds, and to render as required by the Board of Directors statements of all such transactions and of the financial condition of the corporation.

The Assistant Treasurers shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Treasurer may from time to time prescribe. In the event of the absence, inability or refusal to act of the Treasurer, the Assistant Treasurer (or if there shall be more than one, the Assistant Treasurers in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Treasurer.

3.11 Salaries. Officers of the corporation shall be entitled to such salaries, compensation or reimbursement as shall be fixed or allowed from time to time by the Board of Directors.

3.12 Delegation of Authority. The Board of Directors may from time to time delegate the powers or duties of any officer to any other officer or agent, notwithstanding any provision hereof.
ARTICLE IV

CAPITAL STOCK

4.1 Issuance of Stock. Subject to the provisions of the Certificate of Incorporation, the whole or any part of any unissued balance of the authorized capital stock of the corporation or the whole or any part of any shares of the authorized capital stock of the corporation held in the corporation’s treasury may be issued, sold, transferred or otherwise disposed of by vote of the Board of Directors in such manner, for such lawful consideration and on such terms as the Board of Directors may determine.

4.2 Stock Certificates; Uncertificated Shares. The shares of the corporation shall be represented by certificates, provided that the Board of Directors may provide by resolution or resolutions that some or all of any or all classes or series of the corporation’s stock shall be uncertificated shares. Every holder of stock of the corporation represented by certificates shall be entitled to have a certificate, in such form as may be prescribed by law and by the Board of Directors, representing the number of shares held by such holder registered in certificate form. Each such certificate shall be signed in a manner that complies with Section 158 of the General Corporation Law of the State of Delaware.

Each certificate for shares of stock which are subject to any restriction on transfer pursuant to the Certificate of Incorporation, these By-laws, applicable securities laws or any agreement among any number of stockholders or among such holders and the corporation shall have conspicuously noted on the face or back of the certificate either the full text of the restriction or a statement of the existence of such restriction.

If the corporation shall be authorized to issue more than one class of stock or more than one series of any class, the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of each certificate representing shares of such class or series of stock, provided that in lieu of the foregoing requirements there may be set forth on the face or back of each certificate representing shares of such class or series of stock a statement that the corporation will furnish without charge to each stockholder who so requests a copy of the full text of the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

Within a reasonable time after the issuance or transfer of uncertificated shares, the corporation shall send to the registered owner thereof a written notice containing the information required to be set forth or stated on certificates pursuant to Sections 151, 202(a) or 218(a) of the General Corporation Law of the State of Delaware or, with respect to Section 151 of General Corporation Law of the State of Delaware, a statement that the corporation will furnish without charge to each stockholder who so requests the powers, designations, preferences and relative participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.
4.3 **Transfers.** Shares of stock of the corporation shall be transferable in the manner prescribed by law and in these By-laws. Transfers of shares of stock of the corporation shall be made only on the books of the corporation or by transfer agents designated to transfer shares of stock of the corporation. Subject to applicable law, shares of stock represented by certificates shall be transferred only on the books of the corporation by the surrender to the corporation or its transfer agent of the certificate representing such shares properly endorsed or accompanied by a written assignment or power of attorney properly executed, and with such proof of authority or the authenticity of signature as the corporation or its transfer agent may reasonably require. Except as may be otherwise required by law, by the Certificate of Incorporation or by these Bylaws, the corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote with respect to such stock, regardless of any transfer, pledge or other disposition of such stock until the shares have been transferred on the books of the corporation in accordance with the requirements of these By-laws.

4.4 **Lost, Stolen or Destroyed Certificates.** The corporation may issue a new certificate of stock in place of any previously issued certificate alleged to have been lost, stolen or destroyed, upon such terms and conditions as the Board of Directors may prescribe, including the presentation of reasonable evidence of such loss, theft or destruction and the giving of such indemnity and posting of such bond as the Board of Directors may require for the protection of the corporation or any transfer agent or registrar.

4.5 **Record Date.** The Board of Directors may fix in advance a date as a record date for the determination of the stockholders entitled to notice of or to vote at any meeting of stockholders or to express consent (or dissent) to corporate action without a meeting, or entitled to receive payment of any dividend or other distribution or allotment of any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action. Such record date shall not precede the date on which the resolution fixing the record date is adopted, and such record date shall not be more than 60 nor less than 10 days before the date of such meeting, nor more than 10 days after the date of adoption of a record date for a consent without a meeting, nor more than 60 days prior to any other action to which such record date relates.

If no record date is fixed, the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day before the day on which notice is given, or, if notice is waived, at the close of business on the day before the day on which the meeting is held. If no record date is fixed, the record date for determining stockholders entitled to express consent to corporate action without a meeting, when no prior action by the Board of Directors is necessary, shall be the day on which the first consent is properly delivered to the corporation. If no record date is fixed, the record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating to such purpose.

A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for the adjourned meeting.
4.6 Regulations. The issue, transfer, conversion and registration of shares of stock of the corporation shall be governed by such other regulations as the Board of Directors may establish.

ARTICLE V
GENERAL PROVISIONS

5.1 Fiscal Year. Except as from time to time otherwise designated by the Board of Directors, the fiscal year of the corporation shall begin on the first day of January of each year and end on the last day of December in each year.

5.2 Corporate Seal. The corporate seal shall be in such form as shall be approved by the Board of Directors.

5.3 Waiver of Notice. Whenever notice is required to be given by law, by the Certificate of Incorporation or by these By-laws, a written waiver, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before, at or after the time of the event for which notice is to be given, shall be deemed equivalent to notice required to be given to such person. Neither the business nor the purpose of any meeting need be specified in any such waiver. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened.

5.4 Voting of Securities. Except as the Board of Directors may otherwise designate, the Chief Executive Officer, the President or the Treasurer may waive notice of, vote, or appoint any person or persons to vote, on behalf of the corporation at, and act as, or appoint any person or persons to act as, proxy or attorney-in-fact for this corporation (with or without power of substitution) at, any meeting of stockholders or securityholders of any other entity, the securities of which may be held by this corporation.

5.5 Evidence of Authority. A certificate by the Secretary, or an Assistant Secretary, or a temporary Secretary, as to any action taken by the stockholders, directors, a committee or any officer or representative of the corporation shall as to all persons who rely on the certificate in good faith be conclusive evidence of such action.

5.6 Certificate of Incorporation. All references in these By-laws to the Certificate of Incorporation shall be deemed to refer to the Certificate of Incorporation of the corporation, as amended and in effect from time to time.

5.7 Severability. Any determination that any provision of these By-laws is for any reason inapplicable, illegal or ineffective shall not affect or invalidate any other provision of these By-laws.

5.8 Pronouns. All pronouns used in these By-laws shall be deemed to refer to the masculine, feminine or neuter, singular or plural, as the identity of the person or persons may require.
ARTICLE VI

AMENDMENTS

6.1 By the Board of Directors. These By-laws may be altered, amended or repealed, in whole or in part, or new by-laws may be adopted by the Board of Directors.

6.2 By the Stockholders. These By-laws may be altered, amended or repealed, in whole or in part, or new by-laws may be adopted by the affirmative vote of the holders of a majority of the shares of the capital stock of the corporation issued and outstanding and entitled to vote at any annual meeting of stockholders, or at any special meeting of stockholders, provided notice of such alteration, amendment, repeal or adoption of new by-laws shall have been stated in the notice of such special meeting.
AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION
OF
KARUNA THERAPEUTICS, INC.

Karuna Therapeutics, Inc., a corporation organized and existing under the laws of the State of Delaware (the “Corporation”), hereby certifies as follows:

1. The name of the Corporation is Karuna Therapeutics, Inc. The date of the filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was July 24, 2009 (the “Original Certificate”). The name under which the Corporation filed the Original Certificate was Karuna Pharmaceuticals, Inc.

2. This Amended and Restated Certificate of Incorporation (the “Certificate”) amends, restates and integrates the provisions of the Amended and Restated Certificate of Incorporation that was filed with the Secretary of State of the State of Delaware on March 15, 2019 (as amended, the “Amended and Restated Certificate”), and was duly adopted in accordance with the provisions of Sections 228, 242 and 245 of the General Corporation Law of the State of Delaware (the “DGCL”).

3. The text of the Amended and Restated Certificate is hereby amended and restated in its entirety to provide as herein set forth in full.

ARTICLE I

The name of the Corporation is Karuna Therapeutics, Inc.

ARTICLE II

The address of the Corporation’s registered office in the State of Delaware is c/o The Corporation Trust Company, 1209 Orange Street in the City of Wilmington, County of New Castle, 19801. The name of its registered agent at such address is The Corporation Trust Company.

ARTICLE III

The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the DGCL.
ARTICLE IV

CAPITAL STOCK

The total number of shares of capital stock which the Corporation shall have authority to issue is one hundred sixty million (160,000,000) shares of which (i) one hundred fifty million (150,000,000) shares shall be a class designated as common stock, par value $0.0001 per share (the “Common Stock”), and (ii) ten million (10,000,000) shares shall be a class designated as undesignated preferred stock, par value $0.0001 per share (the “Undesignated Preferred Stock”).

Except as otherwise provided in any certificate of designations of any series of Undesignated Preferred Stock, the number of authorized shares of the class of Common Stock or Undesignated Preferred Stock may from time to time be increased or decreased (but not below the number of shares of such class outstanding) by the affirmative vote of the holders of a majority in voting power of the outstanding shares of capital stock of the Corporation irrespective of the provisions of Section 242(b)(2) of the DGCL.

The powers, preferences and rights of, and the qualifications, limitations and restrictions upon, each class or series of stock shall be determined in accordance with, or as set forth below in, this Article IV.

A. COMMON STOCK

Subject to all the rights, powers and preferences of the Undesignated Preferred Stock and except as provided by law or in this Certificate (or in any certificate of designations of any series of Undesignated Preferred Stock):

(a) the holders of the Common Stock shall have the exclusive right to vote for the election of directors of the Corporation (the “Directors”) and on all other matters requiring stockholder action, each outstanding share entitling the holder thereof to one vote on each matter properly submitted to the stockholders of the Corporation for their vote; provided, however, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Certificate (or on any amendment to a certificate of designations of any series of Undesignated Preferred Stock) that alters or changes the powers, preferences, rights or other terms of one or more outstanding series of Undesignated Preferred Stock if the holders of such affected series of Undesignated Preferred Stock are entitled to vote, either separately or together with the holders of one or more other such series, on such amendment pursuant to this Certificate (or pursuant to a certificate of designations of any series of Undesignated Preferred Stock) or pursuant to the DGCL;

(b) dividends may be declared and paid or set apart for payment upon the Common Stock out of any assets or funds of the Corporation legally available for the payment of dividends, but only when and as declared by the Board of Directors or any authorized committee thereof; and
(c) upon the voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the net assets of the Corporation shall be distributed pro rata to the holders of the Common Stock.

B. UNDESIGNATED PREFERRED STOCK

The Board of Directors or any authorized committee thereof is expressly authorized, to the fullest extent permitted by law, to provide by resolution or resolutions for, out of the unissued shares of Undesignated Preferred Stock, the issuance of the shares of Undesignated Preferred Stock in one or more series of such stock, and by filing a certificate of designations pursuant to applicable law of the State of Delaware, to establish or change from time to time the number of shares of each such series, and to fix the designations, powers, including voting powers, full or limited, or no voting powers, preferences and the relative, participating, optional or other special rights of the shares of each series and any qualifications, limitations and restrictions thereof.

ARTICLE V

STOCKHOLDER ACTION

1. Action without Meeting. Any action required or permitted to be taken by the stockholders of the Corporation at any annual or special meeting of stockholders of the Corporation must be effected at a duly called annual or special meeting of stockholders and may not be taken or effected by a written consent of stockholders in lieu thereof. Notwithstanding anything herein to the contrary, the affirmative vote of not less than two-thirds (2/3) of the outstanding shares of capital stock entitled to vote thereon, and the affirmative vote of not less than two-thirds (2/3) of the outstanding shares of each class entitled to vote thereon as a class, shall be required to amend or repeal any provision of this Article V, Section 1.

2. Special Meetings. Except as otherwise required by statute and subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock, special meetings of the stockholders of the Corporation may be called only by the Board of Directors acting pursuant to a resolution approved by the affirmative vote of a majority of the Directors then in office, and special meetings of stockholders may not be called by any other person or persons. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders of the Corporation.

ARTICLE VI

DIRECTORS

1. General. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors except as otherwise provided herein or required by law.
2. **Election of Directors.** Election of Directors need not be by written ballot unless the By-laws of the Corporation (the “By-laws”) shall so provide.

3. **Number of Directors; Term of Office.** The number of Directors of the Corporation shall be fixed solely and exclusively by resolution duly adopted from time to time by the Board of Directors. The Directors, other than those who may be elected by the holders of any series of Undesignated Preferred Stock, shall be classified, with respect to the term for which they severally hold office, into three classes. The initial Class I Directors of the Corporation shall be Bharat Chowrira, J.D., Ph.D. and Heather Preston, M.D.; the initial Class II Directors of the Corporation shall be Jeffrey Jonas, M.D., James Healy, M.D., Ph.D., and Robert Nelsen; and the initial Class III Directors of the Corporation shall be Steven Paul, Edmund Harrigan, M.D., and Atul Pande, M.D.. The initial Class I Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2020, the initial Class II Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2021, and the initial Class III Directors shall serve for a term expiring at the annual meeting of stockholders to be held in 2022. The mailing address of each person who is to serve initially as a director is c/o Karuna Therapeutics, Inc., 33 Arch Street, Suite 3110, Boston, Massachusetts 02110. At each annual meeting of stockholders, Directors elected to succeed those Directors whose terms expire shall be elected for a term of office to expire at the third succeeding annual meeting of stockholders after their election. Notwithstanding the foregoing, the Directors elected to each class shall hold office until their successors are duly elected and qualified or until their earlier resignation, death or removal.

   Notwithstanding the foregoing, whenever, pursuant to the provisions of Article IV of this Certificate, the holders of any one or more series of Undesignated Preferred Stock shall have the right, voting separately as a series or together with holders of other such series, to elect Directors at an annual or special meeting of stockholders, the election, term of office, filling of vacancies and other features of such directorships shall be governed by the terms of this Certificate and any certificate of designations applicable to such series.

   Notwithstanding anything herein to the contrary, the affirmative vote of not less than two-thirds \(^{2/3}\) of the outstanding shares of capital stock entitled to vote thereon, and the affirmative vote of not less than two-thirds \(^{2/3}\) of the outstanding shares of each class entitled to vote thereon as a class, shall be required to amend or repeal any provision of this Article VI, Section 3.

4. **Vacancies.** Subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock to elect Directors and to fill vacancies in the Board of Directors relating thereto, any and all vacancies in the Board of Directors, however occurring, including, without limitation, by reason of an increase in the size of the Board of Directors, or the death, resignation, disqualification or removal of a Director, shall be filled solely and exclusively by the affirmative vote of a majority of the remaining Directors then in office, even if less than a quorum of the Board of Directors, and not by the stockholders. Any Director appointed in accordance with the preceding sentence shall hold office for the remainder of the full term of the class of Directors in which the new directorship was created or the vacancy occurred and until such Director’s successor shall have been duly elected and qualified or until his or her earlier resignation, death or removal. Subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock to elect Directors, when the number of Directors is increased or
decreased, the Board of Directors shall, subject to Article VI, Section 3 hereof, determine the class or classes to which the increased or decreased number of Directors shall be apportioned; provided, however, that no decrease in the number of Directors shall shorten the term of any incumbent Director. In the event of a vacancy in the Board of Directors, the remaining Directors, except as otherwise provided by law, shall exercise the powers of the full Board of Directors until the vacancy is filled.

5. **Removal.** Subject to the rights, if any, of any series of Undesignated Preferred Stock to elect Directors and to remove any Director whom the holders of any such series have the right to elect, any Director (including persons elected by Directors to fill vacancies in the Board of Directors) may be removed from office (i) only with cause and (ii) only by the affirmative vote of the holders of not less than two thirds (2/3) of the outstanding shares of capital stock then entitled to vote at an election of Directors. At least forty-five (45) days prior to any annual or special meeting of stockholders at which it is proposed that any Director be removed from office, written notice of such proposed removal and the alleged grounds thereof shall be sent to the Director whose removal will be considered at the meeting.

**ARTICLE VII**

**LIMITATION OF LIABILITY**

A Director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of his or her fiduciary duty as a Director, except for liability (a) for any breach of the Director’s duty of loyalty to the Corporation or its stockholders, (b) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (c) under Section 174 of the DGCL or (d) for any transaction from which the Director derived an improper personal benefit. If the DGCL is amended after the effective date of this Certificate to authorize corporate action further eliminating or limiting the personal liability of Directors, then the liability of a Director of the Corporation shall be eliminated or limited to the fullest extent permitted by the DGCL, as so amended.

Any amendment, repeal or modification of this Article VII by either of (i) the stockholders of the Corporation or (ii) an amendment to the DGCL, shall not adversely affect any right or protection existing at the time of such amendment, repeal or modification with respect to any acts or omissions occurring before such amendment, repeal or modification of a person serving as a Director at the time of such amendment, repeal or modification.

Notwithstanding anything herein to the contrary, the affirmative vote of not less than two thirds (2/3) of the outstanding shares of capital stock entitled to vote thereon, and the affirmative vote of not less than two thirds (2/3) of the outstanding shares of each class entitled to vote thereon as a class, shall be required to amend or repeal any provision of this Article VII.
ARTICLE VIII

AMENDMENT OF BY-LAWS

1. Amendment by Directors. Except as otherwise provided by law, the By-laws of the Corporation may be amended or repealed by the Board of Directors by the affirmative vote of a majority of the Directors then in office.

2. Amendment by Stockholders. Except as otherwise provided therein, the By-laws of the Corporation may be amended or repealed at any annual meeting of stockholders, or special meeting of stockholders called for such purpose, by the affirmative vote of not less than two thirds (2/3) of the outstanding shares of capital stock entitled to vote on such amendment or repeal, voting together as a single class; provided, however, that if the Board of Directors recommends that stockholders approve such amendment or repeal at such meeting of stockholders, such amendment or repeal shall only require the affirmative vote of the majority of the outstanding shares of capital stock entitled to vote on such amendment or repeal, voting together as a single class.

ARTICLE IX

AMENDMENT OF CERTIFICATE OF INCORPORATION

The Corporation reserves the right to amend or repeal this Certificate in the manner now or hereafter prescribed by statute and this Certificate, and all rights conferred upon stockholders herein are granted subject to this reservation. Except as otherwise required by this Certificate or by law, whenever any vote of the holders of capital stock of the Corporation is required to amend or repeal any provision of this Certificate, such amendment or repeal shall require the affirmative vote of the majority of the outstanding shares of capital stock entitled to vote on such amendment or repeal, and the affirmative vote of the majority of the outstanding shares of each class entitled to vote thereon as a class, at a duly constituted meeting of stockholders called expressly for such purpose.

[End of Text]
THIS AMENDED AND RESTATED CERTIFICATE OF INCORPORATION is executed as of this ______ day of ______, 2019.

KARUNA THERAPEUTICS, INC.

By: ______________________________________
Name:
Title:

Signature Page to Amended and Restated Certificate of Incorporation
AMENDED AND RESTATED

BY-LAWS

OF

KARUNA THERAPEUTICS, INC.

(the “Corporation”)

ARTICLE I

Stockholders

SECTION 1. Annual Meeting. The annual meeting of stockholders (any such meeting being referred to in these By-laws as an “Annual Meeting”) shall be held at the hour, date and place within or without the United States which is fixed by the Board of Directors, which time, date and place may subsequently be changed at any time by vote of the Board of Directors. If no Annual Meeting has been held for a period of thirteen (13) months after the Corporation’s last Annual Meeting, a special meeting in lieu thereof may be held, and such special meeting shall have, for the purposes of these By-laws or otherwise, all the force and effect of an Annual Meeting. Any and all references hereafter in these By-laws to an Annual Meeting or Annual Meetings also shall be deemed to refer to any special meeting(s) in lieu thereof.

SECTION 2. Notice of Stockholder Business and Nominations.

(a) Annual Meetings of Stockholders.

(1) Nominations of persons for election to the Board of Directors of the Corporation and the proposal of other business to be considered by the stockholders may be brought before an Annual Meeting (i) by or at the direction of the Board of Directors or (ii) by any stockholder of the Corporation who was a stockholder of record at the time of giving of notice provided for in this By-law, who is entitled to vote at the meeting, who is present (in person or by proxy) at the meeting and who complies with the notice procedures set forth in this By-law as to such nomination or business. For the avoidance of doubt, the foregoing clause (ii) shall be the exclusive means for a stockholder to bring nominations or business properly before an Annual Meeting (other than matters properly brought under Rule 14a-8 (or any successor rule) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”)), and such stockholder must comply with the notice and other procedures set forth in Article I, Section 2(a)(2) and (3) of this By-law to bring such nominations or business properly before an Annual Meeting. In addition to the other requirements set forth in this By-law, for any proposal of business to be considered at an Annual Meeting, it must be a proper subject for action by stockholders of the Corporation under Delaware law.

(2) For nominations or other business to be properly brought before an Annual Meeting by a stockholder pursuant to clause (ii) of Article I, Section 2(a)(1) of this By-law, the stockholder must (i) have given Timely Notice (as defined below)
thereof in writing to the Secretary of the Corporation, (ii) have provided any updates or supplements to such notice at the times and in the forms required by this By-law and (iii) together with the beneficial owner(s), if any, on whose behalf the nomination or business proposal is made, have acted in accordance with the representations set forth in the Solicitation Statement (as defined below) required by this By-law. To be timely, a stockholder’s written notice shall be received by the Secretary at the principal executive offices of the Corporation not later than the close of business on the ninetieth (90th) day nor earlier than the close of business on the one hundred twentieth (120th) day prior to the one-year anniversary of the preceding year’s Annual Meeting; provided, however, that in the event the Annual Meeting is first convened more than thirty (30) days before or more than sixty (60) days after such anniversary date, or if no Annual Meeting were held in the preceding year, notice by the stockholder to be timely must be received by the Secretary of the Corporation not later than the close of business on the later of the ninetieth (90th) day prior to the scheduled date of such Annual Meeting or the tenth (10th) day following the day on which public announcement of the date of such meeting is first made (such notice within such time periods shall be referred to as “Timely Notice”). Notwithstanding anything to the contrary provided herein, for the first Annual Meeting following the initial public offering of common stock of the Corporation, a stockholder’s notice shall be timely if received by the Secretary at the principal executive offices of the Corporation not later than the close of business on the later of the ninetieth (90th) day prior to the scheduled date of such Annual Meeting or the tenth (10th) day following the day on which public announcement of the date of such Annual Meeting is first made or sent by the Corporation. Such stockholder’s Timely Notice shall set forth:

(A) as to each person whom the stockholder proposes to nominate for election or reelection as a director, (i) the name, age, business address and residence address of the nominee, (ii) the principal occupation or employment of the nominee, (iii) the class and number of shares of the Corporation that are held of record or are beneficially owned by the nominee and any derivative positions held or beneficially held by the nominee, (iv) whether and the extent to which any hedging or other transaction or series of transactions has been entered into by or on behalf of the nominee with respect to any securities of the Corporation, and a description of any other agreement, arrangement or understanding (including any short position or any borrowing or lending of shares), the effect or intent of which is to mitigate loss to, or to manage the risk or benefit of share price changes for, or to increase or decrease the voting power of the nominee, (v) a description of all arrangements or understandings between or among the stockholder and each nominee and any other person or persons (naming such person or persons) pursuant to which the nominations are to be made by the stockholder or concerning the nominee’s potential service on the Board of Directors, (vi) a written statement executed by the nominee acknowledging that as a director of the corporation, the nominee will owe fiduciary duties under Delaware law with respect to the Corporation and its stockholders, and (vii) all information relating to such person that is required to be disclosed in solicitations of proxies for election of directors in an election contest, or is otherwise required, in each case pursuant to Regulation 14A under the Exchange Act (including such person’s written consent to being named in the proxy statement as a nominee and to serving as a director if elected);
(B) as to any other business that the stockholder proposes to bring before the meeting, a brief description of the business desired to be brought before the meeting, the reasons for conducting such business at the meeting, the text, if any, of any resolutions or By-law amendment proposed for adoption, and any material interest in such business of each Proposing Person (as defined below);

(C) (i) the name and address of the stockholder giving the notice, as they appear on the Corporation’s books, and the names and addresses of the other Proposing Persons (if any) and (ii) as to each Proposing Person, the following information: (a) the class or series and number of all shares of capital stock of the Corporation which are, directly or indirectly, owned beneficially or of record by such Proposing Person or any of its affiliates or associates (as such terms are defined in Rule 12b-2 promulgated under the Exchange Act), including any shares of any class or series of capital stock of the Corporation as to which such Proposing Person or any of its affiliates or associates has a right to acquire beneficial ownership at any time in the future, (b) all Synthetic Equity Interests (as defined below) in which such Proposing Person or any of its affiliates or associates, directly or indirectly, holds an interest including a description of the material terms of each such Synthetic Equity Interest, including without limitation, identification of the counterparty to each such Synthetic Equity Interest and disclosure, for each such Synthetic Equity Interest, as to (x) whether or not such Synthetic Equity Interest conveys any voting rights, directly or indirectly, in such shares to such Proposing Person, (y) whether or not such Synthetic Equity Interest is required to be, or is capable of being, settled through delivery of such shares and (z) whether or not such Proposing Person and/or, to the extent known, the counterparty to such Synthetic Equity Interest has entered into other transactions that hedge or mitigate the economic effect of such Synthetic Equity Interest, (c) any proxy (other than a revocable proxy given in response to a public proxy solicitation made pursuant to, and in accordance with, the Exchange Act), agreement, arrangement, understanding or relationship pursuant to which such Proposing Person has or shares a right to, directly or indirectly, vote any shares of any class or series of capital stock of the Corporation, (d) any rights to dividends or other distributions on the shares of any class or series of capital stock of the Corporation, directly or indirectly, owned beneficially by such Proposing Person that are separated or separable from the underlying shares of the Corporation, and (e) any performance-related fees (other than an asset based fee) that such Proposing Person, directly or indirectly, is entitled to based on any increase or decrease in the value of shares of any class or series of capital stock of the Corporation or any Synthetic Equity Interests (the disclosures to be made pursuant to the foregoing clauses (a) through (e) are referred to, collectively, as “Material Ownership Interests”) and (iii) a description of the material terms of all agreements, arrangements or understandings (whether or not in writing) entered into by any Proposing Person or any of its affiliates or associates with any other person for the purpose of acquiring, holding, disposing or voting of any shares of any class or series of capital stock of the Corporation;
(D) (i) a description of all agreements, arrangements or understandings by and among any of the Proposing Persons, or by and among any Proposing Persons and any other person (including with any proposed nominee(s)), pertaining to the nomination(s), or other business proposed to be brought before the meeting of stockholders (which description shall identify the name of each other person who is party to such an agreement, arrangement or understanding), and (ii) identification of the names and addresses of other stockholders (including beneficial owners) known by any of the Proposing Persons to support such nominations or other business proposal(s), and to the extent known the class and number of all shares of the Corporation’s capital stock owned beneficially or of record by such other stockholder(s) or other beneficial owner(s); and

(E) a statement whether or not the stockholder giving the notice and/or the other Proposing Person(s), if any, will deliver a proxy statement and form of proxy to holders of, in the case of a business proposal, at least the percentage of voting power of all of the shares of capital stock of the Corporation required under applicable law to approve the proposal or, in the case of a nomination or nominations, at least the percentage of voting power of all of the shares of capital stock of the Corporation reasonably believed by such Proposing Person to be sufficient to elect the nominee or nominees proposed to be nominated by such stockholder (such statement, the “Solicitation Statement”).

For purposes of this Article I of these By-laws, the term “Proposing Person” shall mean the following persons: (i) the stockholder of record providing the notice of nominations or business proposed to be brought before a stockholders’ meeting, and (ii) the beneficial owner(s), if different, on whose behalf the nominations or business proposed to be brought before a stockholders’ meeting is made. For purposes of this Section 2 of Article I of these By-laws, the term “Synthetic Equity Interest” shall mean any transaction, agreement or arrangement (or series of transactions, agreements or arrangements), including, without limitation, any derivative, swap, hedge, repurchase or so-called “stock borrowing” agreement or arrangement, the purpose or effect of which is to, directly or indirectly: (a) give a person or entity economic benefit and/or risk similar to ownership of shares of any class or series of capital stock of the Corporation, in whole or in part, including due to the fact that such transaction, agreement or arrangement provides, directly or indirectly, the opportunity to profit or avoid a loss from any increase or decrease in the value of any shares of any class or series of capital stock of the Corporation, (b) mitigate loss to, reduce the economic risk of or manage the risk of share price changes for, any person or entity with respect to any shares of any class or series of capital stock of the Corporation, (c) otherwise provide in any manner the opportunity to profit or avoid a loss from any decrease in the value of any shares of any class or series of capital stock of the Corporation, or (d) increase or decrease the voting power of any person or entity with respect to any shares of any class or series of capital stock of the Corporation.
(3) A stockholder providing Timely Notice of nominations or business proposed to be brought before an Annual Meeting shall further update and supplement such notice, if necessary, so that the information (including, without limitation, the Material Ownership Interests information) provided or required to be provided in such notice pursuant to this By-law shall be true and correct as of the record date for the meeting and as of the date that is ten (10) business days prior to such Annual Meeting, and such update and supplement shall be received by the Secretary at the principal executive offices of the Corporation not later than the close of business on the fifth (5th) business day after the record date for the Annual Meeting (in the case of the update and supplement required to be made as of the record date), and not later than the close of business on the eighth (8th) business day prior to the date of the Annual Meeting (in the case of the update and supplement required to be made as of ten (10) business days prior to the meeting).

(4) Notwithstanding anything in the second sentence of Article I, Section 2(a)(2) of this By-law to the contrary, in the event that the number of directors to be elected to the Board of Directors of the Corporation is increased and there is no public announcement naming all of the nominees for director or specifying the size of the increased Board of Directors made by the Corporation at least ten (10) days before the last day a stockholder may deliver a notice of nomination in accordance with the second sentence of Article I, Section 2(a)(2), a stockholder’s notice required by this By-law shall also be considered timely, but only with respect to nominees for any new positions created by such increase, if it shall be received by the Secretary of the Corporation not later than the close of business on the tenth (10th) day following the day on which such public announcement is first made by the Corporation.

(b) General.

(1) Only such persons who are nominated in accordance with the provisions of this By-law shall be eligible for election and to serve as directors and only such business shall be conducted at an Annual Meeting as shall have been brought before the meeting in accordance with the provisions of this By-law or in accordance with Rule 14a-8 under the Exchange Act. The Board of Directors or a designated committee thereof shall have the power to determine whether a nomination or any business proposed to be brought before the meeting was made in accordance with the provisions of this By-law. If neither the Board of Directors nor such designated committee makes a determination as to whether any stockholder proposal or nomination was made in accordance with the provisions of this By-law, the presiding officer of the Annual Meeting shall have the power and duty to determine whether the stockholder proposal or nomination was made in accordance with the provisions of this By-law. If the Board of Directors or a designated committee thereof or the presiding officer, as applicable, determines that any stockholder proposal or nomination was not made in accordance with the provisions of this By-law, such proposal or nomination shall be disregarded and shall not be presented for action at the Annual Meeting.
Except as otherwise required by law, nothing in this Article I, Section 2 shall obligate the Corporation or the Board of Directors to include in any proxy statement or other stockholder communication distributed on behalf of the Corporation or the Board of Directors information with respect to any nominee for director or any other matter of business submitted by a stockholder.

Notwithstanding the foregoing provisions of this Article I, Section 2, if the nominating or proposing stockholder (or a qualified representative of the stockholder) does not appear at the Annual Meeting to present a nomination or any business, such nomination or business shall be disregarded, notwithstanding that proxies in respect of such vote may have been received by the Corporation. For purposes of this Article I, Section 2, to be considered a qualified representative of the proposing stockholder, a person must be authorized by a written instrument executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such written instrument or electronic transmission, or a reliable reproduction of the written instrument or electronic transmission, to the presiding officer at the meeting of stockholders.

For purposes of this By-law, “public announcement” shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press or comparable national news service or in a document publicly filed by the Corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act.

Notwithstanding the foregoing provisions of this By-law, a stockholder shall also comply with all applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to the matters set forth in this By-law. Nothing in this By-law shall be deemed to affect any rights of (i) stockholders to have proposals included in the Corporation’s proxy statement pursuant to Rule 14a-8 (or any successor rule), as applicable, under the Exchange Act and, to the extent required by such rule, have such proposals considered and voted on at an Annual Meeting or (ii) the holders of any series of Undesignated Preferred Stock to elect directors under specified circumstances.

Notwithstanding anything herein to the contrary, the affirmative vote of not less than two thirds (2/3) of the outstanding shares of capital stock entitled to vote thereon, and the affirmative vote of not less than two thirds (2/3) of the outstanding shares of each class entitled to vote thereon as a class, shall be required to amend or repeal any provision of this Article I, Section 2; provided, however, that if the Board of Directors recommends that stockholders approve such amendment or repeal at such meeting of stockholders, such amendment or repeal shall only require the affirmative vote of a majority of the outstanding shares entitled to vote on such amendment or repeal, voting together as a single class.

SECTION 3. Special Meetings. Except as otherwise required by statute and subject to the rights, if any, of the holders of any series of Undesignated Preferred Stock, special meetings of the stockholders of the Corporation may be called only by the Board of Directors acting pursuant to a resolution approved by the affirmative vote of a majority of the Directors then in office. The Board of Directors may postpone or reschedule any previously scheduled special meeting of stockholders. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders of the Corporation. Nominations
of persons for election to the Board of Directors of the Corporation and stockholder proposals of other business shall not be brought before a special
meeting of stockholders to be considered by the stockholders unless such special meeting is held in lieu of an annual meeting of stockholders in
accordance with Article I, Section 1 of these By-laws, in which case such special meeting in lieu thereof shall be deemed an Annual Meeting for
purposes of these By-laws and the provisions of Article I, Section 2 of these By-laws shall govern such special meeting.

Notwithstanding anything herein to the contrary, the affirmative vote of not less than two thirds (2/3) of the outstanding shares of capital stock
entitled to vote thereon, and the affirmative vote of not less than two thirds (2/3) of the outstanding shares of each class entitled to vote thereon as a
class, shall be required to amend or repeal any provision of this Article I, Section 3; provided, however, that if the Board of Directors recommends that
stockholders approve such amendment or repeal at such meeting of stockholders, such amendment or repeal shall only require the affirmative vote of a
majority of the outstanding shares entitled to vote on such amendment or repeal, voting together as a single class.

SECTION 4. Notice of Meetings; Adjournments.

(a) A notice of each Annual Meeting stating the hour, date and place, if any, of such Annual Meeting and the means of remote communication, if
any, by which stockholders and proxyholders may be deemed to be present in person and vote at such meeting, shall be given not less than ten (10) days
nor more than sixty (60) days before the Annual Meeting, to each stockholder entitled to vote thereat by delivering such notice to such stockholder or by
mailing it, postage prepaid, addressed to such stockholder at the address of such stockholder as it appears on the Corporation’s stock transfer books.
Without limiting the manner by which notice may otherwise be given to stockholders, any notice to stockholders may be given by electronic
transmission in the manner provided in Section 232 of the Delaware General Corporation Law (“DGCL”).

(b) Unless otherwise required by the DGCL, notice of all special meetings of stockholders shall be given in the same manner as provided for
Annual Meetings, except that the notice of all special meetings of stockholders shall state the purpose or purposes for which the meeting has been called.

(c) Notice of an Annual Meeting or special meeting of stockholders need not be given to a stockholder if a waiver of notice is executed, or waiver
of notice by electronic transmission is provided, before or after such meeting by such stockholder or if such stockholder attends such meeting, unless
such attendance is for the express purpose of objecting at the beginning of the meeting to the transaction of any business because the meeting was not
lawfully called or convened.

(d) The Board of Directors may postpone and reschedule any previously scheduled Annual Meeting or special meeting of stockholders and any
record date with respect thereto, regardless of whether any notice or public disclosure with respect to any such meeting has been sent or made pursuant
to Section 2 of this Article I of these By-laws or otherwise. In no event shall the public announcement of an adjournment, postponement or rescheduling
of any previously scheduled meeting of stockholders commence a new time period for the giving of a stockholder’s notice under this Article I of these
By-laws.
(e) When any meeting is convened, the presiding officer may adjourn the meeting if (i) no quorum is present for the transaction of business, (ii) the Board of Directors determines that adjournment is necessary or appropriate to enable the stockholders to consider fully information which the Board of Directors determines has not been made sufficiently or timely available to stockholders, or (iii) the Board of Directors determines that adjournment is otherwise in the best interests of the Corporation. When any Annual Meeting or special meeting of stockholders is adjourned to another hour, date or place, notice need not be given of the adjourned meeting other than an announcement at the meeting at which the adjournment is taken of the hour, date and place, if any, to which the meeting is adjourned and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting; provided, however, that if the adjournment is for more than thirty (30) days from the meeting date, or if after the adjournment a new record date is fixed for the adjourned meeting, notice of the adjourned meeting and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting shall be given to each stockholder of record entitled to vote thereat and each stockholder who, by law or under the Certificate of Incorporation of the Corporation (as the same may hereafter be amended and/or restated, the “Certificate”) or these By-laws, is entitled to such notice.

SECTION 5. Quorum. A majority of the outstanding shares entitled to vote, present in person or represented by proxy, shall constitute a quorum at any meeting of stockholders. If less than a quorum is present at a meeting, the holders of voting stock representing a majority of the voting power present at the meeting or the presiding officer may adjourn the meeting from time to time, and the meeting may be held as adjourned without further notice, except as provided in Section 4 of this Article I. At such adjourned meeting at which a quorum is present, any business may be transacted which might have been transacted at the original meeting. The stockholders present at a duly constituted meeting may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum.

SECTION 6. Voting and Proxies. Stockholders shall have one vote for each share of stock entitled to vote owned by them of record according to the stock ledger of the Corporation as of the record date, unless otherwise provided by law or by the Certificate. Stockholders may vote either (i) in person, (ii) by written proxy or (iii) by a transmission permitted by Section 212(c) of the DGCL. Any copy, facsimile telecommunication or other reliable reproduction of the writing or transmission permitted by Section 212(c) of the DGCL may be substituted for or used in lieu of the original writing or transmission for any and all purposes for which the original writing or transmission could be used, provided that such copy, facsimile telecommunication or other reproduction shall be a complete reproduction of the entire original writing or transmission. Proxies shall be filed in accordance with the procedures established for the meeting of stockholders. Except as otherwise limited therein or as otherwise provided by law, proxies authorizing a person to vote at a specific meeting shall entitle the persons authorized thereby to vote at any adjournment of such meeting, but they shall not be valid after final adjournment of such meeting. A proxy with respect to stock held in the name of two or more persons shall be valid if executed by or on behalf of any one of them unless at or prior to the exercise of the proxy the Corporation receives a specific written notice to the contrary from any one of them.
SECTION 7. **Action at Meeting.** When a quorum is present at any meeting of stockholders, any matter before any such meeting (other than an election of a director or directors) shall be decided by a majority of the votes properly cast for and against such matter, except where a larger vote is required by law, by the Certificate or by these By-laws. Any election of directors by stockholders shall be determined by a plurality of the votes properly cast on the election of directors.

SECTION 8. **Stockholder Lists.** The Secretary or an Assistant Secretary (or the Corporation’s transfer agent or other person authorized by these By-laws or by law) shall prepare and make, at least ten (10) days before every Annual Meeting or special meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. Such list shall be open to the examination of any stockholder, for a period of at least ten (10) days prior to the meeting as provided in the manner, and subject to the terms, set forth in Section 219 of the DGCL (or any successor provision). The list shall also be open to the examination of any stockholder during the whole time of the meeting as provided by law.

SECTION 9. **Presiding Officer.** The Board of Directors shall designate a representative to preside over all Annual Meetings or special meetings of stockholders, provided that if the Board of Directors does not so designate such a presiding officer, then the Chairman of the Board, if one is elected, shall preside over such meetings. If the Board of Directors does not so designate such a presiding officer and there is no Chairman of the Board or the Chairman of the Board is unable to so preside or is absent, then the Chief Executive Officer, if one is elected, shall preside over such meetings, provided further that if there is no Chief Executive Officer or the Chief Executive Officer is unable to so preside or is absent, then the President shall preside over such meetings. The presiding officer at any Annual Meeting or special meeting of stockholders shall have the power, among other things, to adjourn such meeting at any time and from time to time, subject to Sections 4 and 5 of this Article I. The order of business and all other matters of procedure at any meeting of the stockholders shall be determined by the presiding officer.

SECTION 10. **Inspectors of Elections.** The Corporation shall, in advance of any meeting of stockholders, appoint one or more inspectors to act at the meeting and make a written report thereof. The Corporation may designate one or more persons as alternate inspectors to replace any inspector who fails to act. If no inspector or alternate is able to act at a meeting of stockholders, the presiding officer shall appoint one or more inspectors to act at the meeting. Any inspector may, but need not, be an officer, employee or agent of the Corporation. Each inspector, before entering upon the discharge of his or her duties, shall take and sign an oath faithfully to execute the duties of inspector with strict impartiality and according to the best of his or her ability. The inspectors shall perform such duties as are required by the DGCL, including the counting of all votes and ballots. The inspectors may appoint or retain other persons or entities to assist the inspectors in the performance of the duties of the inspectors. The presiding officer may review all determinations made by the inspectors, and in so doing the
presiding officer shall be entitled to exercise his or her sole judgment and discretion and he or she shall not be bound by any determinations made by the inspectors. All determinations by the inspectors and, if applicable, the presiding officer, shall be subject to further review by any court of competent jurisdiction.

ARTICLE II

Directors

SECTION 1. Powers. The business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors except as otherwise provided by the Certificate or required by law.

SECTION 2. Number and Terms. The number of directors of the Corporation shall be fixed solely and exclusively by resolution duly adopted from time to time by the Board of Directors. The directors shall hold office in the manner provided in the Certificate.

SECTION 3. Qualification. No director need be a stockholder of the Corporation.

SECTION 4. Vacancies. Vacancies in the Board of Directors shall be filled in the manner provided in the Certificate.

SECTION 5. Removal. Directors may be removed from office only in the manner provided in the Certificate.

SECTION 6. Resignation. A director may resign at any time by electronic transmission or by giving written notice to the Chairman of the Board, if one is elected, the President or the Secretary. A resignation shall be effective upon receipt, unless the resignation otherwise provides.

SECTION 7. Regular Meetings. The regular annual meeting of the Board of Directors shall be held, without notice other than this Section 7, on the same date and at the same place as the Annual Meeting following the close of such meeting of stockholders. Other regular meetings of the Board of Directors may be held at such hour, date and place as the Board of Directors may by resolution from time to time determine and publicize by means of reasonable notice given to any director who is not present at the meeting at which such resolution is adopted.

SECTION 8. Special Meetings. Special meetings of the Board of Directors may be called, orally or in writing, by or at the request of a majority of the directors, the Chairman of the Board, if one is elected, or the President. The person calling any such special meeting of the Board of Directors may fix the hour, date and place thereof.

SECTION 9. Notice of Meetings. Notice of the hour, date and place of all special meetings of the Board of Directors shall be given to each director by the Secretary or an Assistant Secretary, or in case of the death, absence, incapacity or refusal of such persons, by the Chairman of the Board, if one is elected, or the President or such other officer designated by the Chairman of the Board, if one is elected, or the President. Notice of any special meeting of the Board of Directors shall be given to each director in person, by telephone, or by facsimile,
electronic mail or other form of electronic communication, sent to his or her business or home address, at least twenty-four (24) hours in advance of the
meeting, or by written notice mailed to his or her business or home address, at least forty-eight (48) hours in advance of the meeting. Such notice shall
be deemed to be delivered when hand-delivered to such address, read to such director by telephone, deposited in the mail so addressed, with postage
thereon prepaid if mailed, dispatched or transmitted if sent by facsimile transmission or by electronic mail or other form of electronic communications.
A written waiver of notice signed or electronically transmitted before or after a meeting by a director and filed with the records of the meeting shall be
deemed to be equivalent to notice of the meeting. The attendance of a director at a meeting shall constitute a waiver of notice of such meeting, except
where a director attends a meeting for the express purpose of objecting at the beginning of the meeting to the transaction of any business because such
meeting is not lawfully called or convened. Except as otherwise required by law, by the Certificate or by these By-laws, neither the business to be
transacted at, nor the purpose of, any meeting of the Board of Directors need be specified in the notice or waiver of notice of such meeting.

SECTION 10. Quorum. At any meeting of the Board of Directors, a majority of the total number of directors shall constitute a quorum for the
transaction of business, but if less than a quorum is present at a meeting, a majority of the directors present may adjourn the meeting from time to time,
and the meeting may be held as adjourned without further notice. Any business which might have been transacted at the meeting as originally noticed
may be transacted at such adjourned meeting at which a quorum is present. For purposes of this section, the total number of directors includes any
unfilled vacancies on the Board of Directors.

SECTION 11. Action at Meeting. At any meeting of the Board of Directors at which a quorum is present, the vote of a majority of the directors
present shall constitute action by the Board of Directors, unless otherwise required by law, by the Certificate or by these By-laws.

SECTION 12. Action by Consent. Any action required or permitted to be taken at any meeting of the Board of Directors may be taken without a
meeting if all members of the Board of Directors consent thereto in writing or by electronic transmission and the writing or writings or electronic
transmission or transmissions are filed with the records of the meetings of the Board of Directors. Such filing shall be in paper form if the minutes are
maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form. Such consent shall be treated as a resolution of
the Board of Directors for all purposes.

SECTION 13. Manner of Participation. Directors may participate in meetings of the Board of Directors by means of conference telephone or other
communications equipment by means of which all directors participating in the meeting can hear each other, and participation in a meeting in
accordance herewith shall constitute presence in person at such meeting for purposes of these By-laws.

SECTION 14. Presiding Director. The Board of Directors shall designate a representative to preside over all meetings of the Board of Directors,
provided that if the Board of Directors does not so designate such a presiding director or such designated presiding director is unable to so preside or is
absent, then the Chairman of the Board, if one is elected, shall preside over all meetings of the Board of Directors. If both the designated presiding
director, if one is so designated, and the Chairman of the Board, if one is elected, are unable to preside or are absent, the Board of Directors shall
designate an alternate representative to preside over a meeting of the Board of Directors.
SECTION 15. Committees. The Board of Directors, by vote of a majority of the directors then in office, may elect one or more committees, including, without limitation, a Compensation Committee, a Nominating & Corporate Governance Committee and an Audit Committee, and may delegate thereto some or all of its powers except those which by law, by the Certificate or by these By-laws may not be delegated. Except as the Board of Directors may otherwise determine, any such committee may make rules for the conduct of its business, but unless otherwise provided by the Board of Directors or in such rules, its business shall be conducted so far as possible in the same manner as is provided by these By-laws for the Board of Directors. All members of such committees shall hold such offices at the pleasure of the Board of Directors. The Board of Directors may abolish any such committee at any time. Any committee to which the Board of Directors delegates any of its powers or duties shall keep records of its meetings and shall report its action to the Board of Directors.

SECTION 16. Compensation of Directors. Directors shall receive such compensation for their services as shall be determined by a majority of the Board of Directors, or a designated committee thereof, provided that directors who are serving the Corporation as employees and who receive compensation for their services as such, shall not receive any salary or other compensation for their services as directors of the Corporation.

ARTICLE III

Officers

SECTION 1. Enumeration. The officers of the Corporation shall consist of a President, a Treasurer, a Secretary and such other officers, including, without limitation, a Chairman of the Board of Directors, a Chief Executive Officer and one or more Vice Presidents (including Executive Vice Presidents or Senior Vice Presidents), Assistant Vice Presidents, Assistant Treasurers and Assistant Secretaries, as the Board of Directors may determine.

SECTION 2. Election. At the regular annual meeting of the Board of Directors following the Annual Meeting, the Board of Directors shall elect the President, the Treasurer and the Secretary. Other officers may be elected by the Board of Directors at such regular annual meeting of the Board of Directors or at any other regular or special meeting.

SECTION 3. Qualification. No officer need be a stockholder or a director. Any person may occupy more than one office of the Corporation at any time.

SECTION 4. Tenure. Except as otherwise provided by the Certificate or by these By-laws, each of the officers of the Corporation shall hold office until the regular annual meeting of the Board of Directors following the next Annual Meeting and until his or her successor is elected and qualified or until his or her earlier resignation or removal.

SECTION 5. Resignation. Any officer may resign by delivering his or her written or electronically transmitted resignation to the Corporation addressed to the President or the Secretary, and such resignation shall be effective upon receipt, unless the resignation otherwise provides.
SECTION 6. Removal. Except as otherwise provided by law or by resolution of the Board of Directors, the Board of Directors may remove any officer with or without cause by the affirmative vote of a majority of the directors then in office.

SECTION 7. Absence or Disability. In the event of the absence or disability of any officer, the Board of Directors may designate another officer to act temporarily in place of such absent or disabled officer.

SECTION 8. Vacancies. Any vacancy in any office may be filled for the unexpired portion of the term by the Board of Directors.

SECTION 9. President. The President shall, subject to the direction of the Board of Directors, have such powers and shall perform such duties as the Board of Directors may from time to time designate.

SECTION 10. Chairman of the Board. The Chairman of the Board, if one is elected, shall have such powers and shall perform such duties as the Board of Directors may from time to time designate.

SECTION 11. Chief Executive Officer. The Chief Executive Officer, if one is elected, shall have such powers and shall perform such duties as the Board of Directors may from time to time designate.

SECTION 12. Vice Presidents and Assistant Vice Presidents. Any Vice President (including any Executive Vice President or Senior Vice President) and any Assistant Vice President shall have such powers and shall perform such duties as the Board of Directors or the Chief Executive Officer may from time to time designate.

SECTION 13. Treasurer and Assistant Treasurers. The Treasurer shall, subject to the direction of the Board of Directors and except as the Board of Directors or the Chief Executive Officer may otherwise provide, have general charge of the financial affairs of the Corporation and shall cause to be kept accurate books of account. The Treasurer shall have custody of all funds, securities, and valuable documents of the Corporation. He or she shall have such other duties and powers as may be designated from time to time by the Board of Directors or the Chief Executive Officer. Any Assistant Treasurer shall have such powers and perform such duties as the Board of Directors or the Chief Executive Officer may from time to time designate.

SECTION 14. Secretary and Assistant Secretaries. The Secretary shall record all the proceedings of the meetings of the stockholders and the Board of Directors (including committees of the Board of Directors) in books kept for that purpose. In his or her absence from any such meeting, a temporary secretary chosen at the meeting shall record the proceedings thereof. The Secretary shall have charge of the stock ledger (which may, however, be kept by any transfer or other agent of the Corporation). The Secretary shall have custody of the seal of the Corporation, and the Secretary, or an Assistant Secretary shall have authority to affix it to any instrument requiring it, and, when so affixed, the seal may be attested by his or her signature.
or that of an Assistant Secretary. The Secretary shall have such other duties and powers as may be designated from time to time by the Board of Directors or the Chief Executive Officer. In the absence of the Secretary, any Assistant Secretary may perform his or her duties and responsibilities. Any Assistant Secretary shall have such powers and perform such duties as the Board of Directors or the Chief Executive Officer may from time to time designate.

SECTION 15. Other Powers and Duties. Subject to these By-laws and to such limitations as the Board of Directors may from time to time prescribe, the officers of the Corporation shall each have such powers and duties as generally pertain to their respective offices, as well as such powers and duties as from time to time may be conferred by the Board of Directors or the Chief Executive Officer.

ARTICLE IV
Capital Stock

SECTION 1. Certificates of Stock. Each stockholder shall be entitled to a certificate of the capital stock of the Corporation in such form as may from time to time be prescribed by the Board of Directors. Such certificate shall be signed by any two authorized officers of the Corporation. The Corporation seal and the signatures by the Corporation’s officers, the transfer agent or the registrar may be facsimiles. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed on such certificate shall have ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Corporation with the same effect as if he or she were such officer, transfer agent or registrar at the time of its issue. Every certificate for shares of stock which are subject to any restriction on transfer and every certificate issued when the Corporation is authorized to issue more than one class or series of stock shall contain such legend with respect thereto as is required by law. Notwithstanding anything to the contrary provided in these By-laws, the Board of Directors of the Corporation may provide by resolution or resolutions that some or all of any or all classes or series of its stock shall be uncertificated shares (except that the foregoing shall not apply to shares represented by a certificate until such certificate is surrendered to the Corporation), and by the approval and adoption of these By-laws the Board of Directors has determined that all classes or series of the Corporation’s stock may be uncertificated, whether upon original issuance, re-issuance, or subsequent transfer.

SECTION 2. Transfers. Subject to any restrictions on transfer and unless otherwise provided by the Board of Directors, shares of stock that are represented by a certificate may be transferred on the books of the Corporation by the surrender to the Corporation or its transfer agent of the certificate theretofore properly endorsed or accompanied by a written assignment or power of attorney properly executed, with transfer stamps (if necessary) affixed, and with such proof of the authenticity of signature as the Corporation or its transfer agent may reasonably require. Shares of stock that are not represented by a certificate may be transferred on the books of the Corporation by submitting to the Corporation or its transfer agent such evidence of transfer and following such other procedures as the Corporation or its transfer agent may require.
SECTION 3. Record Holders. Except as may otherwise be required by law, by the Certificate or by these By-laws, the Corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote with respect thereto, regardless of any transfer, pledge or other disposition of such stock, until the shares have been transferred on the books of the Corporation in accordance with the requirements of these By-laws.

SECTION 4. Record Date. In order that the Corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof or entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board of Directors may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board of Directors, and which record date: (a) in the case of determination of stockholders entitled to vote at any meeting of stockholders, shall, unless otherwise required by law, not be more than sixty (60) nor less than ten (10) days before the date of such meeting and (b) in the case of any other action, shall not be more than sixty (60) days prior to such other action. If no record date is fixed: (i) the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held; and (ii) the record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto.

SECTION 5. Replacement of Certificates. In case of the alleged loss, destruction or mutilation of a certificate of stock of the Corporation, a duplicate certificate may be issued in place thereof, upon such terms as the Board of Directors may prescribe.

ARTICLE V

Indemnification

SECTION 1. Definitions. For purposes of this Article:

(a) “Corporate Status” describes the status of a person who is serving or has served (i) as a Director of the Corporation, (ii) as an Officer of the Corporation, (iii) as a Non-Officer Employee of the Corporation, or (iv) as a director, partner, trustee, officer, employee or agent of any other corporation, partnership, limited liability company, joint venture, trust, employee benefit plan, foundation, association, organization or other legal entity which such person is or was serving at the request of the Corporation. For purposes of this Section 1(a), a Director, Officer or Non-Officer Employee of the Corporation who is serving or has served as a director, partner, trustee, officer, employee or agent of a Subsidiary shall be deemed to be serving at the request of the Corporation. Notwithstanding the foregoing, “Corporate Status” shall not include the status of a person who is serving or has served as a director, officer, employee or agent of a constituent corporation absorbed in a merger or consolidation transaction with the Corporation with respect to such person’s activities prior to said transaction, unless specifically authorized by the Board of Directors or the stockholders of the Corporation;
(b) “Director” means any person who serves or has served the Corporation as a director on the Board of Directors of the Corporation;

(c) “Disinterested Director” means, with respect to each Proceeding in respect of which indemnification is sought hereunder, a Director of the Corporation who is not and was not a party to such Proceeding;

(d) “Expenses” means all attorneys’ fees, retainers, court costs, transcript costs, fees of expert witnesses, private investigators and professional advisors (including, without limitation, accountants and investment bankers), travel expenses, duplicating costs, printing and binding costs, costs of preparation of demonstrative evidence and other courtroom presentation aids and devices, costs incurred in connection with document review, organization, imaging and computerization, telephone charges, postage, delivery service fees, and all other disbursements, costs or expenses of the type customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, settling or otherwise participating in, a Proceeding;

(e) “Liabilities” means judgments, damages, liabilities, losses, penalties, excise taxes, fines and amounts paid in settlement;

(f) “Non-Officer Employee” means any person who serves or has served as an employee or agent of the Corporation, but who is not or was not a Director or Officer;

(g) “Officer” means any person who serves or has served the Corporation as an officer of the Corporation appointed by the Board of Directors of the Corporation;

(h) “Proceeding” means any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, inquiry, investigation, administrative hearing or other proceeding, whether civil, criminal, administrative, arbitrable or investigative; and

(i) “Subsidiary” shall mean any corporation, partnership, limited liability company, joint venture, trust or other entity of which the Corporation owns (either directly or through or together with another Subsidiary of the Corporation) either (i) a general partner, managing member or other similar interest or (ii) (A) fifty percent (50%) or more of the voting power of the voting capital equity interests of such corporation, partnership, limited liability company, joint venture or other entity, or (B) fifty percent (50%) or more of the outstanding voting capital stock or other voting equity interests of such corporation, partnership, limited liability company, joint venture or other entity.
SECTION 2. Indemnification of Directors and Officers.

(a) Subject to the operation of Section 4 of this Article V of these By-laws, each Director and Officer shall be indemnified and held harmless by the Corporation to the fullest extent authorized by the DGCL, as the same exists or may hereafter be amended (but, in the case of any such amendment, only to the extent that such amendment permits the Corporation to provide broader indemnification rights than such law permitted the Corporation to provide prior to such amendment), and to the extent authorized in this Section 2.

(1) **Actions, Suits and Proceedings Other than By or In the Right of the Corporation.** Each Director and Officer shall be indemnified and held harmless by the Corporation against any and all Expenses and Liabilities that are incurred or paid by such Director or Officer or on such Director’s or Officer’s behalf in connection with any Proceeding or any claim, issue or matter therein (other than an action by or in the right of the Corporation), which such Director or Officer is, or is threatened to be made, a party to or participant in by reason of such Director’s or Officer’s Corporate Status, if such Director or Officer acted in good faith and in a manner such Director or Officer reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful.

(2) **Actions, Suits and Proceedings By or In the Right of the Corporation.** Each Director and Officer shall be indemnified and held harmless by the Corporation against any and all Expenses that are incurred by such Director or Officer or on such Director’s or Officer’s behalf in connection with any Proceeding or any claim, issue or matter therein by or in the right of the Corporation, which such Director or Officer is, or is threatened to be made, a party to or participant in by reason of such Director’s or Officer’s Corporate Status, if such Director or Officer acted in good faith and in a manner such Director or Officer reasonably believed to be in or not opposed to the best interests of the Corporation; provided, however, that no indemnification shall be made under this Section 2(a)(2) in respect of any claim, issue or matter as to which such Director or Officer shall have been finally adjudged by a court of competent jurisdiction to be liable to the Corporation, unless, and only to the extent that, the Court of Chancery or another court in which such Proceeding was brought shall determine upon application that, despite adjudication of liability, but in view of all the circumstances of the case, such Director or Officer is fairly and reasonably entitled to indemnification for such Expenses that such court deems proper.

(3) **Survival of Rights.** The rights of indemnification provided by this Section 2 shall continue as to a Director or Officer after he or she has ceased to be a Director or Officer and shall inure to the benefit of his or her heirs, executors, administrators and personal representatives.

(4) **Actions by Directors or Officers.** Notwithstanding the foregoing, the Corporation shall indemnify any Director or Officer seeking indemnification in connection with a Proceeding initiated by such Director or Officer only if such Proceeding (including any parts of such Proceeding not initiated by such Director or
SECTION 3. Indemnification of Non-Officer Employees. Subject to the operation of Section 4 of this Article V of these By-laws, each Non-Officer Employee may, in the discretion of the Board of Directors of the Corporation, be indemnified by the Corporation to the fullest extent authorized by the DGCL, as the same exists or may hereafter be amended, against any or all Expenses and Liabilities that are incurred by such Non-Officer Employee or on such Non-Officer Employee’s behalf in connection with any threatened, pending or completed Proceeding, or any claim, issue or matter therein, which such Non-Officer Employee is, or is threatened to be made, a party to or participant in by reason of such Non-Officer Employee’s Corporate Status, if such Non-Officer Employee acted in good faith and in a manner such Non-Officer Employee reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. The rights of indemnification provided by this Section 3 shall exist as to a Non-Officer Employee after he or she has ceased to be a Non-Officer Employee and shall inure to the benefit of his or her heirs, personal representatives, executors and administrators. Notwithstanding the foregoing, the Corporation may indemnify any Non-Officer Employee seeking indemnification in connection with a Proceeding initiated by such Non-Officer Employee only if such Proceeding was authorized in advance by the Board of Directors of the Corporation.

SECTION 4. Determination. Unless ordered by a court, no indemnification shall be provided pursuant to this Article V to a Director, to an Officer or to a Non-Officer Employee unless a determination shall have been made that such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the Corporation and, with respect to any criminal Proceeding, such person had no reasonable cause to believe his or her conduct was unlawful. Such determination shall be made by (a) a majority vote of the Disinterested Directors, even though less than a quorum of the Board of Directors, (b) a committee comprised of Disinterested Directors, such committee having been designated by a majority vote of the Disinterested Directors (even though less than a quorum), (c) if there are no such Disinterested Directors, or if a majority of Disinterested Directors so directs, by independent legal counsel in a written opinion, or (d) by the stockholders of the Corporation.

SECTION 5. Advancement of Expenses to Directors Prior to Final Disposition. (a) The Corporation shall advance all Expenses incurred by or on behalf of any Director in connection with any Proceeding in which such Director is involved by reason of such Director’s Corporate Status within thirty (30) days after the receipt by the Corporation of a written statement from such Director requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by such Director and shall be preceded or accompanied by an undertaking by or on behalf of such Director to repay any Expenses so advanced if it shall ultimately be determined that such Director is not entitled to be indemnified against such Expenses. Notwithstanding the foregoing, the Corporation shall advance all
Expenses incurred by or on behalf of any Director seeking advancement of expenses hereunder in connection with a Proceeding initiated by such Director only if such Proceeding (including any parts of such Proceeding not initiated by such Director) was (i) authorized by the Board of Directors of the Corporation, or (ii) brought to enforce such Director’s rights to indemnification or advancement of Expenses under these By-laws.

(b) If a claim for advancement of Expenses hereunder by a Director is not paid in full by the Corporation within thirty (30) days after receipt by the Corporation of documentation of Expenses and the required undertaking, such Director may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim and if successful in whole or in part, such Director shall also be entitled to be paid the expenses of prosecuting such claim. The failure of the Corporation (including its Board of Directors or any committee thereof, independent legal counsel, or stockholders) to make a determination concerning the permissibility of such advancement of Expenses under this Article V shall not be a defense to an action brought by a Director for recovery of the unpaid amount of an advancement claim and shall not create a presumption that such advancement is not permissible. The burden of proving that a Director is not entitled to an advancement of expenses shall be on the Corporation.

(c) In any suit brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall be entitled to recover such expenses upon a final adjudication that the Director has not met any applicable standard for indemnification set forth in the DGCL.

SECTION 6. Advancement of Expenses to Officers and Non-Officer Employees Prior to Final Disposition.

(a) The Corporation may, at the discretion of the Board of Directors of the Corporation, advance any or all Expenses incurred by or on behalf of any Officer or any Non-Officer Employee in connection with any Proceeding in which such person is involved by reason of his or her Corporate Status as an Officer or Non-Officer Employee upon the receipt by the Corporation of a statement or statements from such Officer or Non-Officer Employee requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by such Officer or Non-Officer Employee and shall be preceded or accompanied by an undertaking by or on behalf of such person to repay any Expenses so advanced if it shall ultimately be determined that such Officer or Non-Officer Employee is not entitled to be indemnified against such Expenses.

(b) In any suit brought by the Corporation to recover an advancement of expenses pursuant to the terms of an undertaking, the Corporation shall be entitled to recover such expenses upon a final adjudication that the Officer or Non-Officer Employee has not met any applicable standard for indemnification set forth in the DGCL.

(a) The provisions of this Article V shall be deemed to be a contract between the Corporation and each Director and Officer entitled to the benefits hereof at any time while this Article V is in effect, in consideration of such person's past or current and any future performance of services for the Corporation. Neither amendment, repeal or modification of any provision of this Article V nor the adoption of any provision of the Certificate of Incorporation inconsistent with this Article V shall eliminate or reduce any right conferred by this Article V in respect of any act or omission occurring, or any cause of action or claim that accrues or arises or any state of facts existing, at the time of or before such amendment, repeal, modification or adoption of an inconsistent provision (even in the case of a proceeding based on such a state of facts that is commenced after such time), and all rights to indemnification and advancement of Expenses granted herein or arising out of any act or omission shall vest at the time of the act or omission in question, regardless of when or if any proceeding with respect to such act or omission is commenced. The rights to indemnification and to advancement of expenses provided by, or granted pursuant to, this Article V shall continue notwithstanding that the person has ceased to be a director or officer of the Corporation and shall inure to the benefit of the estate, heirs, executors, administrators, legatees and distributees of such person.

(b) If a claim for indemnification hereunder by a Director or Officer is not paid in full by the Corporation within sixty (60) days after receipt by the Corporation of a written claim for indemnification, such Director or Officer may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim, and if successful in whole or in part, such Director or Officer shall also be entitled to be paid the expenses of prosecuting such claim. The failure of the Corporation (including its Board of Directors or any committee thereof, independent legal counsel, or stockholders) to make a determination concerning the permissibility of such indemnification under this Article V shall not be a defense to an action brought by a Director or Officer for recovery of the unpaid amount of an indemnification claim and shall not create a presumption that such indemnification is not permissible. The burden of proving that a Director or Officer is not entitled to indemnification shall be on the Corporation.

(c) In any suit brought by a Director or Officer to enforce a right to indemnification hereunder, it shall be a defense that such Director or Officer has not met any applicable standard for indemnification set forth in the DGCL.

SECTION 8. Non-Exclusivity of Rights. The rights to indemnification and to advancement of Expenses set forth in this Article V shall not be exclusive of any other right which any Director, Officer, or Non-Officer Employee may have or hereafter acquire under any statute, provision of the Certificate or these By-laws, agreement, vote of stockholders or Disinterested Directors or otherwise.

SECTION 9. Insurance. The Corporation may maintain insurance, at its expense, to protect itself and any Director, Officer or Non-Officer Employee against any liability of any character asserted against or incurred by the Corporation or any such Director, Officer or Non-Officer Employee, or arising out of any such person's Corporate Status, whether or not the Corporation would have the power to indemnify such person against such liability under the DGCL or the provisions of this Article V.

SECTION 10. Other Indemnification. The Corporation’s obligation, if any, to indemnify or provide advancement of Expenses to any person under this Article V as a result of such person serving, at the request of the Corporation, as a director, partner, trustee, officer, employee or
agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall be reduced by any amount such person may collect as indemnification or advancement of Expenses from such other corporation, partnership, joint venture, trust, employee benefit plan or enterprise (the “Primary Indemnitor”). Any indemnification or advancement of Expenses under this Article V owed by the Corporation as a result of a person serving, at the request of the Corporation, as a director, partner, trustee, officer, employee or agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise shall only be in excess of, and shall be secondary to, the indemnification or advancement of Expenses available from the applicable Primary Indemnitor(s) and any applicable insurance policies.

ARTICLE VI

Miscellaneous Provisions

SECTION 1. Fiscal Year. The fiscal year of the Corporation shall be determined by the Board of Directors.

SECTION 2. Seal. The Board of Directors shall have power to adopt and alter the seal of the Corporation.

SECTION 3. Execution of Instruments. All deeds, leases, transfers, contracts, bonds, notes and other obligations to be entered into by the Corporation in the ordinary course of its business without director action may be executed on behalf of the Corporation by the Chairman of the Board, if one is elected, the Chief Executive Officer, President or the Treasurer or any other officer, employee or agent of the Corporation as the Board of Directors or the executive committee of the Board may authorize.

SECTION 4. Voting of Securities. Unless the Board of Directors otherwise provides, the Chairman of the Board, if one is elected, the Chief Executive Officer, President or the Treasurer may waive notice of and act on behalf of the Corporation (including with regard to voting and actions by written consent), or appoint another person or persons to act as proxy or attorney in fact for the Corporation with or without discretionary power and/or power of substitution, at any meeting of stockholders or shareholders of any other corporation or organization, any of whose securities are held by the Corporation.

SECTION 5. Resident Agent. The Board of Directors may appoint a resident agent upon whom legal process may be served in any action or proceeding against the Corporation.

SECTION 6. Corporate Records. The original or attested copies of the Certificate, By-laws and records of all meetings of the incorporators, stockholders and the Board of Directors and the stock transfer books, which shall contain the names of all stockholders, their record addresses and the amount of stock held by each, may be kept outside the State of Delaware and shall be kept at the principal office of the Corporation, at an office of its counsel, at an office of its transfer agent or at such other place or places as may be designated from time to time by the Board of Directors.
SECTION 7. Certificate. All references in these By-laws to the Certificate shall be deemed to refer to the Amended and Restated Certificate of Incorporation of the Corporation, as amended and/or restated and in effect from time to time.

SECTION 8. Exclusive Jurisdiction. Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for state law claims for (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of a fiduciary duty owed by any current or former directors, officers and employees of the Corporation to the Corporation or the Corporation’s stockholders, (iii) any action asserting a claim arising against the Corporation or any current or former directors, officers and employees of the Corporation pursuant to any provision of the Delaware General Corporation Law or the Certificate or By-laws, (iv) any action to interpret, apply, enforce or determine the validity of the Certificate or By-laws, or (v) any action asserting a claim against the Corporation or current or former directors or officers or other employees that is governed by the internal affairs doctrine, in each case subject to the Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein. The provisions of this Section 8 shall not apply to any claims arising under the Exchange Act or the Securities Act of 1933, as amended. Any person or entity purchasing or otherwise acquiring any interest in shares of capital stock of the Corporation shall be deemed to have notice of and consented to the provisions of this Section 8.

SECTION 9. Amendment of By-laws.

(a) Amendment by Directors. Except as provided otherwise by law, these By-laws may be amended or repealed by the Board of Directors by the affirmative vote of a majority of the directors then in office.

(b) Amendment by Stockholders. Except as otherwise required by these By-laws or by law, these By-laws may be amended or repealed at any Annual Meeting, or special meeting of stockholders called for such purpose in accordance with these By-Laws, by the affirmative vote of not less than two thirds (2/3) of the outstanding shares of capital stock entitled to vote on such amendment or repeal, voting together as a single class; provided, however, that if the Board of Directors recommends that stockholders approve such amendment or repeal at such meeting of stockholders, such amendment or repeal shall only require the affirmative vote of the majority of the outstanding shares of capital stock entitled to vote on such amendment or repeal, voting together as a single class. Notwithstanding the foregoing, stockholder approval shall not be required unless mandated by the Certificate, these By-laws, or other applicable law.

SECTION 10. Notices. If mailed, notice to stockholders shall be deemed given when deposited in the mail, postage prepaid, directed to the stockholder at such stockholder’s address as it appears on the records of the Corporation. Without limiting the manner by which notice otherwise may be given to stockholders, any notice to stockholders may be given by electronic transmission in the manner provided in Section 232 of the DGCL.
SECTION 11. Waivers. A written waiver of any notice, signed by a stockholder or director, or waiver by electronic transmission by such person, whether given before or after the time of the event for which notice is to be given, shall be deemed equivalent to the notice required to be given to such person. Neither the business to be transacted at, nor the purpose of, any meeting need be specified in such a waiver.

Adopted May 16, 2019, subject to and effective upon the effectiveness of the Corporation’s Registration Statement on Form S-1 for its initial public offering.
KARUNA THERAPEUTICS, INC.

AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT

THIS AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT (this “Agreement”), is made as of the 15th day of March, 2019, by and among Karuna Therapeutics, Inc., a Delaware corporation (the “Company”), each of the investors listed on Schedule A hereto, each of which is referred to in this Agreement as an “Investor.”

RECITALS

WHEREAS, certain of the Investors (the “Existing Investors”) hold shares of the Preferred Stock and/or shares of Common Stock and possess registration rights, information rights, rights of first offer and other rights pursuant to that certain Investors’ Rights Agreement dated as of August 1, 2018, by and among the Company and such Existing Investors (the “Prior Agreement”);

WHEREAS, the Prior Agreement may be amended, and any provision therein waived, with the consent of the Company and (a) the holders of at least a majority of the outstanding Series Seed Preferred Stock of the Company and (b) the holders of at least two-thirds of the outstanding Series A Preferred Stock of the Company;

WHEREAS, the undersigned Existing Investors, as (i) holders of least a majority of the outstanding Series Seed Preferred Stock of the Company, and (ii) holders of at least two-thirds of the outstanding Series A Preferred Stock of the Company, desire to terminate the Prior Agreement and to accept the rights created pursuant hereto in lieu of the rights granted to them under the Prior Agreement;

WHEREAS, the Company and certain of the Investors (the “New Investors”) are parties to that certain Series B Preferred Stock Purchase Agreement of even date herewith (the “Purchase Agreement”);

WHEREAS, in order to induce the Company to enter into the Purchase Agreement and to induce the New Investors to invest funds in the Company pursuant to the Purchase Agreement, the Investors and the Company hereby agree that this Agreement shall govern the rights of the Investors to cause the Company to register shares of Common Stock issuable to the Investors, to receive certain information from the Company, and to participate in future equity offerings by the Company, and shall govern certain other matters as set forth in this Agreement.

NOW, THEREFORE, the parties hereby agree as follows:

1. Definitions. For purposes of this Agreement:

   “Affiliate” means, with respect to any specified Person, any other Person who, directly or indirectly, controls, is controlled by, or is under common control with such Person, including without limitation any general partner, managing member, officer or director of such Person or any venture capital fund now or hereafter existing that is controlled by one or more general partners or managing members of, or shares the same management company with, such Person.
“Board of Directors” means the board of directors of the Company.

“Certificate of Incorporation” means the Company’s Second Amended and Restated Certificate of Incorporation, as amended and/or restated from time to time.

“Common Stock” means shares of the Company’s common stock, par value $0.0001 per share.

“Competitor” means a Person engaged, directly or indirectly (including through any partnership, limited liability company, corporation, joint venture or similar arrangement (whether now existing or formed hereafter)), in developing therapies for psychosis, cognition and pain but shall not include any passive financial investment firm or collective investment vehicle that, together with its Affiliates, holds less than twenty percent (20)% of the outstanding equity of any Competitor and does not, nor do any of its Affiliates, have a right to designate any members of the board of directors of any Competitor; provided that none of PureTech, ARCH, Pivotal, Fidelity, Sands, PFM or Eventide shall be deemed to be a Competitor.

“Damages” means any loss, damage, claim or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, claim or liability (or any action in respect thereof) arises out of or is based upon: (i) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (ii) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (iii) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

“Derivative Securities” means any securities or rights convertible into, or exercisable or exchangeable for (in each case, directly or indirectly), Common Stock, including options and warrants.


“Excluded Registration” means (i) a registration relating to the sale or grant of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, equity incentive or similar plan; (ii) a registration relating to an SEC Rule 145 transaction; (iii) a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or (iv) a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.
“FOIA Party” means a Person that, in the reasonable determination of the Board of Directors, may be subject to, and thereby required to disclose non-public information furnished by or relating to the Company under, the Freedom of Information Act, 5 U.S.C. 552 ("FOIA"), any state public records access law, any state or other jurisdiction’s laws similar in intent or effect to FOIA, or any other similar statutory or regulatory requirement.

“Form S-1” means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

“Form S-3” means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits forward incorporation of substantial information by reference to other documents filed by the Company with the SEC.

“GAAP” means generally accepted accounting principles in the United States as in effect from time to time.

“Holder” means any holder of Registrable Securities who is a party to this Agreement.

“Immediate Family Member” means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including, adoptive relationships, of a natural person referred to herein.

“Initiating Holders” means, collectively, Major Investors who properly initiate a registration request under this Agreement.

“IPO” means the Company’s first underwritten public offering of its Common Stock under the Securities Act.

“Key Employee” means any executive level employee (including division director and vice president level positions) as well as any employee who, either alone or in concert with others, develops, invents, programs, or designs any Company Intellectual Property (as defined in the Purchase Agreement).

“Major Investor” means any Investor that, individually or together with such Investor’s Affiliates, holds at least 300,000 shares of Registrable Securities (as adjusted for any stock split, stock dividend, combination, or other recapitalization or reclassification after the date hereof).

“New Securities” means, collectively, equity securities of the Company, whether or not currently authorized, as well as rights, options, or warrants to purchase such equity securities, or securities of any type whatsoever that are, or may become, convertible or exchangeable into or exercisable for such equity securities.
“Person” means any individual, corporation, partnership, trust, limited liability company, association or other entity.

“Preferred Stock” means shares of the Company’s Preferred Stock, par value $0.0001 per share.

“Qualified IPO” shall have the meaning set forth in the Certificate of Incorporation.

“Registrable Securities” means (i) the Common Stock issuable or issued upon conversion of the Preferred Stock (ii) any Common Stock, or any Common Stock issued or issuable (directly or indirectly) upon conversion and/or exercise of any other securities of the Company, acquired by the Investors after the date hereof; and (iii) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clauses (i) and (ii) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Subsection 2.13 and excluding for purposes of Section 2 any shares for which registration rights have terminated pursuant to Subsection 2.13 of this Agreement.

“Registrable Securities then outstanding” means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

“Restricted Securities” means the securities of the Company required to be notated with the legend set forth in Subsection 2.12(b) hereof.

“SEC” means the Securities and Exchange Commission.

“SEC Rule 144” means Rule 144 promulgated by the SEC under the Securities Act.

“SEC Rule 145” means Rule 145 promulgated by the SEC under the Securities Act.

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Selling Expenses” means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Subsection 2.6.

“Wellcome Trust” means The Wellcome Trust Limited as Trustee of the Wellcome Trust.
2. **Registration Rights.** The Company covenants and agrees as follows:

2.1 **Demand Registration.**

(a) **Form S-1 Demand.** If at any time after the earlier of (i) five (5) years after the date of this Agreement or (ii) one hundred eighty (180) days after the effective date of the registration statement for the IPO, the Company receives a request from the Holders of a majority of the Registrable Securities held by Major Investors then outstanding that the Company file a Form S-1 registration statement with respect to at least forty percent (40%) of the Registrable Securities then outstanding (or a lesser percent if the anticipated aggregate offering price, net of Selling Expenses, would exceed $10 million), then the Company shall (x) within ten (10) days after the date such request is given, give notice thereof (the “Demand Notice”) to all Major Investors other than the Initiating Holders; and (y) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-1 registration statement under the Securities Act covering all Registrable Securities that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Major Investors, as specified by notice given by each such Major Investor to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(b) **Form S-3 Demand.** If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Major Investors holding Registrable Securities then outstanding having an anticipated aggregate offering price, net of Selling Expenses, of at least $5 million that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Major Investors, then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Major Investors other than the Initiating Holders; and (ii) as soon as practicable, and in any event within forty-five (45) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Major Investors, as specified by notice given by each such Major Investor to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Major Investors requesting a registration pursuant to this Subsection 2.1 a certificate signed by the Company’s chief executive officer stating that in the good faith judgment of the Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the Company shall have the right to defer taking action with respect to such filing, and any time periods with respect to filing or effectiveness thereof shall be tolled correspondingly, for a period of not more than one hundred twenty (120) days after the request.
of the Initiating Holders is given; provided, however, that the Company may not invoke this right more than once in any twelve (12)-month period; and provided further that the Company shall not register any securities for its own account or that of any other stockholder during such one hundred twenty (120) day period other than an Excluded Registration.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(a)(i) during the period that is sixty (60) days before the Company’s good faith estimate of the date of filing of, and ending on a date that is one hundred eighty (180) days after the effective date of, a Company-initiated registration, provided that (i) the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two registrations pursuant to Subsection 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Subsection 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(b) (i) during the period that is thirty (30) days before the Company’s good faith estimate of the date of filing of, and ending on a date that is ninety (90) days after the effective date of, a Company-initiated registration, provided that the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two registrations pursuant to Subsection 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall not be counted as “effected” for purposes of this Subsection 2.1(d) until such time as the applicable registration statement has been declared effective by the SEC, unless the Initiating Holders withdraw their request for such registration, elect not to pay the registration expenses therefor, and forfeit their right to one demand registration statement pursuant to Subsection 2.6, in which case such withdrawn registration statement shall be counted as “effected” for purposes of this Subsection 2.1(d); provided, that if such withdrawal is during a period the Company has deferred taking action pursuant to Subsection 2.1(c), then the Initiating Holders may withdraw their request for registration and such registration will not be counted as “effected” for purposes of this Subsection 2.1(d).

2.2 Company Registration. If the Company proposes to register (including, for this purpose, a registration effected by the Company for stockholders other than the Major Investors) any of its securities under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Subsection 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Subsection 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Subsection 2.2 before the effective date of such registration, whether or not any Holder has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Subsection 2.6.
2.3 Underwriting Requirements.

(a) If, pursuant to Subsection 2.1, the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Subsection 2.1, and the Company shall include such information in the Demand Notice. The underwriter(s) will be selected by the Initiating Holders, subject only to the reasonable approval of the Company. In such event, the right of any Major Investor to include such Major Investor’s Registrable Securities in such registration shall be conditioned upon such Major Investor’s participation in such underwriting and the inclusion of such Major Investor’s Registrable Securities in the underwriting to the extent provided herein. All Major Investors proposing to distribute their securities through such underwriting shall (together with the Company as provided in Subsection 2.4(e)) enter into an underwriting agreement in customary form with the underwriter(s) selected for such underwriting. Notwithstanding any other provision of this Subsection 2.3, if the managing underwriter(s) advise(s) the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Major Investors that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Major Investors, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Major Investor or in such other proportion as shall mutually be agreed to by all such selling Major Investors provided, however, that the number of Registrable Securities held by the Major Investors to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Major Investor to the nearest one hundred (100) shares.

(b) In connection with any offering involving an underwriting of shares of the Company’s capital stock pursuant to Subsection 2.2, the Company shall not be required to include any of the Holders’ Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable) to the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other
securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below thirty percent (30%) of the total number of securities included in such offering, unless such offering is the IPO, in which case the selling Holders may be excluded further if the underwriters make the determination described above and no other stockholder’s securities are included in such offering. For purposes of the provision in this Subsection 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single “selling Holder,” and any pro rata reduction with respect to such “selling Holder” shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such “selling Holder,” as defined in this sentence.

(c) For purposes of Subsection 2.1, a registration shall not be counted as “effected” if, as a result of an exercise of the underwriter’s cutback provisions in Subsection 2.3, fewer than fifty percent (50%) of the total number of Registrable Securities that Major Investors have requested to be included in such registration statement are actually included.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; provided, however, that such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration;

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; provided that the...
Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any managing underwriter(s) participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company’s officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

In addition, the Company shall ensure that, at all times after any registration statement covering a public offering of securities of the Company under the Securities Act shall have become effective, its insider trading policy shall provide that the Company’s directors may implement a trading program under Rule 10b5-1 of the Exchange Act.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder’s Registrable Securities.
2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers’ and accounting fees; fees and disbursements of counsel for the Company; and the reasonable fees and disbursements of one counsel for the selling Holders (“Selling Holder Counsel”), shall be borne and paid by the Company; provided, however, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Subsection 2.1 if the registration request is subsequently withdrawn at the request of the Major Investors holding a majority of the Registrable Securities to be registered (in which case all selling Major Investors shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Major Investors holding a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b), as the case may be; provided further that if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Major Investors at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Major Investors shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.
(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; provided, however, that the indemnity agreement contained in this Subsection 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and provided further that in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Subsections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Subsection 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Subsection 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the defense thereof with counsel mutually satisfactory to the parties; provided, however, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action. The failure to give notice to the indemnifying party within a reasonable time of the commencement of any such action shall relieve such indemnifying party of any liability that it may have to any indemnified party otherwise than under this Subsection 2.8.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either: (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Subsection 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this
Subsection 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Subsection 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim, damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties’ relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; provided, however, that, in any such case (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and provided further that in no event shall a Holder’s liability pursuant to this Subsection 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Subsection 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Subsection 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2, and otherwise shall survive the termination of this Agreement.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144, at all times after the effective date of the registration statement filed by the Company for the IPO;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and
furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of SEC Rule 144 (at any time after ninety (90) days after the effective date of the registration statement filed by the Company for the IPO), the Securities Act, and the Exchange Act (at any time after the Company has become subject to such reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after the Company so qualifies); (ii) a copy of the most recent annual or quarterly report of the Company and such other reports and documents so filed by the Company; and (iii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Holders of a majority of the Registrable Securities then outstanding, enter into any agreement with any holder or prospective holder of any securities of the Company that (i) allow such holder or prospective holder to include such securities in any registration unless, under the terms of such agreement, such holder or prospective holder may include such securities in any such registration only to the extent that the inclusion of such securities will not reduce the number of the Registrable Securities of the Holders that are included or (ii) allow such holder or prospective holder to initiate a demand for registration of any securities held by such holder or prospective holder; provided that this limitation shall not apply to any additional Investor who becomes a party to this Agreement in accordance with Subsection 6.9.

2.11 "Market Stand-off Agreement. Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter, during the period commencing on the date of the final prospectus relating to the registration by the Company for its own behalf of shares of its Common Stock or any other equity securities under the Securities Act on a registration statement on Form S-1, and ending on the date specified by the Company and the managing underwriter (such period not to exceed one hundred eighty (180) days, or such other period as may be requested by the Company or the underwriter to accommodate regulatory restrictions on (1) the publication or other distribution of research reports, and (2) analyst recommendations and opinions, including, but not limited to, the restrictions contained in FINRA Rule 2711(f)(4) or NYSE Rule 472(f)(4), or any successor provisions or amendments thereto) or such other period as may be requested by the Company or an underwriter to accommodate regulatory restrictions on (1) the publication or other distribution of research reports and (2) analyst recommendations and opinions, including, but not limited to, the restrictions contained in FINRA Rule 2711(f)(4) or NYSE Rule 472(f)(4), or any successor provisions or amendments thereto, (i) lend; offer; pledge; sell; contract to sell; sell any option or contract to purchase; purchase any option or contract to sell; grant any option, right, or warrant to purchase; or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable (directly or indirectly) for Common Stock held immediately before the effective date of the registration statement for such offering or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of such securities, whether any such
transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash, or otherwise. The foregoing provisions of this Subsection 2.11 shall apply only to the IPO, shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, or the transfer of any shares to any trust for the direct or indirect benefit of the Holder or the immediate family of the Holder, provided that the trustee of the trust agrees to be bound in writing by the restrictions set forth herein, and provided further that any such transfer shall not involve a disposition for value, and shall be applicable to the Holders only if all officers and directors are subject to the same restrictions and the Company uses commercially reasonable efforts to obtain a similar agreement from all stockholders individually owning more than one percent (1%) of the Company’s outstanding Common Stock (after giving effect to conversion into Common Stock of all outstanding Preferred Stock). The underwriters in connection with such registration are intended third-party beneficiaries of this Subsection 2.11 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in connection with such registration that are consistent with this Subsection 2.11 or that are necessary to give further effect thereto. Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply pro rata to all Company stockholders that are subject to such agreements, based on the number of shares subject to such agreements.

2.12 Restrictions on Transfer.

(a) The Preferred Stock and Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Preferred Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement.

(b) Each certificate, instrument, or book entry representing the Preferred Stock and the Registrable Securities shall (unless otherwise permitted by the provisions of Subsection 2.12(c)) be notated with a legend substantially in the following form:

THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.

THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.
The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Subsection 2.12.

(c) The holder of such Restricted Securities, by acceptance of ownership thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction, the Holder thereof shall give notice to the Company of such Holder’s intention to effect such sale, pledge, or transfer. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder’s expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a “no action” letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a legal opinion or “no action” letter (x) in any transaction in compliance with SEC Rule 144; or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; provided that each transferee agrees in writing to be subject to the terms of this Subsection 2.12. Each certificate, instrument, or book entry representing the Restricted Securities transferred as above provided shall be notated with, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Subsection 2.12(b), except that such certificate instrument, or book entry shall not be notated with such restrictive legend if, in the opinion of counsel for such Holder and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.13 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Subsections 2.1 or 2.2 shall terminate upon the earliest to occur of:

(a) the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation; and

(b) the fifth (5th) anniversary of the IPO.
3. Information and Observer Rights.

3.1 Delivery of Financial Statements. The Company shall deliver to each Major Investor and each Investor advised or subadvised by Fidelity Management & Research Company or its affiliate (each such Investor, a “Fidelity Investor”), provided that the Board of Directors has not reasonably determined that such Major Investor is a Competitor:

(a) as soon as practicable, but in any event within ninety (90) days after the end of each fiscal year of the Company (i) a balance sheet as of the end of such year, (ii) statements of income and of cash flows for such year, and (iii) a statement of stockholders’ equity as of the end of such year, all such financial statements audited and certified by independent public accountants of nationally recognized standing selected by the Company;

(b) as soon as practicable, but in any event within forty-five (45) days after the end of each of the first three (3) quarters of each fiscal year of the Company, unaudited statements of income and cash flows for such fiscal quarter, and an unaudited balance sheet and a statement of stockholders’ equity as of the end of such fiscal quarter, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments; and (ii) not contain all notes thereto that may be required in accordance with GAAP);

(c) as soon as practicable, but in any event within forty-five (45) days after the end of each of the first three (3) quarters of each fiscal year of the Company, a statement showing the number of shares of each class and series of capital stock and securities convertible into or exercisable for shares of capital stock outstanding at the end of the period, the Common Stock issuable upon conversion or exercise of any outstanding securities convertible or exercisable for Common Stock and the exchange ratio or exercise price applicable thereto, and the number of shares of issued stock options and stock options not yet issued but reserved for issuance, if any, all in sufficient detail as to permit the Major Investors and Fidelity Investors to calculate their respective percentage equity ownership in the Company, and certified by the chief financial officer or chief executive officer of the Company as being true, complete, and correct;

(d) as soon as practicable, but in any event thirty (30) days before the end of each fiscal year, a budget and business plan for the next fiscal year (collectively, the “Budget”), approved by the Board of Directors and prepared on a monthly basis, including balance sheets, income statements, and statements of cash flow for such months and, promptly after prepared, any other budgets or revised budgets prepared by the Company;

(e) with respect to the financial statements called for in Subsection 3.13, Subsection 3.1(b) and Subsection 3.1(d), an instrument executed by the chief financial officer or, if no one is currently serving in such role, the chief executive officer of the Company certifying that such financial statements were prepared in accordance with GAAP consistently applied with prior practice for earlier periods (except as otherwise set forth in Subsection 3.1(b) and Subsection 3.1(d) and fairly present the financial condition of the Company and its results of operation for the periods specified therein; and

(f) such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as any Major Investor or Fidelity Investor may from time to time reasonably request; provided, however, that the Company shall not be obligated under this Subsection 3.1 to provide information (i) that the Company reasonably determines in good faith to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in a form acceptable to the Company); or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.
If, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries.

Notwithstanding anything else in this Subsection 3.1 to the contrary, the Company may cease providing the information set forth in this Subsection 3.1 during the period starting with the date sixty (60) days before the Company’s good-faith estimate of the date of filing of a registration statement if it reasonably concludes it must do so to comply with the SEC rules applicable to such registration statement and related offering; provided that the Company’s covenants under this Subsection 3.1 shall be reinstated at such time as the Company is no longer actively employing its commercially reasonable efforts to cause such registration statement to become effective.

3.2 Inspection. The Company shall permit each Major Investor and Fidelity Investor (provided that the Board of Directors has not reasonably determined that such Investor is a Competitor) or its designated representatives or agents, for so long as it holds shares of Preferred Stock, and at such Investor’s expense, to visit and inspect the Company’s properties; examine its books of account and records; and discuss the Company’s affairs, finances, and accounts with its officers, directors, and accountants, at any reasonable time as may be reasonably requested by the Investor; provided, however, that the Company shall not be obligated pursuant to this Subsection 3.2 to provide access to any information that it reasonably and in good faith considers to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in form acceptable to the Company) or the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.3 Observer Rights. The Company shall invite a representative of the Wellcome Trust to attend all meetings of the Board of Directors in a nonvoting observer capacity and, in this respect, shall give such representative copies of all notices, minutes, consents, and other materials that it provides to its directors; provided, however, that such representative shall agree to hold in confidence and trust and to act in a fiduciary manner with respect to all information so provided; and provided further, that the Company reserves the right to withhold any information and to exclude such representative from any meeting or portion thereof if access to such information or attendance at such meeting could adversely affect the attorney-client privilege between the Company and its counsel or result in disclosure of trade secrets or a conflict of interest, or if such Investor or its representative is a Competitor of the Company.

3.4 Termination of Information Rights. The covenants set forth in Subsection 3.1, Subsection 3.2 and Subsection 3.3 shall terminate and be of no further force or effect (i) upon the consummation of a Qualified IPO or (ii) upon the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, in which the consideration received by Company stockholders is cash or marketable securities, whichever event occurs first.
3.5 Confidentiality. Each Investor agrees that such Investor will keep confidential and will not disclose, divulge, or use for any purpose (other than to monitor its investment in the Company) any confidential information obtained from the Company pursuant to the terms of this Agreement (including notice of the Company’s intention to file a registration statement), unless such confidential information (a) is known or becomes known to the public in general (other than as a result of a breach of this Subsection 3.5 by such Investor), (b) is or has been independently developed or conceived by such Investor without use of the Company’s confidential information, or (c) is or has been made known or disclosed to such Investor by a third party without a breach of any obligation of confidentiality such third party may have to the Company; provided, however, that an Investor may disclose confidential information (i) to its attorneys, accountants, consultants, and other professionals to the extent necessary to obtain their services in connection with monitoring its investment in the Company; (ii) to any prospective purchaser of any Registrable Securities from such Investor, if such prospective purchaser agrees to be bound by the provisions of this Subsection 3.5; (iii) to any existing or prospective Affiliate, partner, member, stockholder, or wholly owned subsidiary of such Investor in the ordinary course of business, provided that such Investor informs such Person that such information is confidential and directs such Person to maintain the confidentiality of such information; or (iv) as may otherwise be required by law, regulation, rule, court order or subpoena, provided that such Investor promptly notifies the Company of such disclosure and takes reasonable steps to minimize the extent of any such required disclosure, provided, however that any Fidelity Investor may identify the Company and the value of such Fidelity Investor’s security holdings in the Company in accordance with applicable investment reporting and disclosure regulations or internal policies and respond to examinations, demands, requests or reporting requirements of a regulatory authority without prior notice to or consent from the Company.

4. Rights to Future Stock Issuances.

4.1 Right of First Offer. Subject to the terms and conditions of this Subsection 4.1 and applicable securities laws, if the Company proposes to offer or sell any New Securities, the Company shall first offer such New Securities to each Major Investor and Fidelity Investor (each an “Offeree,” and collectively, the “Offerees”). An Offeree shall be entitled to apportion the right of first offer hereby granted to it, in such proportions as it deems appropriate, among (i) itself, (ii) its Affiliates, and (iii) its beneficial interest holders, such as limited partners, members or any other Person having “beneficial ownership,” as such term is defined in Rule 13d-3 promulgated under the Exchange Act, of such Offeree (“Offeree Beneficial Owners”); provided that each such Affiliate or Offeree Beneficial Owner, as applicable, (x) is not a Competitor or FOIA Party, unless such party’s purchase of New Securities is otherwise consented to by the Board of Directors, (y) agrees to enter into this Agreement and each of the Voting Agreement and Right of First Refusal and Co-Sale Agreement of even date herewith among the Company, the Investors and the other parties named therein, as an “Investor” under each such agreement (provided that any Competitor or FOIA Party shall not be entitled to any rights as an Investor under Subsections 3.1, 3.2, 3.3 and 4.1 hereof), and (z) agrees to purchase at least such number of New Securities as are allocable hereunder to the Major Investor holding the fewest number of shares of Preferred Stock and any other Derivative Securities.
(a) The Company shall give notice (the “Offer Notice”) to each Offeree, stating (i) its bona fide intention to offer such New Securities, (ii) the number of such New Securities to be offered, and (iii) the price and terms, if any, upon which it proposes to offer such New Securities.

(b) By notification to the Company within twenty (20) days after the Offer Notice is given, each Offeree may elect to purchase or otherwise acquire, at the price and on the terms specified in the Offer Notice, up to that portion of such New Securities which equals the proportion that the Common Stock then held by such Offeree (including all shares of Common Stock then issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Preferred Stock and any other Derivative Securities then held by such Offeree) bears to the total Common Stock of the Company then outstanding (assuming full conversion and/or exercise, as applicable, of all Preferred Stock and other Derivative Securities. At the expiration of such twenty (20) day period, the Company shall promptly notify each Offeree that elects to purchase or acquire all the shares available to it (each, a “Fully Exercising Offeree”) of any other Offeree’s failure to do likewise. During the ten (10) day period commencing after the Company has given such notice, each Fully Exercising Offeree may, by giving notice to the Company, elect to purchase or acquire, in addition to the number of shares specified above, up to that portion of the New Securities for which Offerees were entitled to subscribe but that were not subscribed for by the Offerees which is equal to the proportion that the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of Preferred Stock and any other Derivative Securities then held, by such Fully Exercising Offeree bears to the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Preferred Stock and any other Derivative Securities then held, by all Fully Exercising Offerees who wish to purchase such unsubscribed shares. The closing of any sale pursuant to this Subsection 4.1(b) shall occur within the later of ninety (90) days of the date that the Offer Notice is given and the date of initial sale of New Securities pursuant to Subsection 4.1(b).

(c) If all New Securities referred to in the Offer Notice are not elected to be purchased or acquired as provided in Subsection 4.1(b), the Company may, during the ninety (90) day period following the expiration of the periods provided in Subsection 4.1(b), offer and sell the remaining unsubscribed portion of such New Securities to any Person or Persons at a price not less than, and upon terms no more favorable to the offeree than, those specified in the Offer Notice. If the Company does not enter into an agreement for the sale of the New Securities within such period, or if such agreement is not consummated within thirty (30) days of the execution thereof, the right provided hereunder shall be deemed to be revived and such New Securities shall not be offered unless first reoffered to the Offerees in accordance with this Subsection 4.1. Notwithstanding anything to the contrary, the rights set forth in Subsection 4.1 may not be amended, modified or terminated and the observance of any term hereof may not be waived with respect to any Offeree without the written consent of such Offeree, unless such amendment or waiver applies to all Offerees in the same fashion (it being agreed that a waiver of the provisions of Subsection 4.1 with respect to a particular transaction shall not be deemed to apply to all Offerees in the same fashion if the Offerees approving such waiver remain able to purchase securities in such transaction, either directly or by assignment of such purchase right to their affiliate(s), where another Offeree is no longer able to purchase securities in such transaction as a result of such waiver).
4.2 Termination. The covenants set forth in Subsection 4.1 shall terminate and be of no further force or effect (i) upon the consummation of a Qualified IPO, or (ii) upon the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, whichever event occurs first.

5. Additional Covenants Insurance. The Company shall use its commercially reasonable efforts to obtain, within ninety (90) days of the date hereof, from financially sound and reputable insurers, Directors and Officers liability insurance on terms and conditions satisfactory to the Board of Directors, and will use commercially reasonable efforts to cause such insurance policies to be maintained until such time as the Board of Directors determines that such insurance should be discontinued. The policy shall not be cancelable by the Company without prior approval by the Board of Directors.

5.2 Employee Agreements. The Company will cause (i) each person now or hereafter employed by it or by any subsidiary (or engaged by the Company or any subsidiary as a consultant/independent contractor) with access to confidential information and/or trade secrets to enter into a nondisclosure and proprietary rights assignment agreement; and (ii) each Key Employee to enter into a one (1) year noncompetition and nonsolicitation agreement, substantially in the form approved by the Board of Directors. In addition, the Company shall not amend, modify, terminate, waive, or otherwise alter, in whole or in part, any of the above-referenced agreements or any restricted stock agreement between the Company and a Key Employee without the consent of the Board of Directors.

5.3 Employee Stock. Unless otherwise approved by the Board of Directors, all future employees and consultants of the Company who purchase, receive options to purchase, or receive awards of shares of the Company’s capital stock after the date hereof shall be required to execute restricted stock or option agreements, as applicable, providing for (i) vesting of shares over a four (4) year period, with the first twenty-five percent (25%) of such shares vesting following twelve (12) months of continued employment or service, and the remaining shares vesting in equal monthly installments over the following thirty-six (36) months, and (ii) a market stand-off provision substantially similar to that in Subsection 2.11. Without the prior approval by the Board of Directors, the Company shall not amend, modify, terminate, waive or otherwise alter, in whole or in part, any stock purchase, stock restriction or option agreement with any existing employee or service provider if such amendment would cause it to be inconsistent with this Subsection 5.3. In addition, unless otherwise approved by the Board of Directors, the Company shall retain (and not waive) a “right of first refusal” on employee transfers until the Company’s IPO and shall have the right to repurchase unvested shares at cost upon termination of employment of a holder of restricted stock.
5.4 **Qualified Small Business Stock.** The Company shall use commercially reasonable efforts to cause the shares of Series Seed Preferred Stock and Series A Preferred Stock of the Company, as well as any shares into which such shares are converted, within the meaning of Section 1202(f) of the Internal Revenue Code (the "Code"), to constitute "qualified small business stock" as defined in Section 1202(c) of the Code; provided, however, that such requirement shall not be applicable if the Board of Directors determines, in its good-faith business judgment, that such qualification is inconsistent with the best interests of the Company. The Company shall submit to its stockholders (including the Investors) and to the Internal Revenue Service any reports that may be required under Section 1202(d)(1)(C) of the Code and the regulations promulgated thereunder. In addition, within twenty (20) business days after any Investor’s written request therefor, the Company shall, at its option, either (i) deliver to such Investor a written statement indicating whether (and what portion of) such Investor’s interest in the Company constitutes “qualified small business stock” as defined in Section 1202(c) of the Code or (ii) deliver to such Investor such factual information in the Company’s possession as is reasonably necessary to enable such Investor to determine whether (and what portion of) such Investor’s interest in the Company constitutes “qualified small business stock” as defined in Section 1202(c) of the Code.

5.5 **Board Matters.** Unless otherwise determined by the vote of a majority of the directors then in office, the Board of Directors shall meet at least quarterly in accordance with an agreed-upon schedule. The Company shall reimburse the nonemployee directors for all reasonable out-of-pocket travel expenses incurred (consistent with the Company’s travel policy) in connection with attending meetings of the Board of Directors.

5.6 **Successor Indemnification.** If the Company or any of its successors or assignees consolidates with or merges into any other Person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board of Directors as in effect immediately before such transaction, whether such obligations are contained in the Company’s Bylaws, the Certificate of Incorporation, or elsewhere, as the case may be.

5.7 **Expenses of Counsel.** In the event of a transaction which is a Sale of the Company (as defined in the Voting Agreement of even date herewith among the Investors, the Company and the other parties named therein), the reasonable fees and disbursements of one counsel for the Investors ("Investor Counsel"), in their capacities as stockholders, shall be borne and paid by the Company. At the outset of considering a transaction which, if consummated would constitute a Sale of the Company, the Company shall obtain the ability to share with the Investor Counsel (and such counsel’s clients) and shall share the confidential information (including, without limitation, the initial and all subsequent drafts of memoranda of understanding, letters of intent and other transaction documents and related noncompete, employment, consulting and other compensation agreements and plans) pertaining to and memorializing any of the transactions which, individually or when aggregated with others would constitute the Sale of the Company. The Company shall be obligated to share (and cause the Company's counsel and investment bankers to share) such materials when distributed to the Company’s executives and/or any one or more of the other parties to such transaction(s).
event that Investor Counsel deems it appropriate, in its reasonable discretion, to enter into a joint defense agreement or other arrangement to enhance the ability of the parties to protect their communications and other reviewed materials under the attorney client privilege, the Company shall, and shall direct its counsel to, execute and deliver to Investor Counsel and its clients such an agreement in form and substance reasonably acceptable to Investor Counsel. In the event that one or more of the other party or parties to such transactions require the clients of Investor Counsel to enter into a confidentiality agreement and/or joint defense agreement in order to receive such information, then the Company shall share whatever information can be shared without entry into such agreement and shall, at the same time, in good faith work expeditiously to enable Investor Counsel and its clients to negotiate and enter into the appropriate agreement(s) without undue burden to the clients of Investor Counsel.

5.8 Indemnification Matters. The Company hereby acknowledges that one (1) or more of the directors nominated to serve on the Board of Directors by the Investors (each an "Investor Director") may have certain rights to indemnification, advancement of expenses and/or insurance provided by one or more of the Investors and certain of their affiliates (collectively, the "Investor Indemnitors"). The Company hereby agrees (a) that it is the indemnitor of first resort (i.e., its obligations to any such Investor Director are primary and any obligation of the Investor Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by such Investor Director are secondary), (b) that it shall be required to advance the full amount of expenses incurred by such Investor Director and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement by or on behalf of any such Investor Director to the extent legally permitted and as required by the Certificate of Incorporation or Bylaws of the Company (or any agreement between the Company and such Investor Director), without regard to any rights such Investor Director may have against the Investor Indemnitors, and, (c) that it irrevocably waives, relinquishes and releases the Investor Indemnitors from any and all claims against the Investor Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Investor Indemnitors on behalf of any such Investor Director with respect to any claim for which such Investor Director has sought indemnification from the Company shall affect the foregoing and the Investor Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of such Investor Director against the Company. The Investor Directors and the Investor Indemnitors are intended third-party beneficiaries to this Subsection 5.8 and shall have the right, power and authority to enforce the provisions of this Subsection 5.8 as though they were a party to this Agreement.

5.9 Right to Conduct Activities.

(a) The Company hereby agrees and acknowledges that Puretech Health LLC (together with its Affiliates, "PureTech") is a healthcare business, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, PureTech shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by PureTech in any entity competitive with the Company, or (ii) actions taken by any partner, officer or other representative of PureTech to assist any such competitive company, whether or
not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a
detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the
unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company
from any liability associated with his or her fiduciary duties to the Company.

(b) The Company hereby agrees and acknowledges that ARCH Venture Fund IX, L.P. and ARCH Venture Fund IX Overage, L.P. (together
with their Affiliates, “ARCH”) are professional investment funds, and as such invest in numerous portfolio companies, some of which may be deemed
competitive with the Company’s business (as currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the
extent permitted under applicable law, ARCH shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by
ARCH in any entity competitive with the Company, or (ii) actions taken by any partner, officer or other representative of ARCH to assist any such
competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and
whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from
liability associated with the unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director
or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

(c) The Company hereby agrees and acknowledges that Pivotal bioVenture Partners (“Pivotal”) is a professional investment fund, and as
such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as currently conducted or as
currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, Pivotal shall not be liable to the
Company for any claim arising out of, or based upon, (i) the investment by Pivotal in any entity competitive with the Company, or (ii) actions taken by
any partner, officer or other representative of Pivotal to assist any such competitive company, whether or not such action was taken as a member of the
board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; provided,
however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company’s
confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her
fiduciary duties to the Company.

(d) The Company hereby agrees and acknowledges that the Fidelity Investors (together with their Affiliates, “Fidelity”) are professional
investment funds, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as
currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, Fidelity
shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by Fidelity in any entity competitive with the Company,
or (ii) actions taken by any partner, officer or other representative of Fidelity to assist any such competitive company, whether or not such action was
taken as a member of the board of directors of such competitive company or otherwise, and
whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

(e) The Company hereby agrees and acknowledges that Partner Fund Management, L.P. (together with its Affiliates, “PFM”) is a professional investment fund, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, PFM shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by PFM in any entity competitive with the Company, or (ii) actions taken by any partner, officer or other representative of PFM to assist any such competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

(f) The Company hereby agrees and acknowledges that Sands Capital Life Sciences Pulse Fund, L.P. (“Sands”) is a professional investment fund, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, Sands shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by Sands in any entity competitive with the Company, or (ii) actions taken by any partner, officer or other representative of Sands to assist any such competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

(g) The Company hereby agrees and acknowledges that Eventide Healthcare & Life Sciences Fund (“Eventide”) is a professional investment fund, and as such invests in numerous portfolio companies, some of which may be deemed competitive with the Company’s business (as currently conducted or as currently propose to be conducted). The Company hereby agrees that, to the extent permitted under applicable law, Eventide shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by Eventide in any entity competitive with the Company, or (ii) actions taken by any partner, officer or other representative of Eventide to assist any such competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; provided, however, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company’s confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.
5.10 FCPA. The Company represents that it shall not (and shall not permit any of its subsidiaries or affiliates or any of its or their respective directors, officers, managers, employees, independent contractors, representatives or agents to) promise, authorize or make any payment to, or otherwise contribute any item of value to, directly or indirectly, to any third party, including any Non-U.S. Official (as such term is defined in the U.S. Foreign Corrupt Practices Act of 1977, as amended (the “FCPA”)), in each case, in violation of the FCPA, the U.K. Bribery Act, or any other applicable anti-bribery or anti-corruption law. The Company further represents that it shall (and shall cause each of its subsidiaries and affiliates to) cease all of its or their respective activities, as well as remediate any actions taken by the Company, its subsidiaries or affiliates, or any of their respective directors, officers, managers, employees, independent contractors, representatives or agents in violation of the FCPA, the U.K. Bribery Act, or any other applicable anti-bribery or anti-corruption law. The Company further represents that it shall (and shall cause each of its subsidiaries and affiliates to) maintain systems of internal controls (including, but not limited to, accounting systems, purchasing systems and billing systems) to ensure compliance with the FCPA, the U.K. Bribery Act, or any other applicable anti-bribery or anti-corruption law. Upon request, the Company agrees to provide responsive information and/or certifications concerning its compliance with applicable anti-corruption laws. The Company shall promptly notify each Investor if the Company becomes aware of any Enforcement Action (as defined in the Purchase Agreement). The Company shall, and shall cause any direct or indirect subsidiary or entity controlled by it, whether now in existence or formed in the future, to comply with the FCPA. The Company shall use its best efforts to cause any direct or indirect subsidiary, whether now in existence or formed in the future, to comply in all material respects with all applicable laws.

5.11 Tax Reporting. The Company will comply with any obligation imposed on the Company to make any filing (including any filing on Internal Revenue Service Form 5471) as a result of any interest that the Company holds in a non-U.S. Person or any activities that the Company conducts outside of the U.S. and shall include in such filing any information necessary to obviate (to the extent possible) any similar obligation to which any Major Investor would otherwise be subject with respect to such interest or such activity. The Company shall promptly provide each Major Investor with a copy of any such filing.

5.12 Termination of Covenants. The covenants set forth in this Section 5, except for Subsections 5.6, 5.8 and 5.9, shall automatically terminate upon the earlier of (a) the consummation of a Qualified IPO; and (b) the consummation of a Deemed Liquidation Event (as defined in the Certificate of Incorporation).

6. Miscellaneous.

6.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that (i) is an Affiliate of a Holder; (ii) is a Holder’s Immediate Family Member or trust for the benefit of an individual Holder or one or more of such Holder’s Immediate Family
Members; or (iii) after such transfer, holds at least 100,000 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations); provided, however, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement, including the provisions of Subsection 2.11. For the purposes of determining the number of shares of Registrable Securities held by a transferee, the holdings of a transferee (1) that is an Affiliate or stockholder of a Holder; (2) who is a Holder’s Immediate Family Member; or (3) that is a trust for the benefit of an individual Holder or such Holder’s Immediate Family Member shall be aggregated together and with those of the transferring Holder; provided further that all transferees who would not qualify individually for assignment of rights shall have a single attorney-in-fact for the purpose of exercising any rights, receiving notices, or taking any action under this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

6.2 Governing Law. This Agreement and any controversy arising out of or relating to this Agreement shall be governed by and construed in accordance with the internal laws of the State of Delaware, without regard to conflict of law principles that would result in the application of any law other than the law of the State of Delaware.

6.3 Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

6.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

6.5 Notices.
(a) All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or (i) personal delivery to the party to be notified; (ii) when sent, if sent by electronic mail or facsimile during the recipient’s normal business hours, and if not sent during normal business hours, then on the recipient’s next business day; (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (iv) one (1) business day after the business day of deposit with a nationally recognized overnight courier, freight prepaid, specifying next-day delivery, with written verification of receipt. All communications shall be sent to the respective parties at their addresses as set forth on Schedule A hereto, or to the principal office of the Company and to the attention of the Chief
Executive Officer, in the case of the Company, or to such email address, facsimile number, or address as subsequently modified by written notice given in accordance with this Subsection 6.6(g). If notice is given to the Company, a copy shall also be sent to Goodwin Procter LLP, 100 Northern Avenue, Boston, MA 02210, Attention: James T. Barrett, Esq, and if notice is given to the Investors, a copy shall also be given to Morrison Foerster LLP, 200 Clarendon Street, Floor 20, Boston, MA 02116, Attn: Ori Solomon, ori@mofo.com.

(b) Each Investor consents to the delivery of any stockholder notice pursuant to the Delaware General Corporation Law (the “DGCL”), as amended or superseded from time to time, by electronic transmission pursuant to Section 232 of the DGCL (or any successor thereto) at the electronic mail address or the facsimile number set forth below such Investor’s name on the Schedules hereto, as updated from time to time by notice to the Company, or as on the books of the Company. To the extent that any notice given by means of electronic transmission is returned or undeliverable for any reason, the foregoing consent shall be deemed to have been revoked until a new or corrected electronic mail address has been provided, and such attempted Electronic Notice shall be ineffective and deemed to not have been given. Each Investor agrees to promptly notify the Company of any change in its electronic mail address, and that failure to do so shall not affect the foregoing.

6.6 Amendments and Waivers. Any term of this Agreement may be amended, modified or terminated and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the Company and the holders of a majority of the shares of Series A Preferred Stock and Series B Preferred Stock then outstanding, voting together as a single class on an as-converted basis; provided that the Company may in its sole discretion waive compliance with Subsection 2.12(c) (and the Company’s failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Subsection 2.12(c) shall be deemed to be a waiver); and provided further that any provision hereof may be waived by any waiving party on such party’s own behalf, without the consent of any other party. Notwithstanding the foregoing, (i) the definition of “Competitor” in Section 1 and Section 5.9(a) may not be amended with respect to PureTech without the written consent of PureTech; (ii) the definition of “Competitor” in Section 1 and Section 5.9(b) may not be amended with respect to ARCH without the written consent of ARCH; (iii) the definition of “Competitor” in Section 1 and Section 5.9(c) may not be amended with respect to Pivotal without the written consent of Pivotal; (iv) the definition of “Competitor” in Section 1 and Section 5.9(d) may not be adversely amended (with respect to clause (x) above, solely with respect to Fidelity) without the written consent of Fidelity; (v) the definition of “Competitor” in Section 1 and Section 5.9(e) may not be amended with respect to PFM without the written consent of PFM; (vi) the definition of “Competitor” in Section 1 and Section 5.9(f) may not be amended with respect to Sands without the written consent of Sands; (vii) the definition of “Competitor” in Section 1 and Section 5.9(g) may not be amended with respect to Eventide without the written consent of Eventide; (viii) this Agreement may not be amended, modified or terminated and the observance of any term hereof may not be waived with respect to any Investor without the written consent of such Investor, unless such amendment, modification, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 4 with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms; (ix) Subsections 3.1 and 3.2, Section 4 and any
other section of this Agreement applicable to the Major Investors (including this clause (ix) of this Subsection 6.6) may not be amended, modified, terminated or waived without the written consent of the holders of at least a majority of the Registrable Securities then outstanding and held by the Major Investors and (x) Subsection 3.3 shall not be amended, modified, or waived without the written consent of the Wellcome Trust. Notwithstanding the foregoing, (x) Schedule A hereto may be amended by the Company from time to time to add transferees of any Registrable Securities in compliance with the terms of this Agreement without the consent of the other parties; and (y) Subsection 3.3 shall not be amended, modified or waived without the written consent of the Wellcome Trust.

Notwithstanding the foregoing, (x) Schedule A hereto may be amended by the Company from time to time to add transferees of any Registrable Securities in compliance with Subsection 6.6; and (y) if after giving effect to any amendment, modification, termination or waiver of Section 4 with respect to or for the purpose of facilitating any financing, a Major Investor or its Affiliate purchases securities in such financing (such Investor, a “Participating Major Investor”), then each Major Investor shall have the right to purchase a portion of the securities sold in such financing equal to the product of (A) such Major Investor’s pro rata share (determined substantially in accordance with Subsection 4.1(b)) and (B) a fraction, the numerator of which is the amount of securities actually purchased by the Participating Major Investor in such financing, and the denominator of which is the amount of securities such Participating Major Investor would have purchased in such financing if such Participating Major Investor had purchased its full pro rata share (determined substantially in accordance with Subsection 4.1(b)) in such financing; provided, for clarity, that if there is more than one Participating Major Investor, then the largest fraction obtained pursuant to clause (B) above shall apply. The Company shall give prompt notice of any amendment or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, termination, or waiver. Any amendment, termination, or waiver effected in accordance with this Subsection 6.6 shall be binding on all parties hereto, regardless of whether any such party has consented thereto. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision.

6.7 **Severability.** In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

6.8 **Aggregation of Stock.** All shares of Registrable Securities held or acquired by Affiliates shall be aggregated together for the purpose of determining the availability of any rights under this Agreement and such Affiliated persons may apportion such rights as among themselves in any manner they deem appropriate.

6.9 **Additional Investors.** Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of the Company’s Preferred Stock after the date hereof, any purchaser of such shares of Preferred Stock may become a party to this Agreement by executing and delivering an additional counterpart signature page to this Agreement, and thereafter shall be deemed an “Investor” for all purposes hereunder. No action or consent by the Investors shall be required for such joinder to this Agreement by such additional Investor, so long as such additional Investor has agreed in writing to be bound by all of the obligations as an “Investor” hereunder.
6.10 **Entire Agreement.** This Agreement (including any Schedules hereto) constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled.

6.11 **Dispute Resolution.** Any unresolved controversy or claim arising out of or relating to this Agreement, except as (i) otherwise provided in this Agreement, or (ii) any such controversies or claims arising out of either party’s intellectual property rights for which a provisional remedy or equitable relief is sought, shall be submitted to arbitration by one arbitrator mutually agreed upon by the parties, and if no agreement can be reached within thirty (30) days after names of potential arbitrators have been proposed by the American Arbitration Association (the “AAA”), then by one arbitrator having reasonable experience in corporate finance transactions of the type provided for in this Agreement and who is chosen by the AAA. The arbitration shall take place in Boston, Massachusetts, in accordance with the AAA rules then in effect, and judgment upon any award rendered in such arbitration will be binding and may be entered in any court having jurisdiction thereof. There shall be limited discovery prior to the arbitration hearing as follows: (a) exchange of witness lists and copies of documentary evidence and documents relating to or arising out of the issues to be arbitrated, (b) depositions of all party witnesses and (c) such other depositions as may be allowed by the arbitrators upon a showing of good cause. Depositions shall be conducted in accordance with the Delaware Code of Civil Procedure, the arbitrator shall be required to provide in writing to the parties the basis for the award or order of such arbitrator, and a court reporter shall record all hearings, with such record constituting the official transcript of such proceedings.

WAIVER OF JURY TRIAL: EACH PARTY HEREBY WAIVES ITS RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF THIS AGREEMENT, THE OTHER TRANSACTION AGREEMENTS, THE SECURITIES OR THE SUBJECT MATTER HEREOF OR THEREOF. THE SCOPE OF THIS WAIVER IS INTENDED TO BE ALL-ENCOMPASSING OF ANY AND ALL DISPUTES THAT MAY BE FILED IN ANY COURT AND THAT RELATE TO THE SUBJECT MATTER OF THIS TRANSACTION, INCLUDING, WITHOUT LIMITATION, CONTRACT CLAIMS, TORT CLAIMS (INCLUDING NEGLIGENCE), BREACH OF DUTY CLAIMS, AND ALL OTHER COMMON LAW AND STATUTORY CLAIMS. THIS SECTION HAS BEEN FULLY DISCUSSED BY EACH OF THE PARTIES HERETO AND THESE PROVISIONS WILL NOT BE SUBJECT TO ANY EXCEPTIONS. EACH PARTY HERETO HEREBY FURTHER WARRANTS AND REPRESENTS THAT SUCH PARTY HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL, AND THAT SUCH PARTY KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL.

6.12 **Delays or Omissions.** No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such
breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

6.13 Acknowledgment. The Company acknowledges that certain of the Investors are in the business of venture capital investing and therefore review the business plans and related proprietary information of many enterprises, including enterprises which may have products or services which compete directly or indirectly with those of the Company. Nothing in this Agreement shall preclude or in any way restrict the Investors from investing or participating in any particular enterprise whether or not such enterprise has products or services which compete with those of the Company.

6.14 Termination of Prior Agreement. Upon the effectiveness of this Agreement, the Prior Agreement shall terminate and be of no further force and effect, and shall be superseded and replaced in its entirety by this Agreement.

[Remainder of Page Intentionally Left Blank]
IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

KARUNA THERAPEUTICS, INC.

By: /s/ Andrew Miller
Name: Andrew Miller
Title: Chief Operating Officer

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

PURETECH HEALTH LLC

By: /s/ Stephen Muniz
Name: Stephen Muniz
Title: Chief Operating Officer

Address for notices:

501 Boylston Street
Boston, MA 02116
Attn: Stephen Muniz
Phone: (617) 456-0042
Email: sm@puretechhealth.com

SIGNATURE PAGE TO AMENDED AND RESTATE D IN VESTORS’ RIGHTS AGREEMENT
INVESTORS:

ARCH VENTURE FUND IX, L.P.

By: ARCH Venture Partners IX, L.P., its General Partner

By: ARCH Venture Partners IX, LLC, its General Partner

By: /s/ Mark McDonnell
Name: Mark McDonnell
Title: Managing Director

Addresses for notices:

c/o ARCH Venture Partners
8755 W. Higgins Road, Suite 1025
Chicago, IL 60631
Attn: Mark McDonnell
Phone: (773) 380-6600
Email: mmcdonnell@archventure.com

With a mandatory copy, which shall not constitute notice, to:

Morrison Foerster LLP
200 Clarendon Street, Floor 20
Boston, MA 02116
Attn: Ori Solomon
Phone: (617) 648-4710
Email: ori@mofo.com

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT
INVESTORS:

ARCH VENTURE FUND IX OVERAGE, L.P.

By: ARCH Venture Partners IX Overage, L.P., its General Partner

By: ARCH Venture Partners IX, LLC, its General Partner

By: /s/ Mark McDonnell
Name: Mark McDonnell
Title: Managing Director

Addresses for notices:

c/o ARCH Venture Partners
8755 W. Higgins Road, Suite 1025
Chicago, IL 60631
Attn: Mark McDonnell
Phone: (773) 380-6600
Email: mmcdonnell@archventure.com

With a mandatory copy, which shall not constitute notice, to:

Morrison Foerster LLP
200 Clarendon Street, Floor 20
Boston, MA 02116
Attn: Ori Solomon
Phone: (617) 648-4710
Email: ori@mofo.com

SIGNATURE PAGE TO AMENDED AND RESTATE D INVESTORS' RIGHTS AGREEMENT
INVESTOR:

PIVOTAL BIOVENTURE PARTNERS FUND I, L.P.

By: Pivotal bioVenture Partners Fund I G.P., L.P., its general partner

By: Pivotal bioVenture Partners Fund I U.G.P. Ltd, its general partner

By: /s/ Heather Preston M.D.
Name: Heather Preston, M.D.
Title: Managing Partner

Address for notices:

c/o Pivotal bioVenture Partners
501 Second Street, Suite 216
San Francisco, CA 94107
Attn: Heather Preston, M.D.
Email: heather@pivotalbiovp.com

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

FIDELITY MT. VERNON STREET TRUST:
FIDELITY GROWTH COMPANY FUND

By: /s/ Colm Hogan
Name: Colm Hogan
Title: Authorized Signatory

Address for notices:

BNY MELLON
One Bny Mellon Center
00 Grant Street Aim 151-2700
Pittsburgh, PA 15258

With a mandatory copy, which shall not constitute notice, to:

Morrison & Foerster LLP
200 Clarendon Street, 20th Floor | Boston, MA 02116
Attn: Ori Solomon
Phone: (617) 648-4710
Email: ori@mofo.com

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

FIDELITY MT. VERNON STREET TRUST:
FIDELITY SERIES GROWTH COMPANY FUND

By: /s/ Colm Hogan
Name: Colm Hogan
Title: Authorized Signatory

Address for notices:

State Street Bank & Trust
PO Box 5756
Boston, Massachusetts 02206
Attn: WAVELENGTH + CO Fidelity Mt. Vernon
Street Trust: Fidelity Series Growth Company Fund
Email: SSBCORPACTIONS@StateStreet.com
Fax number: 617-988-9110

With a mandatory copy, which shall not constitute notice, to:

Morrison & Foerster LLP
200 Clarendon Street, 20th Floor | Boston, MA 02116
Attn: Ori Solomon
Phone: (617) 648-4710
Email: ori@mofo.com

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

FIDELITY GROWTH COMPANY COMMINGLED POOL

By: Fidelity Management Trust Company, as Trustee

By: /s/ Colm Hogan
Name: Colm Hogan
Title: Authorized Signatory

Address for notices:

Mag & Co.
c/o Brown Brothers Harriman & Co.
Attn: Corporate Actions /Vault
140 Broadway New York, NY 10005
BBH.Fidelity.CA.Notifications@BBH.com

With a mandatory copy, which shall not constitute notice, to:

Morrison & Foerster LLP
200 Clarendon Street, 20th Floor | Boston, MA 02116
Attn: Ori Solomon Phone: (617) 648-4710
Email: ori@mofo.com

SIGNATURE PAGE TO AMENDED AND RESTATEd INVESTORS' RIGHTS AGREEMENT
INVESTOR:

PFM HEALTHCARE MASTER FUND, L.P.
By: Partner Fund Management, L.P., its investment adviser
By: /s/ Yuan DuBord
Name: Yuan DuBord
Title: CFO

Address for notices:
4 Embarcadero Center, Suite 3500 San Francisco, CA 94111

PFM HEALTHCARE EMERGING GROWTH MASTER FUND, L.P.
By: Partner Fund Management, L.P., its investment adviser
By: /s/ Yuan DuBord
Name: Yuan DuBord
Title: CFO

Address for notices:
4 Embarcadero Center, Suite 3500 San Francisco, CA 94111

PFM THERAPEUTICS MASTER FUND, L.P.
By: Partner Fund Management, L.P., its investment adviser
By: /s/ Yuan DuBord
Name: Yuan DuBord
Title: CFO

Address for notices:
4 Embarcadero Center, Suite 3500 San Francisco, CA 94111

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

SANDS CAPITAL LIFE SCIENCES PULSE FUND, L.P.

By: Sands Capital Life Sciences Pulse Fund-GP, L.P., its general partner

By: Sands Capital Life Sciences Pulse Fund-GP, LLC, its general partner

By: /s/ Jonathan Goodman
Name: Jonathan Goodman
Title: General Counsel

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT
INVESTOR:

THE WELLCOME TRUST LIMITED

By: /s/ Tim Knott
Name: Tim Knott
Title: Programme Head, Innovations

Address for notices:

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

ALEXANDRIA VENTURE INVESTMENTS, LLC, a Delaware limited liability company

By: ALEXANDRIA REAL ESTATE EQUITIES, INC., a Maryland corporation, managing member

By: /s/ Aaron Jacobson
Name: Aaron Jacobson
Title: SVP – Venture Counsel
Address: 385 E. Colorado Blvd., Suite 299 Pasadena, CA 91101

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
INVESTOR:

/s/ Steven Paul

Steven Paul, M.D.

SIGNATURE PAGE TO AMENDED AND RESTATED INVESTORS’ RIGHTS AGREEMENT
1. **Purpose.**

   The purpose of this 2009 Stock Incentive Plan (the “Plan”) of Karuna Pharmaceuticals, a Delaware corporation (the “Company”), is to advance the interests of the Company’s stockholders by enhancing the Company’s ability to attract, retain and motivate persons who are expected to make important contributions to the Company and by providing such persons with equity ownership opportunities and performance-based incentives that are intended to better align the interests of such persons with those of the Company’s stockholders. Except where the context otherwise requires, the term “Company” shall include any of the Company’s present or future parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the “Code”) and any other business venture (including, without limitation, joint venture or limited liability company) in which the Company has a controlling interest, as determined by the Board of Directors of the Company (the “Board”).

2. **Eligibility.**

   All of the Company’s employees, officers, directors, consultants and advisors are eligible to be granted options, restricted stock, restricted stock units and other stock-based awards (each, an “Award”) under the Plan. Each person who receives an Award under the Plan is deemed a “Participant.”

3. **Administration and Delegation.**

   (a) **Administration by Board of Directors.** The Plan will be administered by the Board. The Board shall have authority to grant Awards and to adopt, amend and repeal such administrative rules, guidelines and practices relating to the Plan as it shall deem advisable. The Board may construe and interpret the terms of the Plan and any Award agreements entered into under the Plan. The Board may correct any defect, supply any omission or reconcile any inconsistency in the Plan or any Award in the manner and to the extent it shall deem expedient to carry the Plan into effect and it shall be the sole and final judge of such expediency. All decisions by the Board shall be made in the Board’s sole discretion and shall be final and binding on all persons having or claiming any interest in the Plan or in any Award. No director or person acting pursuant to the authority delegated by the Board shall be liable for any action or determination relating to or under the Plan made in good faith.

   (b) **Appointment of Committees.** To the extent permitted by applicable law, the Board may delegate any or all of its powers under the Plan to one or more committees or subcommittees of the Board (a “Committee”). All references in the Plan to the “Board” shall mean the Board or a Committee of the Board or the officers referred to in Section 3(c) to the extent that the Board’s powers or authority under the Plan have been delegated to such Committee or officers.
(c) **Delegation to Officers.** To the extent permitted by applicable law, the Board may delegate to one or more officers of the Company the power to grant Awards (subject to any limitations under the Plan) to employees or officers of the Company or any of its present or future subsidiary corporations and to exercise such other powers under the Plan as the Board may determine, provided that the Board shall fix the terms of the Awards to be granted by such officers (including the exercise price of such Awards, which may include a formula by which the exercise price will be determined) and the maximum number of shares subject to Awards that the officers may grant; provided further, however, that no officer shall be authorized to grant Awards to any “executive officer” of the Company (as defined by Rule 3b-7 under the Securities Exchange Act of 1934, as amended (the “Exchange Act”)) or to any “officer” of the Company (as defined by Rule 16a-1 under the Exchange Act).

4. **Stock Available for Awards.**

   (a) **Number of Shares.** Subject to adjustment under Section 8, Awards may be made under the Plan for up to 1,000,000 shares of common stock, $0.0001 par value per share, of the Company (the “Common Stock”). If any Award expires or is terminated, surrendered or canceled without having been fully exercised, is forfeited in whole or in part (including as the result of shares of Common Stock subject to such Award being repurchased by the Company at the original issuance price pursuant to a contractual repurchase right), or results in any Common Stock not being issued, the unused Common Stock covered by such Award shall again be available for the grant of Awards under the Plan. Further, shares of Common Stock tendered to the Company by a Participant to exercise an Award shall be added to the number of shares of Common Stock available for the grant of Awards under the Plan. However, in the case of Incentive Stock Options (as hereinafter defined), the foregoing provisions shall be subject to any limitations under the Code. Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares.

   (b) **Substitute Awards.** In connection with a merger or consolidation of an entity with the Company or the acquisition by the Company of property or stock of an entity, the Board may grant Awards in substitution for any options or other stock or stock-based awards granted by such entity or an affiliate thereof. Substitute Awards may be granted on such terms as the Board deems appropriate in the circumstances, notwithstanding any limitations on Awards contained in the Plan. Substitute Awards shall not count against the overall share limit set forth in Section 4(a), except as may be required by reason of Section 422 and related provisions of the Code.

5. **Stock Options.**

   (a) **General.** The Board may grant options to purchase Common Stock (each, an “Option”) and determine the number of shares of Common Stock to be covered by each Option, the exercise price of each Option and the conditions and limitations applicable to the exercise of each Option, including conditions relating to applicable federal or state securities laws, as it considers necessary or advisable. An Option that is not intended to be an Incentive Stock Option shall be designated a “Nonstatutory Stock Option.”
(b) **Incentive Stock Options.** An Option that the Board intends to be an “incentive stock option” as defined in Section 422 of the Code (an “Incentive Stock Option”) shall only be granted to employees of the Company, any of the Company’s present or future parent or subsidiary corporations as defined in Sections 424(e) or (f) of the Code, and any other entities the employees of which are eligible to receive Incentive Stock Options under the Code, and shall be subject to and shall be construed consistently with the requirements of Section 422 of the Code. The Company shall have no liability to a Participant, or any other party, if an Option (or any part thereof) that is intended to be an Incentive Stock Option is not an Incentive Stock Option or for any action taken by the Board, including without limitation the conversion of an Incentive Stock Option to a Nonstatutory Stock Option.

(c) **Exercise Price.** The Board shall establish the exercise price of each Option and specify the exercise price in the applicable option agreement. The exercise price shall be not less than 100% of the Fair Market Value (as defined below) on the date the Option is granted.

(d) **Duration of Options.** Each Option shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable option agreement.

(e) **Exercise of Options.** Options may be exercised by delivery to the Company of a written notice of exercise signed by the proper person or by any other form of notice (including electronic notice) approved by the Board together with payment in full as specified in Section 5(f) for the number of shares for which the Option is exercised. Shares of Common Stock subject to the Option will be delivered by the Company as soon as practicable following exercise.

(f) **Payment Upon Exercise.** Common Stock purchased upon the exercise of an Option granted under the Plan shall be paid for as follows:

1. in cash or by check, payable to the order of the Company;
2. when the Common Stock is registered under the Exchange Act, except as may otherwise be provided in the applicable option agreement, by (i) delivery of an irrevocable and unconditional undertaking by a creditworthy broker to deliver promptly to the Company sufficient funds to pay the exercise price and any required tax withholding or (ii) delivery by the Participant to the Company of a copy of irrevocable and unconditional instructions to a creditworthy broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price and any required tax withholding;
3. when the Common Stock is registered under the Exchange Act and to the extent provided for in the applicable option agreement or approved by the Board, in its sole discretion, by delivery (either by actual delivery or attestation) of shares of Common Stock owned by the Participant valued at their fair market value as determined by (or in a manner approved by) the Board (“Fair Market Value”), provided (i) such method of payment is then permitted under applicable law, (ii) such Common Stock, if acquired directly from the Company, was owned by the Participant for such minimum period of time, if any, as may be established by the Board in its discretion and (iii) such Common Stock is not subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements;
4. to the extent permitted by applicable law and provided for in the applicable option agreement or approved by the Board, in its sole discretion, by (i) delivery of a promissory note of the Participant to the Company on terms determined by the Board, or (ii) payment of such other lawful consideration as the Board may determine; or
6. **Restricted Stock; Restricted Stock Units.**

   (a) **General.** The Board may grant Awards entitling recipients to acquire shares of Common Stock ("Restricted Stock"), subject to the right of the Company to repurchase all or part of such shares at their issue price or other stated or formula price (or to require forfeiture of such shares if issued at no cost) from the recipient in the event that conditions specified by the Board in the applicable Award are not satisfied prior to the end of the applicable restriction period or periods established by the Board for such Award. Instead of granting Awards for Restricted Stock, the Board may grant Awards entitling the recipient to receive shares of Common Stock or cash to be delivered at the time such Award vests ("Restricted Stock Units") (Restricted Stock and Restricted Stock Units are each referred to herein as a "Restricted Stock Award").

   (b) **Terms and Conditions for All Restricted Stock Awards.** The Board shall determine the terms and conditions of a Restricted Stock Award, including the conditions for vesting and repurchase (or forfeiture) and the issue price, if any.

   (c) **Additional Provisions Relating to Restricted Stock.**

      (1) **Dividends.** Participants holding shares of Restricted Stock will be entitled to all ordinary cash dividends paid with respect to such shares, unless otherwise provided by the Board. Unless otherwise provided, by the Board, if any dividends or distributions are paid in shares, or consist of a dividend or distribution to holders of Common Stock other than an ordinary cash dividend, the shares, cash or other property will be subject to the same restrictions on transferability and forfeitability as the shares of Restricted Stock with respect to which they were paid. Each dividend payment will be made no later than the end of the calendar year in which the dividends are paid to shareholders of that class of stock or, if later, the 15th day of the third month following the date the dividends are paid to shareholders of that class of stock.

      (2) **Stock Certificates.** The Company may require that any stock certificates issued in respect of shares of Restricted Stock shall be deposited in escrow by the Participant, together with a stock power endorsed in blank, with the Company (or its designee). At the expiration of the applicable restriction periods, the Company (or such designee) shall deliver the certificates no longer subject to such restrictions to the Participant or if the Participant has died, to the beneficiary designated, in a manner determined by the Board, by a Participant to receive amounts due or exercise rights of the Participant in the event of the Participant’s death (the “Designated Beneficiary”). In the absence of an effective designation by a Participant, “Designated Beneficiary” shall mean the Participant’s estate.

7. **Other Stock-Based Awards.**

   Other Awards of shares of Common Stock, and other Awards that are valued in whole or in part by reference to, or are otherwise based on, shares of Common Stock or other property,
may be granted hereunder to Participants ("Other Stock-Based Awards"), including without limitation stock appreciation rights ("SARs") and Awards entitling recipients to receive shares of Common Stock to be delivered in the future. Such Other Stock-Based Awards shall also be available as a form of payment in the settlement of other Awards granted under the Plan or as payment in lieu of compensation to which a Participant is otherwise entitled. Other Stock-Based Awards may be paid in shares of Common Stock or cash, as the Board shall determine. Subject to the provisions of the Plan, the Board shall determine the terms and conditions of each Other Stock-Based Award, including any purchase price applicable thereto.

8. **Adjustments for Changes in Common Stock and Certain Other Events.**

   (a) **Changes in Capitalization.** In the event of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off or other similar change in capitalization or event, or any dividend or distribution to holders of Common Stock other than an ordinary cash dividend, (i) the number and class of securities available under this Plan, (ii) the number and class of securities and exercise price per share of each outstanding Option, (iii) the number of shares subject to and the repurchase price per share subject to each outstanding Restricted Stock Award, and (iv) the terms of each other outstanding Award shall be equitably adjusted by the Company (or substituted Awards may be made, if applicable) in the manner determined by the Board. Without limiting the generality of the foregoing, in the event the Company effects a split of the Common Stock by means of a stock dividend and the exercise price of and the number of shares subject to an outstanding Option are adjusted as of the date of the distribution of the dividend (rather than as of the record date for such dividend), then an optionee who exercises an Option between the record date and the distribution date for such stock dividend shall be entitled to receive, on the distribution date, the stock dividend with respect to the shares of Common Stock acquired upon such Option exercise, notwithstanding the fact that such shares were not outstanding as of the close of business on the record date for such stock dividend.

   (b) **Reorganization Events.**

      (1) **Definition.** A "Reorganization Event" shall mean: (a) any merger or consolidation of the Company with or into another entity as a result of which all of the Common Stock of the Company is converted into or exchanged for the right to receive cash, securities or other property or is cancelled, (b) any exchange of all of the Common Stock of the Company for cash, securities or other property pursuant to a share exchange transaction or (c) any liquidation or dissolution of the Company.

      (2) **Consequences of a Reorganization Event on Awards Other than Restricted Stock Awards.** In connection with a Reorganization Event, the Board may take any one or more of the following actions as to all or any (or any portion of) outstanding Awards other than Restricted Stock Awards on such terms as the Board determines: (i) provide that Awards shall be assumed, or substantially equivalent Awards shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), (ii) upon written notice to a Participant, provide that the Participant's unexercised Awards will terminate immediately prior to the consummation of such Reorganization Event unless exercised by the Participant within a specified period following the date of such notice, (iii) provide that outstanding Awards shall become exercisable, realizable, or
deliverable, or restrictions applicable to an Award shall lapse, in whole or in part prior to or upon such Reorganization Event, (iv) in the event of a
Reorganization Event under the terms of which holders of Common Stock will receive upon consummation thereof a cash payment for each share
surrendered in the Reorganization Event (the “Acquisition Price”), make or provide for a cash payment to a Participant equal to the excess, if any, of
(A) the Acquisition Price times the number of shares of Common Stock subject to the Participant’s Awards (to the extent the exercise price does not
exceed the Acquisition Price) over (B) the aggregate exercise price of all such outstanding Awards and any applicable tax withholdings, in exchange for
the termination of such Awards, (v) provide that, in connection with a liquidation or dissolution of the Company, Awards shall convert into the right to
receive liquidation proceeds (if applicable, net of the exercise price thereof and any applicable tax withholdings) and (vi) any combination of the
foregoing. In taking any of the actions permitted under this Section 8(b), the Board shall not be obligated by the Plan to treat all Awards, all Awards held
by a Participant, or all Awards of the same type, identically.

For purposes of clause (i) above, an Option shall be considered assumed if, following consummation of the Reorganization Event, the Option
confers the right to purchase, for each share of Common Stock subject to the Option immediately prior to the consummation of the Reorganization
Event, the consideration (whether cash, securities or other property) received as a result of the Reorganization Event by holders of Common Stock for
each share of Common Stock held immediately prior to the consummation of the Reorganization Event (and if holders were offered a choice of
consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Common Stock); provided, however, that if the
consideration received as a result of the Reorganization Event is not solely common stock of the acquiring or succeeding corporation (or an affiliate
thereof), the Company may, with the consent of the acquiring or succeeding corporation, provide for the consideration to be received upon the exercise
of Options to consist solely of common stock of the acquiring or succeeding corporation (or an affiliate thereof) equivalent in value (as determined by
the Board) to the per share consideration received by holders of outstanding shares of Common Stock as a result of the Reorganization Event.

(3) Consequences of a Reorganization Event on Restricted Stock Awards. Upon the occurrence of a Reorganization Event other than a
liquidation or dissolution of the Company, the repurchase and other rights of the Company under each outstanding Restricted Stock Award shall inure to
the benefit of the Company’s successor and shall, unless the Board determines otherwise, apply to the cash, securities or other property which the
Common Stock was converted into or exchanged for pursuant to such Reorganization Event in the same manner and to the same extent as they applied
to the Common Stock subject to such Restricted Stock Award. Upon the occurrence of a Reorganization Event involving the liquidation or dissolution of
the Company, except to the extent specifically provided to the contrary in the instrument evidencing any Restricted Stock Award or any other agreement
between a Participant and the Company, all restrictions and conditions on all Restricted Stock Awards then outstanding shall automatically be deemed
terminated or satisfied.
9. **General Provisions Applicable to Awards**

   (a) **Transferability of Awards.** Except as the Board may otherwise determine or provide in an Award, Awards shall not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution or, other than in the case of an Incentive Stock Option, pursuant to a qualified domestic relations order, and, during the life of the Participant, shall be exercisable only by the Participant. References to a Participant, to the extent relevant in the context, shall include references to authorized transferees.

   (b) **Documentation.** Each Award shall be evidenced in such form (written, electronic or otherwise) as the Board shall determine. Each Award may contain terms and conditions in addition to those set forth in the Plan.

   (c) **Board Discretion.** Except as otherwise provided by the Plan, each Award may be made alone or in addition or in relation to any other Award. The terms of each Award need not be identical, and the Board need not treat Participants uniformly.

   (d) **Termination of Status.** The Board shall determine the effect on an Award of the disability, death, termination or other cessation of employment, authorized leave of absence or other change in the employment or other status of a Participant and the extent to which, and the period during which, the Participant, or the Participant’s legal representative, conservator, guardian or Designated Beneficiary, may exercise rights under the Award.

   (e) **Withholding.** The Participant must satisfy all applicable federal, state, and local or other income and employment tax withholding obligations before the Company will deliver stock certificates or otherwise recognize ownership of Common Stock under an Award. The Company may decide to satisfy the withholding obligations through additional withholding on salary or wages. If the Company elects not to or cannot withhold from other compensation, the Participant must pay the Company the full amount, if any, required for withholding or have a broker tender to the Company cash equal to the withholding obligations. Payment of withholding obligations is due before the Company will issue any shares on exercise or release from forfeiture of an Award or, if the Company so requires, at the same time as payment of the exercise price unless the Company determines otherwise. If provided for in an Award or approved by the Board in its sole discretion, a Participant may satisfy such tax obligations in whole or in part by delivery of shares of Common Stock, including shares retained from the Award creating the tax obligation, valued at their Fair Market Value; provided, however, except as otherwise provided by the Board, that the total tax withholding where stock is being used to satisfy such tax obligations cannot exceed the Company’s minimum statutory withholding obligations (based on minimum statutory withholding rates for federal and state tax purposes, including payroll taxes, that are applicable to such supplemental taxable income). Shares surrendered to satisfy tax withholding requirements cannot be subject to any repurchase, forfeiture, unfulfilled vesting or other similar requirements.

   (f) **Amendment of Award.**

      (1) The Board may amend, modify or terminate any outstanding Award, including but not limited to, substituting therefor another Award of the same or a different type, changing the date of exercise or realization, and converting an Incentive Stock Option to a
Nonstatutory Stock Option. The Participant’s consent to such action shall be required unless (i) the Board determines that the action, taking into account any related action, would not materially and adversely affect the Participant’s rights under the Plan or (ii) the change is permitted under Section 8 hereof.

(2) The Board may, without stockholder approval, amend any outstanding Award granted under the Plan to provide an exercise price per share that is lower than the then-current exercise price per share of such outstanding Award. The Board may also, without stockholder approval, cancel any outstanding award (whether or not granted under the Plan) and grant in substitution therefor new Awards under the Plan covering the same or a different number of shares of Common Stock and having an exercise price per share lower than the then-current exercise price per share of the cancelled award.

(g) Conditions on Delivery of Stock. The Company will not be obligated to deliver any shares of Common Stock pursuant to the Plan or to remove restrictions from shares previously delivered under the Plan until (i) all conditions of the Award have been met or removed to the satisfaction of the Company, (ii) in the opinion of the Company’s counsel, all other legal matters in connection with the issuance and delivery of such shares have been satisfied, including any applicable securities laws and any applicable stock exchange or stock market rules and regulations, and (iii) the Participant has executed and delivered to the Company such representations or agreements as the Company may consider appropriate to satisfy the requirements of any applicable laws, rules or regulations.

(h) Acceleration. The Board may at any time provide that any Award shall become immediately exercisable in full or in part, free of some or all restrictions or conditions, or otherwise realizable in full or in part, as the case may be.

10. Miscellaneous.

(a) No Right To Employment or Other Status. No person shall have any claim or right to be granted an Award, and the grant of an Award shall not be construed as giving a Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with a Participant free from any liability or claim under the Plan, except as expressly provided in the applicable Award.

(b) No Rights As Stockholder. Subject to the provisions of the applicable Award, no Participant or Designated Beneficiary shall have any rights as a stockholder with respect to any shares of Common Stock to be distributed with respect to an Award until becoming the record holder of such shares.

(c) Effective Date and Term of Plan. The Plan shall become effective on the date on which it is adopted by the Board. No Awards shall be granted under the Plan after the expiration of 10 years from the earlier of (i) the date on which the Plan was adopted by the Board or (ii) the date the Plan was approved by the Company’s stockholders, but Awards previously granted may extend beyond that date.
(d) **Amendment of Plan.** The Board may amend, suspend or terminate the Plan or any portion thereof at any time; provided that if at any time the approval of the Company’s stockholders is required as to any modification or amendment under Section 422 of the Code or any successor provision with respect to Incentive Stock Options, the Board may not effect such modification or amendment without such approval. Unless otherwise specified in the amendment, any amendment to the Plan adopted in accordance with this Section 10(d) shall apply to, and be binding on the holders of, all Awards outstanding under the Plan at the time the amendment is adopted, provided the Board determines that such amendment does not materially and adversely affect the rights of Participants under the Plan.

(e) **Authorization of Sub-Plans.** The Board may from time to time establish one or more sub-plans under the Plan for purposes of satisfying applicable blue sky, securities or tax laws of various jurisdictions. The Board shall establish such sub-plans by adopting supplements to this Plan containing (i) such limitations on the Board’s discretion under the Plan as the Board deems necessary or desirable or (ii) such additional terms and conditions not otherwise inconsistent with the Plan as the Board shall deem necessary or desirable. All supplements adopted by the Board shall be deemed to be part of the Plan, but each supplement shall apply only to Participants within the affected jurisdiction and the Company shall not be required to provide copies of any supplement to Participants in any jurisdiction which is not the subject of such supplement.

(f) **Compliance with Code Section 409A.** No Award shall provide for deferral of compensation that does not comply with Section 409A of the Code, unless the Board, at the time of grant, specifically provides that the Award is not intended to comply with Section 409A of the Code. The Company shall have no liability to a Participant, or any other party, if an Award that is intended to be exempt from, or compliant with, Section 409A is not so exempt or compliant or for any action taken by the Board.

(g) **Governing Law.** The provisions of the Plan and all Awards made hereunder shall be governed by and interpreted in accordance with the laws of the State of Delaware, excluding choice-of-law principles of the law of such state that would require the application of the laws of a jurisdiction other than such state.
THIS AMENDMENT (this "Amendment") is an amendment to the Karuna Pharmaceuticals, Inc. 2009 Stock Incentive Plan (as amended, the "Plan"). All capitalized terms used herein and not separately defined shall have the meanings ascribed to them in the Plan.

1. **General.** This Amendment hereby amends the Plan to incorporate the terms and conditions set forth herein. Except as explicitly provided in this Amendment, the Plan will remain unchanged and in full force and effect. The term "Plan" as used in the Plan and all other instruments and agreements executed thereunder shall for all purposes refer to the Plan as amended by this Amendment.

2. **Amendment of Section 4(a).** Section 4(a) of the Plan is hereby amended by replacing the first sentence of Section 4(a) with the following sentence:

   "Subject to adjustment under Section 8, Awards may be made under the Plan for up to 3,011,580 shares of common stock, $0.0001 par value per share, of the Company (the "Common Stock")."

DATE APPROVED BY THE BOARD OF DIRECTORS: March 14, 2019
DATE APPROVED BY THE STOCKHOLDERS: March 14, 2019
1. **Grant of Option.**

   This agreement evidences the grant by Karuna Pharmaceuticals, Inc., a Delaware corporation (the “Company”), on [_______], 200[    ] (the “Grant Date”) to [_______], an [employee], [consultant], [director] of the Company (the “Participant”), of an option to purchase, in whole or in part, on the terms provided herein and in the Company’s 2009 Stock Incentive Plan (the “Plan”), a total of [_______] shares (the “Shares”) of common stock, $0.0001 par value per share, of the Company (“Common Stock”) at [_______] per Share. Unless earlier terminated, this option shall expire at 5:00 p.m., Eastern time, on [_______] (the “Final Exercise Date”).

   It is intended that the option evidenced by this agreement shall not be an incentive stock option as defined in Section 422 of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the “Code”). Except as otherwise indicated by the context, the term “Participant”, as used in this option, shall be deemed to include any person who acquires the right to exercise this option validly under its terms.

2. **Vesting Schedule.**

   This option will become exercisable (“vest”) as to [25]% of the original number of Shares on the [first] anniversary of the Grant Date and as to an additional [6.25]% of the original number of Shares at the end of each successive [three-month] period following the first anniversary of the Grant Date until the [fourth] anniversary of the Grant Date.

   The right of exercise shall be cumulative so that to the extent the option is not exercised in any period to the maximum extent permissible it shall continue to be exercisable, in whole or in part, with respect to all Shares for which it is vested until the earlier of the Final Exercise Date or the termination of this option under Section 3 hereof or the Plan.

3. **Exercise of Option.**

   (a) **Form of Exercise.** Each election to exercise this option shall be accompanied by a completed Notice of Stock Option Exercise in the form attached hereto as Exhibit A, signed by the Participant, and received by the Company at its principal office, accompanied by this Agreement, and payment in full in the manner provided in the Plan. The Participant may purchase less than the number of shares covered hereby, provided that no partial exercise of this option may be for any fractional share.

   (b) **Continuous Relationship with the Company Required.** Except as otherwise provided in this Section 3, this option may not be exercised unless the Participant, at the time he or she exercises this option, is, and has been at all times since the Grant Date, an [employee or officer of], or consultant or advisor to, the Company or any other entity the employees, officers, directors, consultants, or advisors of which are eligible to receive option grants under the Plan (an “Eligible Participant”).
(c) **Termination of Relationship with the Company.** If the Participant ceases to be an Eligible Participant for any reason, then, except as provided in paragraphs (d) and (e) below, the right to exercise this option shall terminate three months after such cessation (but in no event after the Final Exercise Date), **provided that** this option shall be exercisable only to the extent that the Participant was entitled to exercise this option on the date of such cessation. Notwithstanding the foregoing, if the Participant, prior to the Final Exercise Date, violates the non-competition or confidentiality provisions of any employment contract, confidentiality and nondisclosure agreement or other agreement between the Participant and the Company, the right to exercise this option shall terminate immediately upon such violation.

(d) **Exercise Period Upon Death or Disability.** If the Participant dies or becomes disabled (within the meaning of Section 22(e)(3) of the Code) prior to the Final Exercise Date while he or she is an Eligible Participant and the Company has not terminated such relationship for “cause” as specified in paragraph (e) below, this option shall be exercisable, within the period of one year following the date of death or disability of the Participant, by the Participant (or in the case of death by an authorized transferee), **provided that** this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of his or her death or disability, and further provided that this option shall not be exercisable after the Final Exercise Date.

(e) **Termination for Cause.** If, prior to the Final Exercise Date, the Participant’s employment or other relationship with the Company is terminated by the Company for Cause (as defined below), the right to exercise this option shall terminate immediately upon the effective date of such termination of employment or other relationship. If the Participant is party to an employment, consulting or severance agreement with the Company that contains a definition of “cause” for termination of employment or other relationship, “Cause” shall have the meaning ascribed to such term in such agreement. Otherwise, “Cause” shall mean willful misconduct by the Participant or willful failure by the Participant to perform his or her responsibilities to the Company (including, without limitation, breach by the Participant of any provision of any employment, consulting, advisory, nondisclosure, non-competition or other similar agreement between the Participant and the Company), as determined by the Company, which determination shall be conclusive. The Participant’s employment or other relationship shall be considered to have been terminated for “Cause” if the Company determines, within 30 days after the Participant’s resignation, that termination for Cause was warranted.

4. **Company Right of First Refusal.**

   (a) **Notice of Proposed Transfer.** If the Participant proposes to sell, assign, transfer, pledge, hypothecate or otherwise dispose of, by operation of law or otherwise (collectively, “transfer”) any Shares acquired upon exercise of this option, then the Participant shall first give written notice of the proposed transfer (the “Transfer Notice”) to the Company. The Transfer Notice shall name the proposed transferee and state the number of such Shares the Participant proposes to transfer (the “Offered Shares”), the price per share and all other material terms and conditions of the transfer.

   (b) **Company Right to Purchase.** For 30 days following its receipt of such Transfer Notice, the Company shall have the option to purchase all or part of the Offered Shares at the
price and upon the terms set forth in the Transfer Notice. In the event the Company elects to purchase all or part of the Offered Shares, it shall give written notice of such election to the Participant within such 30-day period. Within 10 days after his or her receipt of such notice, the Participant shall tender to the Company at its principal offices the certificate or certificates representing the Offered Shares to be purchased by the Company, duly endorsed in blank by the Participant or with duly endorsed stock powers attached thereto, all in a form suitable for transfer of the Offered Shares to the Company. Promptly following receipt of such certificate or certificates, the Company shall deliver or mail to the Participant a check in payment of the purchase price for such Offered Shares; provided that if the terms of payment set forth in the Transfer Notice were other than cash against delivery, the Company may pay for the Offered Shares on the same terms and conditions as were set forth in the Transfer Notice; and provided further that any delay in making such payment shall not invalidate the Company’s exercise of its option to purchase the Offered Shares.

(c) Shares Not Purchased By Company. If the Company does not elect to acquire all of the Offered Shares, the Participant may, within the 30-day period following the expiration of the option granted to the Company under subsection (b) above, transfer the Offered Shares which the Company has not elected to acquire to the proposed transferee, provided that such transfer shall not be on terms and conditions more favorable to the transferee than those contained in the Transfer Notice. Notwithstanding any of the above, all Offered Shares transferred pursuant to this Section 4 shall remain subject to the right of first refusal set forth in this Section 4 and such transferee shall, as a condition to such transfer, deliver to the Company a written instrument confirming that such transferee shall be bound by all of the terms and conditions of this Section 4.

(d) Consequences of Non-Delivery. After the time at which the Offered Shares are required to be delivered to the Company for transfer to the Company pursuant to subsection (b) above, the Company shall not pay any dividend to the Participant on account of such Offered Shares or permit the Participant to exercise any of the privileges or rights of a stockholder with respect to such Offered Shares, but shall, insofar as permitted by law, treat the Company as the owner of such Offered Shares.

(e) Exempt Transactions. The following transactions shall be exempt from the provisions of this Section 4:

1. any transfer of Shares to or for the benefit of any spouse, child or grandchild of the Participant, or to a trust for their benefit;

2. any transfer pursuant to an effective registration statement filed by the Company under the Securities Act of 1933, as amended (the "Securities Act"); and

3. the sale of all or substantially all of the outstanding shares of capital stock of the Company (including pursuant to a merger or consolidation);

provided, however, that in the case of a transfer pursuant to clause (1) above, such Shares shall remain subject to the right of first refusal set forth in this Section 4.
(f) **Assignment of Company Right.** The Company may assign its rights to purchase Offered Shares in any particular transaction under this Section 4 to one or more persons or entities.

(g) **Termination.** The provisions of this Section 4 shall terminate upon the earlier of the following events:

(1) the closing of the sale of shares of Common Stock in an underwritten public offering pursuant to an effective registration statement filed by the Company under the Securities Act; or

(2) the sale of all or substantially all of the outstanding shares of capital stock, assets or business of the Company, by merger, consolidation, sale of assets or otherwise (other than a merger or consolidation in which all or substantially all of the individuals and entities who were beneficial owners of the Company’s voting securities immediately prior to such transaction beneficially own, directly or indirectly, more than 50% (determined on an as-converted basis) of the outstanding securities entitled to vote generally in the election of directors of the resulting, surviving or acquiring corporation in such transaction).

(h) **No Obligation to Recognize Invalid Transfer.** The Company shall not be required (1) to transfer on its books any of the Shares which shall have been sold or transferred in violation of any of the provisions set forth in this Section 4, or (2) to treat as owner of such Shares or to pay dividends to any transferee to whom any such Shares shall have been so sold or transferred.

(i) **Legends.** The certificate representing Shares shall bear a legend substantially in the following form (in addition to, or in combination with, any legend required by applicable federal and state securities laws and agreements relating to the transfer of the Company securities):

> “The shares represented by this certificate are subject to a right of first refusal in favor of the Company, as provided in a certain stock option agreement with the Company.”

5. **Agreement in Connection with Initial Public Offering.**

The Participant agrees, in connection with the initial underwritten public offering of the Common Stock pursuant to a registration statement under the Securities Act, (i) not to (a) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any other securities of the Company or (b) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of shares of Common Stock or other securities of the Company, whether any transaction described in clause (a) or (b) is to be settled by delivery of securities, in cash or otherwise, during the period beginning on the date of the filing of such registration statement with the Securities and Exchange Commission and ending 180 days after the date of the final prospectus relating to the offering (plus up to an additional 34 days to the extent requested by the managing underwriters for such offering in
order to address Rule 2711(f) of the National Association of Securities Dealers, Inc. or any similar successor provision), and (ii) to execute any agreement reflecting clause (i) above as may be requested by the Company or the managing underwriters at the time of such offering. The Company may impose stop-transfer instructions with respect to the shares of Common Stock or other securities subject to the foregoing restriction until the end of the “lock-up” period.

6. **Withholding.**

No Shares will be issued pursuant to the exercise of this option unless and until the Participant pays to the Company, or makes provision satisfactory to the Company for payment of, any federal, state or local withholding taxes required by law to be withheld in respect of this option.

7. **Transfer Restrictions.**

   (a) This option may not be sold, assigned, transferred, pledged or otherwise encumbered by the Participant, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the lifetime of the Participant, this option shall be exercisable only by the Participant.

   (b) The Participant agrees that he or she will not transfer any Shares issued pursuant to the exercise of this option unless the transferee, as a condition to such transfer, delivers to the Company a written instrument confirming that such transferee shall be bound by all of the terms and conditions of Section 4 and Section 5; provided that such a written confirmation shall not be required with respect to (1) Section 4 after such provision has terminated in accordance with Section 4(g) or (2) Section 5 after the completion of the lock-up period in connection with the Company’s initial underwritten public offering.

8. **Provisions of the Plan.**

This option is subject to the provisions of the Plan (including the provisions relating to amendments to the Plan), a copy of which is furnished to the Participant with this option.
IN WITNESS WHEREOF, the Company has caused this option to be executed under its corporate seal by its duly authorized officer. This option shall take effect as a sealed instrument.

KARUNA PHARMACEUTICALS, INC.

By: ________________________________
Name: ______________________________
Title: ______________________________

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PARTICIPANT’S ACCEPTANCE

The undersigned hereby accepts the foregoing option and agrees to the terms and conditions thereof. The undersigned hereby acknowledges receipt of a copy of the Company’s 2009 Stock Incentive Plan.

PARTICIPANT:

Address: ____________________________________________

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NOTICE OF STOCK OPTION EXERCISE

[DATE]¹

Karuna Pharmaceuticals, Inc.
501 Boylston Street, Suite 6102
Boston, MA 02116

Attention: Treasurer

Dear Sir or Madam:

I am the holder of an [Incentive/Nonstatutory] Stock Option granted to me under the Karuna Pharmaceuticals, Inc. (the “Company”) 2009 Stock Incentive Plan on [_______]² for the purchase of [_______]³ shares of Common Stock of the Company at a purchase price of $[_______]⁴ per share.

I hereby exercise my option to purchase [_______]⁵ shares of Common Stock (the “Shares”), for which I have enclosed [_______]⁶ in the amount of [_______]⁷. Please register my stock certificate as follows:

Name(s): ___________________________ ⁸

Address: ___________________________

_______________________________

I represent, warrant and covenant as follows:

1. I am purchasing the Shares for my own account for investment only, and not with a view to, or for sale in connection with, any distribution of the Shares in violation of the Securities Act of 1933 (the “Securities Act”), or any rule or regulation under the Securities Act.

2. I have had such opportunity as I have deemed adequate to obtain from representatives of the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company.

¹ Enter date of exercise.
² Enter the date of grant.
³ Enter the total number of shares of Common Stock for which the option was granted.
⁴ Enter the option exercise price per share of Common Stock.
⁵ Enter the number of shares of Common Stock to be purchased upon exercise of all or part of the option.
⁶ Enter “cash”, “personal check” or if permitted by the option or Plan, “stock certificates No. XXXX and XXXX”.
⁷ Enter the dollar amount (price per share of Common Stock times the number of shares of Common Stock to be purchased), or the number of shares tendered. Fair market value of shares tendered, together with cash or check, must cover the purchase price of the shares issued upon exercise.
⁸ Enter name(s) to appear on stock certificate in one of the following formats: (a) your name only (i.e., John Doe); (b) your name and other name (i.e., John Doe and Jane Doe, Joint Tenants with Right to Survivorship); or for Nonstatutory Stock Options only, (c) a child’s name, with you as custodian (i.e. Jane Doe, Custodian for Tommy Doe). Note: There may be income and/or gift tax consequences for registering shares in a child’s name.
3. I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and
to make an informed investment decision with respect to such purchase.

4. I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period.

5. I understand that (i) the Shares have not been registered under the Securities Act and are “restricted securities” within the meaning of Rule 144
under the Securities Act, (ii) the Shares cannot be sold, transferred or otherwise disposed of unless they are subsequently registered under the Securities
Act or an exemption from registration is then available; (iii) in any event, the exemption from registration under Rule 144 will not be available for at
least one year and even then will not be available unless a public market then exists for the Common Stock, adequate information concerning the
Company is then available to the public, and other terms and conditions of Rule 144 are complied with; and (iv) there is now no registration statement
on file with the Securities and Exchange Commission with respect to any stock of the Company and the Company has no obligation or current intention
to register the Shares under the Securities Act.

Very truly yours,

[Name]
1. **Grant of Option.**

   This agreement evidences the grant by Karuna Pharmaceuticals, Inc., a Delaware corporation (the “Company”), on [_______], 200[_____] (the “Grant Date”) to [_______], an employee of the Company (the “Participant”), of an option to purchase, in whole or in part, on the terms provided herein and in the Company’s 2009 Stock Incentive Plan (the “Plan”), a total of [_______] shares (the “Shares”) of common stock, $0.0001 par value per share, of the Company (“Common Stock”) at $[_____] per Share. Unless earlier terminated, this option shall expire at 5:00 p.m., Eastern time, on [_______] (the “Final Exercise Date”).

   It is intended that the option evidenced by this agreement shall be an incentive stock option as defined in Section 422 of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the “Code”). Except as otherwise indicated by the context, the term “Participant”, as used in this option, shall be deemed to include any person who acquires the right to exercise this option validly under its terms.

2. **Vesting Schedule.**

   This option will become exercisable (“vest”) as to [25]% of the original number of Shares on the [first] anniversary of the Grant Date and as to an additional [6.25]% of the original number of Shares at the end of each successive [three-month] period following the first anniversary of the Grant Date until the [fourth] anniversary of the Grant Date.

   The right of exercise shall be cumulative so that to the extent the option is not exercised in any period to the maximum extent permissible it shall continue to be exercisable, in whole or in part, with respect to all Shares for which it is vested until the earlier of the Final Exercise Date or the termination of this option under Section 3 hereof or the Plan.

3. **Exercise of Option.**

   (a) **Form of Exercise.** Each election to exercise this option shall be accompanied by a completed Notice of Stock Option Exercise in the form attached hereto as Exhibit A, signed by the Participant, and received by the Company at its principal office, accompanied by this Agreement, and payment in full in the manner provided in the Plan. The Participant may purchase less than the number of shares covered hereby, provided that no partial exercise of this option may be for any fractional share.

   (b) **Continuous Relationship with the Company Required.** Except as otherwise provided in this Section 3, this option may not be exercised unless the Participant, at the time he or she exercises this option, is, and has been at all times since the Grant Date, an employee or officer of, or consultant or advisor to, the Company or any parent or subsidiary of the Company as defined in Section 424(e) or (f) of the Code (an “Eligible Participant”).
(c) **Termination of Relationship with the Company.** If the Participant ceases to be an Eligible Participant for any reason, then, except as provided in paragraphs (d) and (e) below, the right to exercise this option shall terminate three months after such cessation (but in no event after the Final Exercise Date), provided that this option shall be exercisable only to the extent that the Participant was entitled to exercise this option on the date of such cessation. Notwithstanding the foregoing, if the Participant, prior to the Final Exercise Date, violates the non-competition or confidentiality provisions of any employment contract, confidentiality and nondisclosure agreement or other agreement between the Participant and the Company, the right to exercise this option shall terminate immediately upon such violation.

(d) **Exercise Period Upon Death or Disability.** If the Participant dies or becomes disabled (within the meaning of Section 22(e)(3) of the Code) prior to the Final Exercise Date while he or she is an Eligible Participant and the Company has not terminated such relationship for “cause” as specified in paragraph (e) below, this option shall be exercisable, within the period of one year following the date of death or disability of the Participant, by the Participant (or in the case of death by an authorized transferee), provided that this option shall be exercisable only to the extent that this option was exercisable by the Participant on the date of his or her death or disability, and further provided that this option shall not be exercisable after the Final Exercise Date.

(e) **Termination for Cause.** If, prior to the Final Exercise Date, the Participant’s employment is terminated by the Company for Cause (as defined below), the right to exercise this option shall terminate immediately upon the effective date of such termination of employment. If the Participant is party to an employment or severance agreement with the Company that contains a definition of “cause” for termination of employment, “Cause” shall have the meaning ascribed to such term in such agreement. Otherwise, “Cause” shall mean willful misconduct by the Participant or willful failure by the Participant to perform his or her responsibilities to the Company (including, without limitation, breach by the Participant of any provision of any employment, consulting, advisory, nondisclosure, non-competition or other similar agreement between the Participant and the Company), as determined by the Company, which determination shall be conclusive. The Participant’s employment shall be considered to have been terminated for Cause if the Company determines, within 30 days after the Participant’s resignation, that termination for Cause was warranted.

4. **Company Right of First Refusal.**

   (a) **Notice of Proposed Transfer.** If the Participant proposes to sell, assign, transfer, pledge, hypothecate or otherwise dispose of, by operation of law or otherwise (collectively, “transfer”) any Shares acquired upon exercise of this option, then the Participant shall first give written notice of the proposed transfer (the “Transfer Notice”) to the Company. The Transfer Notice shall name the proposed transferee and state the number of such Shares the Participant proposes to transfer (the “Offered Shares”), the price per share and all other material terms and conditions of the transfer.

   (b) **Company Right to Purchase.** For 30 days following its receipt of such Transfer Notice, the Company shall have the option to purchase all or part of the Offered Shares at the price and upon the terms set forth in the Transfer Notice. In the event the Company elects to
purchase all or part of the Offered Shares, it shall give written notice of such election to the Participant within such 30-day period. Within 10 days after his or her receipt of such notice, the Participant shall tender to the Company at its principal offices the certificate or certificates representing the Offered Shares to be purchased by the Company, duly endorsed in blank by the Participant or with duly endorsed stock powers attached thereto, all in a form suitable for transfer of the Offered Shares to the Company. Promptly following receipt of such certificate or certificates, the Company shall deliver or mail to the Participant a check in payment of the purchase price for such Offered Shares; provided that if the terms of payment set forth in the Transfer Notice were other than cash against delivery, the Company may pay for the Offered Shares on the same terms and conditions as were set forth in the Transfer Notice; and provided further that any delay in making such payment shall not invalidate the Company’s exercise of its option to purchase the Offered Shares.

(c) Shares Not Purchased By Company. If the Company does not elect to acquire all of the Offered Shares, the Participant may, within the 30-day period following the expiration of the option granted to the Company under subsection (b) above, transfer the Offered Shares which the Company has not elected to acquire to the proposed transferee, provided that such transfer shall not be on terms and conditions more favorable to the transferee than those contained in the Transfer Notice. Notwithstanding any of the above, all Offered Shares transferred pursuant to this Section 4 shall remain subject to the right of first refusal set forth in this Section 4 and such transferee shall, as a condition to such transfer, deliver to the Company a written instrument confirming that such transferee shall be bound by all of the terms and conditions of this Section 4.

(d) Consequences of Non-Delivery. After the time at which the Offered Shares are required to be delivered to the Company for transfer to the Company pursuant to subsection (b) above, the Company shall not pay any dividend to the Participant on account of such Offered Shares or permit the Participant to exercise any of the privileges or rights of a stockholder with respect to such Offered Shares, but shall, insofar as permitted by law, treat the Company as the owner of such Offered Shares.

(e) Exempt Transactions. The following transactions shall be exempt from the provisions of this Section 4:

(1) any transfer of Shares to or for the benefit of any spouse, child or grandchild of the Participant, or to a trust for their benefit;
(2) any transfer pursuant to an effective registration statement filed by the Company under the Securities Act of 1933, as amended (the "Securities Act"); and
(3) the sale of all or substantially all of the outstanding shares of capital stock of the Company (including pursuant to a merger or consolidation); provided, however, that in the case of a transfer pursuant to clause (1) above, such Shares shall remain subject to the right of first refusal set forth in this Section 4.
(f) **Assignment of Company Right.** The Company may assign its rights to purchase Offered Shares in any particular transaction under this Section 4 to one or more persons or entities.

(g) **Termination.** The provisions of this Section 4 shall terminate upon the earlier of the following events:

(1) the closing of the sale of shares of Common Stock in an underwritten public offering pursuant to an effective registration statement filed by the Company under the Securities Act; or

(2) the sale of all or substantially all of the outstanding shares of capital stock, assets or business of the Company, by merger, consolidation, sale of assets or otherwise (other than a merger or consolidation in which all or substantially all of the individuals and entities who were beneficial owners of the Company’s voting securities immediately prior to such transaction beneficially own, directly or indirectly, more than 50% (determined on an as-converted basis) of the outstanding securities entitled to vote generally in the election of directors of the resulting, surviving or acquiring corporation in such transaction).

(h) **No Obligation to Recognize Invalid Transfer.** The Company shall not be required (1) to transfer on its books any of the Shares which shall have been sold or transferred in violation of any of the provisions set forth in this Section 4, or (2) to treat as owner of such Shares or to pay dividends to any transferee to whom any such Shares shall have been so sold or transferred.

(i) **Legends.** The certificate representing Shares shall bear a legend substantially in the following form (in addition to, or in combination with, any legend required by applicable federal and state securities laws and agreements relating to the transfer of the Company securities):

“The shares represented by this certificate are subject to a right of first refusal in favor of the Company, as provided in a certain stock option agreement with the Company.”

5. **Agreement in Connection with Initial Public Offering.**

The Participant agrees, in connection with the initial underwritten public offering of the Common Stock pursuant to a registration statement under the Securities Act, (i) not to (a) offer, pledge, announce the intention to sell, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any other securities of the Company or (b) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of shares of Common Stock or other securities of the Company, whether any transaction described in clause (a) or (b) is to be settled by delivery of securities, in cash or otherwise, during the period beginning on the date of the filing of such registration statement with the Securities and Exchange Commission and ending 180 days after the date of the final prospectus relating to the offering (plus up to an additional 34 days to the extent requested by the managing underwriters for such offering in
order to address Rule 2711(f) of the National Association of Securities Dealers, Inc. or any similar successor provision), and (ii) to execute any agreement reflecting clause (i) above as may be requested by the Company or the managing underwriters at the time of such offering. The Company may impose stop-transfer instructions with respect to the shares of Common Stock or other securities subject to the foregoing restriction until the end of the “lock-up” period.

6. **Tax Matters.**

(a) **Withholding.** No Shares will be issued pursuant to the exercise of this option unless and until the Participant pays to the Company, or makes provision satisfactory to the Company for payment of, any federal, state or local withholding taxes required by law to be withheld in respect of this option.

(b) **Disqualifying Disposition.** If the Participant disposes of Shares acquired upon exercise of this option within two years from the Grant Date or one year after such Shares were acquired pursuant to exercise of this option, the Participant shall notify the Company in writing of such disposition.

7. **Transfer Restrictions.**

(a) This option may not be sold, assigned, transferred, pledged or otherwise encumbered by the Participant, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the lifetime of the Participant, this option shall be exercisable only by the Participant.

(b) The Participant agrees that he or she will not transfer any Shares issued pursuant to the exercise of this option unless the transferee, as a condition to such transfer, delivers to the Company a written instrument confirming that such transferee shall be bound by all of the terms and conditions of Section 4 and Section 5; provided that such a written confirmation shall not be required with respect to (1) Section 4 after such provision has terminated in accordance with Section 4(g) or (2) Section 5 after the completion of the lock-up period in connection with the Company’s initial underwritten public offering.

8. **Provisions of the Plan.**

This option is subject to the provisions of the Plan (including the provisions relating to amendments to the Plan), a copy of which is furnished to the Participant with this option.
IN WITNESS WHEREOF, the Company has caused this option to be executed under its corporate seal by its duly authorized officer. This option shall take effect as a sealed instrument.

KARUNA PHARMACEUTICALS, INC.

By: 

Name: 
Title: 

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PARTICIPANT'S ACCEPTANCE

The undersigned hereby accepts the foregoing option and agrees to the terms and conditions thereof. The undersigned hereby acknowledges receipt of a copy of the Company’s 2009 Stock Incentive Plan.

PARTICIPANT:

Address:  

- 7 -
Notice of Stock Option Exercise

[DATE]

Karuna Pharmaceuticals, Inc.
501 Boylston Street, Suite 6102
Boston, MA 02116

Attention: Treasurer

Dear Sir or Madam:

I am the holder of an [Incentive/Nonstatutory] Stock Option granted to me under the Karuna Pharmaceuticals, Inc. (the “Company”) 2009 Stock Incentive Plan on [date of grant] for the purchase of [number of shares] shares of Common Stock of the Company at a purchase price of $[price per share] per share.

I hereby exercise my option to purchase [number of shares] shares of Common Stock (the “Shares”), for which I have enclosed $[amount enclosed] in the amount of $[iovationfair market value of stock]. Please register my stock certificate as follows:

Name(s): [enter name(s)]
Address: [enter address]

I represent, warrant and covenant as follows:

1. I am purchasing the Shares for my own account for investment only, and not with a view to, or for sale in connection with, any distribution of the Shares in violation of the Securities Act of 1933 (the “Securities Act”), or any rule or regulation under the Securities Act.

[Enter date of exercise.]
[Enter the date of grant.]
[Enter the total number of shares of Common Stock for which the option was granted.]
[Enter the option exercise price per share of Common Stock.]
[Enter the number of shares of Common Stock to be purchased upon exercise of all or part of the option.]
[Enter “cash”, “personal check” or if permitted by the option or Plan, “stock certificates No. XXXX and XXXX”.]
[Enter the dollar amount (price per share of Common Stock times the number of shares of Common Stock to be purchased), or the number of shares tendered. Fair market value of shares tendered, together with cash or check, must cover the purchase price of the shares issued upon exercise.]
[Enter name(s) to appear on stock certificate in one of the following formats: (a) your name only (i.e., John Doe); (b) your name and other name (i.e., John Doe and Jane Doe, Joint Tenants with Right to Survivorship); or for Nonstatutory Stock Options only, (c) a child’s name, with you as custodian (i.e. Jane Doe, Custodian for Tommy Doe). Note: There may be income and/or gift tax consequences for registering shares in a child’s name.]

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2. I have had such opportunity as I have deemed adequate to obtain from representatives of the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company.

3. I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.

4. I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period.

5. I understand that (i) the Shares have not been registered under the Securities Act and are “restricted securities” within the meaning of Rule 144 under the Securities Act, (ii) the Shares cannot be sold, transferred or otherwise disposed of unless they are subsequently registered under the Securities Act or an exemption from registration is then available; (iii) in any event, the exemption from registration under Rule 144 will not be available for at least one year and even then will not be available unless a public market then exists for the Common Stock, adequate information concerning the Company is then available to the public, and other terms and conditions of Rule 144 are complied with; and (iv) there is now no registration statement on file with the Securities and Exchange Commission with respect to any stock of the Company and the Company has no obligation or current intention to register the Shares under the Securities Act.

Very truly yours,

[Name]
INCENTIVE STOCK OPTION AGREEMENT
UNDER THE KARUNA THERAPEUTICS, INC.
2019 STOCK OPTION AND INCENTIVE PLAN

Name of Optionee: ________________________________
No. of Option Shares: ______________________________
Option Exercise Price per Share: $__________________
[FMV on Grant Date (110% of FMV if a 10% owner)]
Grant Date: ______________________________
Expiration Date: [up to 10 years (5 if a 10% owner)]

Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan as amended through the date hereof (the “Plan”), Karuna Therapeutics, Inc. (the “Company”) hereby grants to the Optionee named above an option (the “Stock Option”) to purchase on or prior to the Expiration Date specified above all or part of the number of shares of Common Stock, par value $0.0001 per share (the “Stock”), of the Company specified above at the Option Exercise Price per Share specified above subject to the terms and conditions set forth herein and in the Plan.

1. Exercisability Schedule. No portion of this Stock Option may be exercised until such portion shall have become exercisable. Except as set forth below, and subject to the discretion of the Administrator (as defined in Section 2 of the Plan) to accelerate the exercisability schedule hereunder, this Stock Option shall be exercisable with respect to the following number of Option Shares on the dates indicated so long as the Optionee remains in a Service Relationship on each such date:

Incremental Number of Option Shares Exercisable* | Exercisability Date
--- | ---
(_____) (___%) | 
(_____) (___%) | 
(_____) (___%) | 
(_____) (___%) | 

* Max. of $100,000 per yr.

Once exercisable, this Stock Option shall continue to be exercisable at any time or times prior to the close of business on the Expiration Date, subject to the provisions hereof and of the Plan.
2. **Manner of Exercise.**

(a) The Optionee may exercise this Stock Option only in the following manner: from time to time on or prior to the Expiration Date of this Stock Option, the Optionee may give written notice to the Administrator of his or her election to purchase some or all of the Option Shares purchasable at the time of such notice. This notice shall specify the number of Option Shares to be purchased.

Payment of the purchase price for the Option Shares may be made by one or more of the following methods: (i) in cash, by certified or bank check or other instrument acceptable to the Administrator; (ii) through the delivery (or attestation to the ownership) of shares of Stock that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to any restrictions under any Company plan and that otherwise satisfy any holding periods as may be required by the Administrator; or (iii) by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the option purchase price, provided that in the event the Optionee chooses to pay the option purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; or (iv) a combination of (i), (ii) and (iii) above. Payment instruments will be received subject to collection.

The transfer to the Optionee on the records of the Company or of the transfer agent of the Option Shares will be contingent upon (i) the Company’s receipt from the Optionee of the full purchase price for the Option Shares, as set forth above, (ii) the fulfillment of any other requirements contained herein or in the Plan or in any other agreement or provision of laws, and (iii) the receipt by the Company of any agreement, statement or other evidence that the Company may require to satisfy itself that the issuance of Stock to be purchased pursuant to the exercise of Stock Options under the Plan and any subsequent resale of the shares of Stock will be in compliance with applicable laws and regulations. In the event the Optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the Optionee upon the exercise of the Stock Option shall be net of the Shares attested to.

(b) The shares of Stock purchased upon exercise of this Stock Option shall be transferred to the Optionee on the records of the Company or of the transfer agent upon compliance to the satisfaction of the Administrator with all requirements under applicable laws or regulations in connection with such transfer and with the requirements hereof and of the Plan. The determination of the Administrator as to such compliance shall be final and binding on the Optionee. The Optionee shall not be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Stock subject to this Stock Option unless and until this Stock Option shall have been exercised pursuant to the terms hereof, the Company or the transfer agent shall have transferred the shares to the Optionee, and the Optionee’s name shall have been entered as the stockholder of record on the books of the Company. Thereupon, the Optionee shall have full voting, dividend and other ownership rights with respect to such shares of Stock.
(c) The minimum number of shares with respect to which this Stock Option may be exercised at any one time shall be 100 shares, unless the number of shares with respect to which this Stock Option is being exercised is the total number of shares subject to exercise under this Stock Option at the time.

(d) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date hereof.

3. Termination of Service Relationship. If the Optionee’s Service Relationship is terminated, the period within which to exercise the Stock Option may be subject to earlier termination as set forth below.

(a) Termination Due to Death. If the Optionee’s employment terminates by reason of the Optionee’s death, any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of death, may thereafter be exercised by the Optionee’s legal representative or legatee for a period of 12 months from the date of death or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of death shall terminate immediately and be of no further force or effect.

(b) Termination Due to Disability. If the Optionee’s Service Relationship terminates by reason of the Optionee’s disability (as determined by the Administrator), any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of termination, may thereafter be exercised by the Optionee for a period of 12 months from the date of termination or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of disability shall terminate immediately and be of no further force or effect.

(c) Termination for Cause. If the Optionee’s Service Relationship terminates for Cause, any portion of this Stock Option outstanding on such date shall terminate immediately and be of no further force and effect. For purposes hereof, “Cause” shall mean, unless otherwise provided in an employment agreement between the Company and the Optionee, a determination by the Administrator that the Optionee shall be dismissed as a result of (i) any material breach by the Optionee of any agreement between the Optionee and the Company; (ii) the conviction of, indictment for or plea of nolo contendere by the Optionee to a felony or a crime involving moral turpitude; or (iii) any material misconduct or willful and deliberate non-performance (other than by reason of disability) by the Optionee of the Optionee’s duties to the Company.

(d) Other Termination. If the Optionee’s Service Relationship terminates for any reason other than the Optionee’s death, the Optionee’s disability, or Cause, and unless otherwise determined by the Administrator, any portion of this Stock Option outstanding on such date may be exercised, to the extent exercisable on the date of termination, for a period of three months from the date of termination or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of termination shall terminate immediately and be of no further force or effect.
The Administrator’s determination of the reason for termination of the Optionee’s Service Relationship shall be conclusive and binding on the Optionee and his or her representatives or legatees.

4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

5. Transferability. This Agreement is personal to the Optionee, is non-assignable and is not transferable in any manner, by operation of law or otherwise, other than by will or the laws of descent and distribution. This Stock Option is exercisable, during the Optionee’s lifetime, only by the Optionee, and thereafter, only by the Optionee’s legal representative or legatee.

6. Status of the Stock Option. This Stock Option is intended to qualify as an “incentive stock option” under Section 422 of the Internal Revenue Code of 1986, as amended (the “Code”), but the Company does not represent or warrant that this Stock Option qualifies as such. The Optionee should consult with his or her own tax advisors regarding the tax effects of this Stock Option and the requirements necessary to obtain favorable income tax treatment under Section 422 of the Code, including, but not limited to, holding period requirements. To the extent any portion of this Stock Option does not so qualify as an “incentive stock option,” such portion shall be deemed to be a non-qualified stock option. If the Optionee intends to dispose or does dispose (whether by sale, gift, transfer or otherwise) of any Option Shares within the one-year period beginning on the date after the transfer of such shares to him or her, or within the two-year period beginning on the day after the grant of this Stock Option, he or she will so notify the Company within 30 days after such disposition.

7. Tax Withholding. The Optionee shall, not later than the date as of which the exercise of this Stock Option becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. The Company shall have the authority to cause the required tax withholding obligation to be satisfied, in whole or in part, by withholding from shares of Stock to be issued to the Optionee a number of shares of Stock with an aggregate Fair Market Value that would satisfy the withholding amount due.

8. No Obligation to Continue Service Relationship. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Optionee in a Service Relationship and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment or Service Relationship of the Optionee at any time.

9. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.
10. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Optionee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Optionee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Optionee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

11. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Optionee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

KARUNA THERAPEUTICS, INC.

By: ____________________________
    ____________________________
    Title: ________________________

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Optionee (including through an online acceptance process) is acceptable.

Dated: __________________________

_______________________________
    Optionee’s Signature

_______________________________
    Optionee’s name and address:

_______________________________

_______________________________

5
Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan as amended through the date hereof (the “Plan”), Karuna Therapeutics, Inc. hereby grants to the Optionee named above an option (the “Stock Option”) to purchase on or prior to the Expiration Date specified above all or part of the number of shares of Common Stock, par value $0.0001 per share (the “Stock”) of the Company specified above at the Option Exercise Price per Share specified above subject to the terms and conditions set forth herein and in the Plan. This Stock Option is not intended to be an “incentive stock option” under Section 422 of the Internal Revenue Code of 1986, as amended.

1. Exercisability Schedule. No portion of this Stock Option may be exercised until such portion shall have become exercisable. Except as set forth below, and subject to the discretion of the Administrator (as defined in Section 2 of the Plan) to accelerate the exercisability schedule hereunder, this Stock Option shall be exercisable with respect to the following number of Option Shares on the dates indicated so long as Optionee remains in a Service Relationship on each such date:

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Once exercisable, this Stock Option shall continue to be exercisable at any time or times prior to the close of business on the Expiration Date, subject to the provisions hereof and of the Plan.


(a) The Optionee may exercise this Stock Option only in the following manner: from time to time on or prior to the Expiration Date of this Stock Option, the Optionee may give written notice to the Administrator of his or her election to purchase some or all of the Option Shares purchasable at the time of such notice. This notice shall specify the number of Option Shares to be purchased.

Payment of the purchase price for the Option Shares may be made by one or more of the following methods: (i) in cash, by certified or bank check or other instrument acceptable to the Administrator; (ii) through the delivery (or attestation to the ownership) of shares of Stock that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to any restrictions under any Company plan and that otherwise satisfy any holding periods as may be required by the Administrator; (iii) by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the option purchase price, provided that in the event the Optionee chooses to pay the option purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; (iv) by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; or (v) a combination of (i), (ii), (iii) and (iv) above. Payment instruments will be received subject to collection.

The transfer to the Optionee on the records of the Company or of the transfer agent of the Option Shares will be contingent upon (i) the Company’s receipt from the Optionee of the full purchase price for the Option Shares, as set forth above, (ii) the fulfillment of any other requirements contained herein or in the Plan or in any other agreement or provision of laws, and (iii) the receipt by the Company of any agreement, statement or other evidence that the Company may require to satisfy itself that the issuance of Stock to be purchased pursuant to the exercise of Stock Options under the Plan and any subsequent resale of the shares of Stock will be in compliance with applicable laws and regulations. In the event the Optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the Optionee upon the exercise of the Stock Option shall be net of the Shares attested to.

(b) The shares of Stock purchased upon exercise of this Stock Option shall be transferred to the Optionee on the records of the Company or of the transfer agent upon compliance to the satisfaction of the Administrator with all requirements under applicable laws or regulations in connection with such transfer and with the requirements hereof and of the Plan. The determination of the Administrator as to such compliance shall be final and binding on the Optionee. The Optionee shall not be deemed to be the holder of, or to have any of the rights of a
holder with respect to, any shares of Stock subject to this Stock Option unless and until this Stock Option shall have been exercised pursuant to the
terms hereof, the Company or the transfer agent shall have transferred the shares to the Optionee, and the Optionee’s name shall have been entered as
the stockholder of record on the books of the Company. Thereupon, the Optionee shall have full voting, dividend and other ownership rights with
respect to such shares of Stock.

(c) The minimum number of shares with respect to which this Stock Option may be exercised at any one time shall be 100 shares, unless the
number of shares with respect to which this Stock Option is being exercised is the total number of shares subject to exercise under this Stock Option at
the time.

(d) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date
hereof.

3. Termination of Service Relationship. If the Optionee’s Service Relationship is terminated, the period within which to exercise the Stock Option
may be subject to earlier termination as set forth below.

(a) Termination Due to Death. If the Optionee’s Service Relationship terminates by reason of the Optionee’s death, any portion of this Stock
Option outstanding on such date, to the extent exercisable on the date of death, may thereafter be exercised by the Optionee’s legal representative or
legatee for a period of 12 months from the date of death or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable
on the date of death shall terminate immediately and be of no further force or effect.

(b) Termination Due to Disability. If the Optionee’s Service Relationship terminates by reason of the Optionee’s disability (as determined by
the Administrator), any portion of this Stock Option outstanding on such date, to the extent exercisable on the date of termination, may thereafter be
exercised by the Optionee for a period of 12 months from the date of disability or until the Expiration Date, if earlier. Any portion of this Stock Option
that is not exercisable on the date of termination shall terminate immediately and be of no further force or effect.

(c) Termination for Cause. If the Optionee’s Service Relationship terminates for Cause, any portion of this Stock Option outstanding on such
date shall terminate immediately and be of no further force and effect. For purposes hereof, “Cause” shall mean, unless otherwise provided in an
employment agreement between the Company and the Optionee, a determination by the Administrator that the Optionee shall be dismissed as a result of
(i) any material breach by the Optionee of any agreement between the Optionee and the Company; (ii) the conviction of, indictment for or plea of nolo
contendere by the Optionee to a felony or a crime involving moral turpitude; or (iii) any material misconduct or willful and deliberate
non-performance (other than by reason of disability) by the Optionee of the Optionee’s duties to the Company.

(d) Other Termination. If the Optionee’s Service Relationship terminates for any reason other than the Optionee’s death, the Optionee’s
disability or Cause, and unless otherwise determined by the Administrator, any portion of this Stock Option outstanding on such date may be exercised,
to the extent exercisable on the date of termination, for a period of three months from the date of termination or until the Expiration Date, if earlier. Any
portion of this Stock Option that is not exercisable on the date of termination shall terminate immediately and be of no further force or effect.
4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

5. Transferability. This Agreement is personal to the Optionee, is non-assignable and is not transferable in any manner, by operation of law or otherwise, other than by will or the laws of descent and distribution. This Stock Option is exercisable, during the Optionee’s lifetime, only by the Optionee, and thereafter, only by the Optionee’s legal representative or legatee.

6. Tax Withholding. The Optionee shall, not later than the date as of which the exercise of this Stock Option becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. The Company shall have the authority to cause the required tax withholding obligation to be satisfied, in whole or in part, by withholding from shares of Stock to be issued to the Optionee a number of shares of Stock with an aggregate Fair Market Value that would satisfy the withholding amount due.

7. No Obligation to Continue Service Relationship. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Optionee in a Service Relationship and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment or Service Relationship of the Optionee at any time.

8. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

9. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Optionee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy
The Optionee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Optionee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

10. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Optionee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

KARUNA THERAPEUTICS, INC.

By: 
Title: 

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Optionee (including through an online acceptance process) is acceptable.

Dated: 

Optionee’s Signature

Optionee’s name and address:
Name of Optionee: 
No. of Option Shares: 
Option Exercise Price per Share: 
[FMV on Grant Date] 
Grant Date: 
Expiration Date: [No more than 10 years] 

Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan as amended through the date hereof (the “Plan”), Karuna Therapeutics, Inc. (the “Company”) hereby grants to the Optionee named above, who is a Director of the Company but is not an employee of the Company, an option (the “Stock Option”) to purchase on or prior to the Expiration Date specified above all or part of the number of shares of Common Stock, par value $0.0001 per share (the “Stock”), of the Company specified above at the Option Exercise Price per Share specified above subject to the terms and conditions set forth herein and in the Plan. This Stock Option is not intended to be an “incentive stock option” under Section 422 of the Internal Revenue Code of 1986, as amended.

1. Exercisability Schedule. No portion of this Stock Option may be exercised until such portion shall have become exercisable. Except as set forth below, and subject to the discretion of the Administrator (as defined in Section 2 of the Plan) to accelerate the exercisability schedule hereunder, this Stock Option shall be exercisable with respect to the following number of Option Shares on the dates indicated so long as the Optionee remains in a Service Relationship on each such date:

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Once exercisable, this Stock Option shall continue to be exercisable at any time or times prior to the close of business on the Expiration Date, subject to the provisions hereof and of the Plan.


(a) The Optionee may exercise this Stock Option only in the following manner: from time to time on or prior to the Expiration Date of this Stock Option, the Optionee may give written notice to the Administrator of his or her election to purchase some or all of the Option Shares purchasable at the time of such notice. This notice shall specify the number of Option Shares to be purchased.

Payment of the purchase price for the Option Shares may be made by one or more of the following methods: (i) in cash, by certified or bank check or other instrument acceptable to the Administrator; (ii) through the delivery (or attestation to the ownership) of shares of Stock that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to any restrictions under any Company plan and that otherwise satisfy any holding periods as may be required by the Administrator; (iii) by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company to pay the option purchase price, provided that in the event the Optionee chooses to pay the option purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Administrator shall prescribe as a condition of such payment procedure; (iv) by a “net exercise” arrangement pursuant to which the Company will reduce the number of shares of Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; or (v) a combination of (i), (ii), (iii) and (iv) above. Payment instruments will be received subject to collection.

The transfer to the Optionee on the records of the Company or of the transfer agent of the Option Shares will be contingent upon (i) the Company’s receipt from the Optionee of the full purchase price for the Option Shares, as set forth above, (ii) the fulfillment of any other requirements contained herein or in the Plan or in any other agreement or provision of laws, and (iii) the receipt by the Company of any agreement, statement or other evidence that the Company may require to satisfy itself that the issuance of Stock to be purchased pursuant to the exercise of Stock Options under the Plan and any subsequent resale of the shares of Stock will be in compliance with applicable laws and regulations. In the event the Optionee chooses to pay the purchase price by previously-owned shares of Stock through the attestation method, the number of shares of Stock transferred to the Optionee upon the exercise of the Stock Option shall be net of the Shares attested to.

(b) The shares of Stock purchased upon exercise of this Stock Option shall be transferred to the Optionee on the records of the Company or of the transfer agent upon compliance with the satisfaction of the Administrator with all requirements under applicable laws or regulations in connection with such transfer and with the requirements hereof and of the Plan. The determination of the Administrator as to such compliance shall be final and binding on the Optionee. The Optionee shall not be deemed to be the holder of, or to have any of the rights of a
holder with respect to, any shares of Stock subject to this Stock Option unless and until this Stock Option shall have been exercised pursuant to the
terms hereof, the Company or the transfer agent shall have transferred the shares to the Optionee, and the Optionee’s name shall have been entered as
the stockholder of record on the books of the Company. Thereupon, the Optionee shall have full voting, dividend and other ownership rights with
respect to such shares of Stock.

(c) The minimum number of shares with respect to which this Stock Option may be exercised at any one time shall be 100 shares, unless the
number of shares with respect to which this Stock Option is being exercised is the total number of shares subject to exercise under this Stock Option at
the time.

(d) Notwithstanding any other provision hereof or of the Plan, no portion of this Stock Option shall be exercisable after the Expiration Date
hereof.

3. Termination of Service Relationship. If the Optionee’s Service Relationship is terminated, the period within which to exercise the Stock Option
may be subject to earlier termination as set forth below.

(a) Termination Due to Death. If the Optionee’s Service Relationship terminates by reason of the Optionee’s death, any portion of this Stock
Option outstanding on such date, to the extent exercisable on the date of death, may thereafter be exercised by the Optionee’s legal representative or
legatee for a period of 12 months from the date of death or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable
on the date of death shall terminate immediately and be of no further force or effect.

(b) Other Termination. If the Optionee’s Service Relationship terminates for any reason other than the Optionee’s death, any portion of this
Stock Option outstanding on such date may be exercised, to the extent exercisable on the date of such termination, for a period of six months from the
date of termination or until the Expiration Date, if earlier. Any portion of this Stock Option that is not exercisable on the date of termination shall
terminate immediately and be of no further force or effect.

4. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Stock Option shall be subject to and governed by all the terms and
conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the
meaning specified in the Plan, unless a different meaning is specified herein.

5. Transferability. This Agreement is personal to the Optionee, is non-assignable and is not transferable in any manner, by operation of law or
otherwise, other than by will or the laws of descent and distribution. This Stock Option is exercisable, during the Optionee’s lifetime, only by the
Optionee, and thereafter, only by the Optionee’s legal representative or legatee.

6. No Obligation to Continue Service Relationship. Neither the Plan nor this Stock Option confers upon the Optionee any rights with respect to
continuance as a Director or continuance of a Service Relationship.
7. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

8. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Optionee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Optionee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Optionee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.
9. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Optionee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

KARUNA THERAPEUTICS, INC.

By: ____________________________

Title: __________________________

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Optionee (including through an online acceptance process) is acceptable.

Dated: __________________________

Optionee’s Signature

Optionee’s name and address:

____________________________________

____________________________________

____________________________________
RESTRICTED STOCK AWARD AGREEMENT
UNDER THE KARUNA THERAPEUTICS, INC.
2019 STOCK OPTION AND INCENTIVE PLAN

Name of Grantee: ________________________________
No. of Shares: ________________________________
Grant Date: ________________________________

Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan (the “Plan”) as amended through the date hereof, Karuna Therapeutics, Inc. (the “Company”) hereby grants a Restricted Stock Award (an “Award”) to the Grantee named above. Upon acceptance of this Award, the Grantee shall receive the number of shares of Common Stock, par value $0.0001 per share (the “Stock”) of the Company specified above, subject to the restrictions and conditions set forth herein and in the Plan. The Company acknowledges the receipt from the Grantee of consideration with respect to the par value of the Stock in the form of cash, past or future services rendered to the Company by the Grantee or such other form of consideration as is acceptable to the Administrator.

1. Award. The shares of Restricted Stock awarded hereunder shall be issued and held by the Company’s transfer agent in book entry form, and the Grantee’s name shall be entered as the stockholder of record on the books of the Company. Thereupon, the Grantee shall have all the rights of a stockholder with respect to such shares, including voting and dividend rights, subject, however, to the restrictions and conditions specified in Paragraph 2 below. The Grantee shall (i) sign and deliver to the Company a copy of this Award Agreement and (ii) deliver to the Company a stock power endorsed in blank.

2. Restrictions and Conditions.
   (a) Any book entries for the shares of Restricted Stock granted herein shall bear an appropriate legend, as determined by the Administrator in its sole discretion, to the effect that such shares are subject to restrictions as set forth herein and in the Plan.
   (b) Shares of Restricted Stock granted herein may not be sold, assigned, transferred, pledged or otherwise encumbered or disposed of by the Grantee prior to vesting.
   (c) If the Grantee’s Service Relationship is voluntarily or involuntarily terminated for any reason (including death) prior to vesting of shares of Restricted Stock granted herein, all shares of Restricted Stock shall immediately and automatically be forfeited and returned to the Company.

3. Vesting of Restricted Stock. The restrictions and conditions in Paragraph 2 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains in a Service Relationship on each such Date. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 2 shall lapse only with respect to the number of shares of Restricted Stock specified as vested on such date.
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Subsequent to such Vesting Date or Dates, the shares of Stock on which all restrictions and conditions have lapsed shall no longer be deemed Restricted Stock. The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 3.

4. **Dividends.** Dividends on shares of Restricted Stock shall be paid currently to the Grantee.

5. **Incorporation of Plan.** Notwithstanding anything herein to the contrary, this Award shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. **Transferability.** This Agreement is personal to the Grantee, is non-assignable and is not transferable in any manner, by operation of law or otherwise, other than by will or the laws of descent and distribution.

7. **Tax Withholding.** The Grantee shall, not later than the date as of which the receipt of this Award becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. Except in the case where an election is made pursuant to Paragraph 8 below, the Company shall have the authority to cause the required tax withholding obligation to be satisfied, in whole or in part, by withholding from shares of Stock to be issued or released by the transfer agent a number of shares of Stock with an aggregate Fair Market Value that would satisfy the withholding amount due.

8. **Election Under Section 83(b).** The Grantee and the Company hereby agree that the Grantee may, within 30 days following the Grant Date of this Award, file with the Internal Revenue Service and the Company an election under Section 83(b) of the Internal Revenue Code. In the event the Grantee makes such an election, he or she agrees to provide a copy of the election to the Company. The Grantee acknowledges that he or she is responsible for obtaining the advice of his or her tax advisors with regard to the Section 83(b) election and that he or she is relying solely on such advisors and not on any statements or representations of the Company or any of its agents with regard to such election.
9. No Obligation to Continue Service Relationship. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Grantee in a Service Relationship and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment or Service Relationship of the Grantee at any time.

10. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

11. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.
12. **Notices.** Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

**KARUNA THERAPEUTICS, INC.**

By:  
Title:  

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated:  
Grantee’s Signature  
Grantee’s name and address:  


Name of Grantee: 
No. of Restricted Stock Units: 
Grant Date: 

Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan as amended through the date hereof (the “Plan”), Karuna Therapeutics, Inc. (the “Company”) hereby grants an award of the number of Restricted Stock Units listed above (an “Award”) to the Grantee named above. Each Restricted Stock Unit shall relate to one share of Common Stock, par value $0.0001 per share (the “Stock”) of the Company.

1. Restrictions on Transfer of Award. This Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of by the Grantee, and any shares of Stock issuable with respect to the Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of until (i) the Restricted Stock Units have vested as provided in Paragraph 2 of this Agreement and (ii) shares of Stock have been issued to the Grantee in accordance with the terms of the Plan and this Agreement.

2. Vesting of Restricted Stock Units. The restrictions and conditions of Paragraph 1 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains in a Service Relationship on each such Dates. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 1 shall lapse only with respect to the number of Restricted Stock Units specified as vested on such date.

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<th>Incremental Number of Restricted Stock Units Vested</th>
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The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 2.

3. Termination of Service Relationship. If the Grantee’s Service Relationship terminates for any reason (including death or disability) prior to the satisfaction of the vesting conditions set forth in Paragraph 2 above, any Restricted Stock Units that have not vested as of such date shall automatically and without notice terminate and be forfeited, and neither the Grantee nor any of his or her successors, heirs, assigns, or personal representatives will thereafter have any further rights or interests in such unvested Restricted Stock Units.
4. Issuance of Shares of Stock. As soon as practicable following each Vesting Date (but in no event later than two and one-half months after the end of the year in which the Vesting Date occurs), the Company shall issue to the Grantee the number of shares of Stock equal to the aggregate number of Restricted Stock Units that have vested pursuant to Paragraph 2 of this Agreement on such date and the Grantee shall thereafter have all the rights of a stockholder of the Company with respect to such shares.

5. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Agreement shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. Tax Withholding. The Grantee shall, not later than the date as of which the receipt of this Award becomes a taxable event for Federal income tax purposes, pay to the Company or make arrangements satisfactory to the Administrator for payment of any Federal, state, and local taxes required by law to be withheld on account of such taxable event. The Company shall have the authority to cause the required tax withholding obligation to be satisfied, in whole or in part, by withholding from shares of Stock to be issued to the Grantee a number of shares of Stock with an aggregate Fair Market Value that would satisfy the withholding amount due.

7. Section 409A of the Code. This Agreement shall be interpreted in such a manner that all provisions relating to the settlement of the Award are exempt from the requirements of Section 409A of the Code as “short-term deferrals” as described in Section 409A of the Code.

8. No Obligation to Continue Service Relationship. Neither the Company nor any Subsidiary is obligated by or as a result of the Plan or this Agreement to continue the Grantee in a Service Relationship and neither the Plan nor this Agreement shall interfere in any way with the right of the Company or any Subsidiary to terminate the employment or Service Relationship of the Grantee at any time.

9. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

10. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the
Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.

11. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

KARUNA THERAPEUTICS, INC.

By: __________________________________________
    Title: _______________________________________

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated: _________________________________________

Grantee’s Signature

Grantee’s name and address:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3
RESTRIC TED STOCK UNIT AWARD AGREEMENT
FOR NON-EMPLOYEE DIRECTORS
UNDER KARUNA THERAPEUTICS, INC.
2019 STO CK OPTION AND INCEN TIVE PLAN

Name of Grantee:

No. of Restricted Stock Units:

Grant Date:

Pursuant to the Karuna Therapeutics, Inc. 2019 Stock Option and Incentive Plan as amended through the date hereof (the “Plan”), Karuna Therapeutics, Inc. (the "Company") hereby grants an award of the number of Restricted Stock Units listed above (an “Award”) to the Grantee named above. Each Restricted Stock Unit shall relate to one share of Common Stock, par value $0.0001 per share (the “Stock”) of the Company.

1. Restrictions on Transfer of Award. This Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of by the Grantee, and any shares of Stock issuable with respect to the Award may not be sold, transferred, pledged, assigned or otherwise encumbered or disposed of until (i) the Restricted Stock Units have vested as provided in Paragraph 2 of this Agreement and (ii) shares of Stock have been issued to the Grantee in accordance with the terms of the Plan and this Agreement.

2. Vesting of Restricted Stock Units. The restrictions and conditions of Paragraph 1 of this Agreement shall lapse on the Vesting Date or Dates specified in the following schedule so long as the Grantee remains in a Service Relationship on each such Date. If a series of Vesting Dates is specified, then the restrictions and conditions in Paragraph 1 shall lapse only with respect to the number of Restricted Stock Units specified as vested on such date.

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The Administrator may at any time accelerate the vesting schedule specified in this Paragraph 2.

3. Termination of Service Relationship. If the Grantee’s Service Relationship terminates for any reason (including death or disability) prior to the satisfaction of the vesting conditions set forth in Paragraph 2 above, any Restricted Stock Units that have not vested as of such date shall automatically and without notice terminate and be forfeited, and neither the
Grantee nor any of his or her successors, heirs, assigns, or personal representatives will thereafter have any further rights or interests in such unvested Restricted Stock Units.

4. Issuance of Shares of Stock. As soon as practicable following each Vesting Date (but in no event later than two and one-half months after the end of the year in which the Vesting Date occurs), the Company shall issue to the Grantee the number of shares of Stock equal to the aggregate number of Restricted Stock Units that have vested pursuant to Paragraph 2 of this Agreement on such date and the Grantee shall thereafter have all the rights of a stockholder of the Company with respect to such shares.

5. Incorporation of Plan. Notwithstanding anything herein to the contrary, this Agreement shall be subject to and governed by all the terms and conditions of the Plan, including the powers of the Administrator set forth in Section 2(b) of the Plan. Capitalized terms in this Agreement shall have the meaning specified in the Plan, unless a different meaning is specified herein.

6. Section 409A of the Code. This Agreement shall be interpreted in such a manner that all provisions relating to the settlement of the Award are exempt from the requirements of Section 409A of the Code as “short-term deferrals” as described in Section 409A of the Code.

7. No Obligation to Continue Service Relationship. Neither the Plan nor this Award confers upon the Grantee any rights with respect to continuance as a Director or continuance of a Service Relationship.

8. Integration. This Agreement constitutes the entire agreement between the parties with respect to this Award and supersedes all prior agreements and discussions between the parties concerning such subject matter.

9. Data Privacy Consent. In order to administer the Plan and this Agreement and to implement or structure future equity grants, the Company, its subsidiaries and affiliates and certain agents thereof (together, the “Relevant Companies”) may process any and all personal or professional data, including but not limited to Social Security or other identification number, home address and telephone number, date of birth and other information that is necessary or desirable for the administration of the Plan and/or this Agreement (the “Relevant Information”). By entering into this Agreement, the Grantee (i) authorizes the Company to collect, process, register and transfer to the Relevant Companies all Relevant Information; (ii) waives any privacy rights the Grantee may have with respect to the Relevant Information; (iii) authorizes the Relevant Companies to store and transmit such information in electronic form; and (iv) authorizes the transfer of the Relevant Information to any jurisdiction in which the Relevant Companies consider appropriate. The Grantee shall have access to, and the right to change, the Relevant Information. Relevant Information will only be used in accordance with applicable law.
10. Notices. Notices hereunder shall be mailed or delivered to the Company at its principal place of business and shall be mailed or delivered to the Grantee at the address on file with the Company or, in either case, at such other address as one party may subsequently furnish to the other party in writing.

KARUNA THERAPEUTICS, INC.

By: __________________________________________
   Title: _______________________________________

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned. Electronic acceptance of this Agreement pursuant to the Company’s instructions to the Grantee (including through an online acceptance process) is acceptable.

Dated: _______________________________________

Grantee’s Signature

Grantee’s name and address:

_____________________________________________

_____________________________________________
CERTAIN IDENTIFIED INFORMATION HAS BEEN EXCLUDED (INDICATED BY: [ *** ]) FROM THE EXHIBIT BECAUSE IT IS BOTH (I) NOT MATERIAL AND (II) WOULD LIKELY CAUSE COMPETITIVE HARM IF PUBLICLY DISCLOSED.

Exhibit 10.10

CONFIDENTIAL

LICENSE AGREEMENT

THIS LICENSE AGREEMENT (the “Agreement”) is made effective as of May 9, 2012 (the “Effective Date”), by and between Eli Lilly and Company, an Indiana corporation (“Lilly”) having an address at Lilly Corporate Center, Indianapolis, Indiana 46285, and Karuna Pharmaceuticals, Inc., a Delaware corporation (“Karuna”) having an address at 500 Boylston Street, Suite 1600, Boston, MA 02116, USA.

RECITALS

WHEREAS, Lilly is the owner of certain data, regulatory Filings and patent rights relating to Xanomeline (as defined below);

WHEREAS, Karuna desires to obtain certain rights to such data, regulatory filings and patent rights and Lilly is willing to grant the same to the Karuna upon the terms and conditions hereinafter set forth.

NOW, THEREFORE, the Parties hereby agree as follows:

Article I DEFINITIONS

As used herein, the following terms have the following meanings (with derivative forms being interpreted accordingly):

Section 1.01 “$” and “Dollars” means United States dollars.

Section 1.02 “Affiliate” means, with respect to a given entity, any other entity that, directly or indirectly, through one or more intermediaries, controls, is controlled by or is under common control with such first given entity. For this purpose, “control” shall mean the ownership of more than fifty percent (50%) of the voting securities entitled to elect the directors or management of the entity, or the actual power to elect or direct the management or policies of the entity.

Section 1.03 “Business Day” shall mean any Monday, Tuesday, Wednesday, Thursday or Friday that is not a national holiday in the United States.

Section 1.04 “Confidential Information” means, subject to the limitations set forth in Section 6.01, all confidential or proprietary information received by a Party pursuant to this Agreement from the other Party whether in oral, written, graphic or electronic form, including the following types of information: any preclinical data, clinical data, manufacturing information, trade secret information, invention, idea, sample, assay component, process, formula, or test data; or other information relating to any research project, work in progress or development, manufacturing, regulatory, marketing, servicing, financing or personnel matter relating to the disclosing Party, its research programs or current or future products, sales, suppliers, clients, customers, employees, collaborators, investors or business. Any information disclosed under the Prior CDA shall be deemed disclosed under this Agreement for purposes of this definition.
Section 1.05    “EMEA” means European Medicines Evaluation Agency, or any successor thereto.

Section 1.06    “FDA” means the United States Food and Drug Administration, or any successor thereto.

Section 1.07    “First Commercial Sale” means, with respect to any particular country, the first sale of a Product in such country by any of Karuna, an Affiliate, or a Sublicensee, or a distributor of any of them, after all Regulatory Approvals have been granted in such country for such Product to be marketed and sold legally as a pharmaceutical in such country.

Section 1.08    “IND” means (i) an Investigational New Drug Application as defined in the United States Food, Drug and Cosmetic Act and applicable regulations promulgated thereunder by the FDA or (ii) the equivalent application to the equivalent agency in any other country or group of countries, the filing of which is necessary to commence clinical testing of a pharmaceutical product in humans in a particular jurisdiction.

Section 1.09    “JMHW” means the Japanese Ministry of Health and Welfare, or any successor entity.

Section 1.10    “Major Market Country” means any of the United States, Japan, France, Germany, the United Kingdom, Canada, Italy, and Spain.

Section 1.11    “Net Sales” means [ *** ]
Section 1.12 “Party” means Lilly or Karuna, and “Parties” means both of them.

Section 1.13 “Patent Rights” shall mean all of Lilly’s right, title and interest in:

(a) the patents listed on Exhibit A and their foreign counterparts;

(b) any divisional, continuations, continuation-in-part applications, or any other application claiming priority to one or more of the patents listed on Exhibit A to the extent the claims are directed to subject matter specifically described in the patents listed on Exhibit A, and the resulting patents; and

(c) any patents resulting from reissues, reexaminations, extensions, or restorations (and their relevant international equivalents) of the patents described in (a) and (b) above.

Section 1.14 “Product” means, regardless of form or formulation, all pharmaceutical compositions for use in humans that contain Xanomeline.

Section 1.15 “Xanomeline IND” means IND 36,999 and IND 48,761 in the name of Lilly.

Section 1.16 “Prior CPA” means that certain Confidential Disclosure Agreement between Karuna and Lilly dated [ *** ]

Section 1.17 “Regulatory Agency” means a supranational, regional, federal, state, provincial or other local regulatory agency, department, bureau or other governmental authority with jurisdiction over Regulatory Approvals, including without limitation the FDA, EMEA and the JMHW.

Section 1.18 “Regulatory Approval” means, collectively with respect to a particular jurisdiction, all governmental approvals (including all pricing and reimbursement approvals practically required to launch in the country), product and/or establishment licenses, registrations or authorizations necessary for the manufacture, use, storage, import, export, transport, marketing and sale of a pharmaceutical product as a pharmaceutical in such jurisdiction. For the avoidance of doubt, if Regulatory Approval for a particular jurisdiction consists of multiple components (for example, approval of both the manufacturing process used to produce the drug in the facility where it is used and in addition approval of the safety and efficacy of the drug itself and permission to market it), the Regulatory Approval for such jurisdiction for purposes of this Agreement is not deemed to occur until the last component is approved.
Section 1.19 "Xanomeline Data" means (a) all data referred to in Exhibit B and (b) all material data files reasonably accessible to Lilly and relating to Xanomeline that, in Lilly’s good faith determination, would reasonably be expected to have a material effect on the clinical, regulatory or commercial development of Xanomeline by Karuna.

Section 1.20 "Lilly Transfer Contact" means the individual designated in writing by Lilly to respond to Karuna’s requests regarding transfer of and access to Xanomeline Data and the Xanomeline IND.

Section 1.21 "Royalty Term" means, on a country-by-country basis, if any Products are sold in, and for use in, a country in which Karuna then holds no data package exclusivity that provides effective market exclusivity with respect to such Product(s) in such country, the period from the Effective Date until the six (6) year anniversary of the First Commercial Sale of the first Product in such country by or on behalf of Karuna, its Affiliate or its or its Affiliate’s Sublicensee. If data package exclusivity exists for a period longer than six (6) years, then the Royalty Term shall be for the term of such data package exclusivity.

Section 1.22 "Sublicensee"* means any Third Party to which Karuna grants a sublicense (or otherwise transfer rights hereunder) under the Patent Rights, the Xanomeline Data and the Xanomeline IND.

Section 1.23 "Term" means the term of this Agreement, as determined in accordance with Article 10.

Section 1.24 "Third Party." means any entity or person other than Lilly, Karuna, or an Affiliate of either of them.
Section 1.25  “Xanomeline” means a compound of the formula:

\[
\begin{align*}
\text{--- & --- & --- & --- & --- & --- & ---} \\
\text{--- & --- & --- & --- & --- & --- & ---} \\
\text{--- & --- & --- & --- & --- & --- & ---} \\
\text{--- & --- & --- & --- & --- & --- & ---} \\
\end{align*}
\]

or a pharmaceutically acceptable salt or solvate thereof

Article II  DEVELOPMENT AND COMMERCIALIZATION

Section 2.01  Development. Karuna shall use commercially reasonable efforts to develop Product and shall conduct all research and development activities and manufacture and supply of, all Product consistent with current industry standards and all applicable U.S. federal laws, rules and regulations including, but not limited to, cGMP and all applicable laws and regulations in the other legal jurisdictions in which Karuna intends to market and sell Products. Each year, on the anniversary of the Effective Date, Karuna shall provide Lilly with a written report describing the progress made with respect to its development of Product.

Section 2.02  Commercialization. Karuna shall use commercially reasonable efforts to commercialize the Product in each Major Market Country (including, without limitation, obtaining all Registrations necessary to market and sell the Product in each such country and conducting any post-marketing studies required by any Regulatory Authorities in any Major Market Country). Karuna also shall use commercially reasonable efforts and proceed diligently to launch the Product in each Major Market Country as soon as reasonably possible upon registration of Product in such country and to perform such obligations by using, without limitation, personnel with sufficient skills and experience, together with sufficient equipment and facilities,

Article III  SCOPE OF LICENSE

Section 3.01  Transfer of Xanomeline Data and Xanomeline IND. Lilly hereby transfers to Karuna all of its right, title and interest to the Xanomeline Data and the Xanomeline IND. Lilly will deliver to Karuna copies of the Xanomeline Data and the Xanomeline IND as soon as reasonably practicable following the Effective Date, but no later than [ *** ] following the Effective Date.
Section 3.02 License Grant. Lilly hereby grants to Karuna and its Affiliates for the Term a royalty-bearing exclusive license (even as against Lilly) under the Patent Rights to research, develop, make, have made, use, offer for sale, sell, lease, import and otherwise exploit Products.

Section 3.03 Retention of Rights. Notwithstanding Section 3.01 and 3.02, Lilly hereby retains the right to use the Xanomeline Data for internal research purposes, including for use in [***].

Section 3.04 Sublicenses. Karuna shall be entitled to sublicense (or otherwise transfer) the rights granted to it hereunder to Affiliates or Third Parties without the need to obtain consent from Lilly. Each sublicense shall be subject to the terms and conditions of this Agreement and shall be consistent with this Agreement. Provided, however, that no sublicense granted by Karuna shall be valid unless: (i) the Sublicensee shall guarantee and be responsible for, as applicable, the performance of, or the making of all payments due and the making of any reports under this Agreement with respect to sales of Product by its Affiliates and Sublicensees and, in each case, the Affiliates and Sublicensees compliance with all applicable terms of this Agreement; and (ii) as applicable, each Affiliate or Sublicensee agrees in writing to maintain books and records and permit Lilly to review such books and records pursuant to the relevant provisions, and to observe all other applicable terms, of this Agreement. Karuna shall promptly provide Lilly with notice of any sublicense granted pursuant to this Section 3.04, and provide a copy of the applicable agreement to Lilly upon its request. Karuna shall be entitled to grant to its Sublicensees the right further to sublicense; provided that the further sublicensees and sub-sublicensees shall be considered “Sublicensees” under this Agreement for purposes of the Net Sales definition and other provisions in this Agreement that refer to “Sublicensees.”

Section 3.05 Exclusivity Covenants.

(a) Lilly hereby covenants that prior to the expiration of the Royalty Term under this Agreement, Lilly and its Affiliates shall not (i) grant any Third Party any license with respect to any of the Patent Rights, and shall not grant any Third Party any right to access, reference, inspect or otherwise use or rely upon the Xanomeline Data or the Xanomeline IND; nor (ii) use, practice or refer to any of the Xanomeline Data and the Xanomeline IND in any activities to research, develop, prepare or submit an IND (or like regulatory filing) for, apply for (or hold) Regulatory Approval for, make, have made, use, sell, offer to sell, import, export or otherwise commercialize Xanomeline anywhere in the world, other than as permitted under Section 3.03 hereof.
Lilly hereby acknowledges on behalf of itself and its Affiliates that the covenants of this Section 3.05 are legally enforceable and reasonable, necessary and appropriate to prevent a breach of the exclusivity provided to Karuna hereunder, as well as to protect Karuna’s Confidential Information.

Section 3.06 Technical Support and Letter of Authorization.

(a) Technical Support. In response to Karuna’s queries to the Lilly Transfer Contact, Lilly shall make personnel most knowledgeable in the applicable area reasonably available to Karuna to discuss any questions Karuna may have regarding the Xanomeline Data and the Xanomeline IND.

(b) Requested Data. Karuna shall address all requests for information and meetings to the Lilly Transfer Contact (who will provide to Karuna the information requested by Karuna and will make reasonable efforts to arrange meetings with and make available the appropriate person or people to answer such requests from Karuna and/or to discuss any documentation that has been provided and answer follow-up questions). The assistance described in this section (b) shall be limited to a maximum of [***] on an FTE basis.

(c) Letters of Authorization. Lilly shall, as soon as reasonably practicable, but in any event within [***] receiving a written request by Karuna, provide any letters of transfer and authorization to FDA Karuna may request, transferring the Xanomeline IND to Karuna and authorizing Karuna and its Affiliates to reference the Xanomeline IND in its filings with Regulatory Agencies.

(d) Later Access Required by Regulatory Agencies. At all times during the Term, in addition to Section 3.05(c) assistance, in response to Karuna’s request due to a Regulatory Agency request or inquiry (as such request or inquiry will be evidenced by Karuna), if there is information that may be in Lilly’s possession (but not in Karuna’s possession) that is needed to respond to that request, Lilly will give access to Karuna to the available information that Lilly has at that time in its possession (without any requirement to generate new data). Such access will be granted during normal business hours and upon reasonable request from Karuna.

Section 3.07 Regulatory Matters. As between the Parties, Karuna shall have the sole right to communicate with Regulatory Agencies regarding Products developed or commercialized by Karuna, its Affiliates and Sublicensees, to seek Regulatory Approvals for such Products and to own such Regulatory Approvals. Lilly shall not perform any clinical trials or other activities under the Xanomeline IND during such time. Except as requested in writing by Karuna or as otherwise required by law or in accordance with Section 3.03, Lilly and its Affiliates shall not communicate with any Regulatory Agency in any country of the world with respect to Xanomeline and/or a Product.

Section 3.08 Misappropriation of Xanomeline Data and Xanomeline IND by Third Parties. Each Party shall promptly notify the other Party in writing of any alleged, threatened or actual misappropriation of, theft, unauthorized access to, or breach of confidentiality and/or non-use
obligations with respect to the Xanomeline Data and the Xanomeline IND by Third Parties of which the reporting Party becomes aware. The reporting Party shall provide all information available to that Party relating to such activities by the Third Party. Karuna (or its Affiliate or Sublicensee) shall have the first right, but not the obligation, to initiate, prosecute and control any action during the Term with respect to such misappropriation, by counsel of its own choice and at its own expense, to secure the cessation of the infringement or to bring suit against the infringer. If requested by Karuna, Lilly shall provide reasonable assistance to Karuna in such suits, including being joined as a party plaintiff and being named as the lead in such action if requested by Karuna in cases where that would be required in order for the suit to be maintained Karuna shall reimburse all reasonable expenses (including reasonable attorney’s fees) of such cooperation of Lilly. Any damages or other monetary awards recovered in a suit prosecuted by Karuna, its Affiliate or Sublicensee under this Section shall be retained by Karuna.

Article IV   FINANCIAL TERMS

Section 4.01  Up-Front Payment. Within [ *** ] after the Effective Date, Karuna shall pay to Lilly one hundred thousand dollars ($100,000).

Section 4.02  Milestone Payments. Karuna, its Affiliate or its Sublicensee, as applicable, shall pay to Lilly the following amounts (each a “Milestone Payment”) upon the achievement by Karuna, such Affiliate or such Sublicensee of the following milestones:

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Amount Paid to Lilly</th>
</tr>
</thead>
<tbody>
<tr>
<td>First FDA Regulatory Approval of a Product</td>
<td>[ *** ]</td>
</tr>
<tr>
<td>First EMEA Regulatory Approval of a Product</td>
<td>[ *** ]</td>
</tr>
<tr>
<td>First JMHW Regulatory Approval of a Product</td>
<td>[ *** ]</td>
</tr>
<tr>
<td>Cumulative Net Sales of a Product, including a Combination Product, first reach [ *** ]</td>
<td>[ *** ]</td>
</tr>
<tr>
<td>Annual Net Sales of a Product, including a Combination Product, first reach [ *** ]</td>
<td>[ *** ]</td>
</tr>
</tbody>
</table>

The above payments shall be due one (1) time only, regardless of whether achieved multiple times, by multiple entities or with respect to multiple Products.

Section 4.03  Royalty Payments. Karuna, its Affiliates and its Sublicensees, as applicable, shall pay Lilly a royalty on Net Sales on a country by country basis (to avoid doubt, solely those Net Sales that are during the Royalty Term in such country) at a rate based on the level of aggregate worldwide Net Sales of Products according to the following table;
<table>
<thead>
<tr>
<th>Net Sales in Calendar Year of a Product</th>
<th>Royalty Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than [***]</td>
<td>[***]</td>
</tr>
<tr>
<td>Between [<em><strong>] and [</strong></em>]</td>
<td>[***]</td>
</tr>
<tr>
<td>Between [<em><strong>] and [</strong></em>]</td>
<td>[***]</td>
</tr>
<tr>
<td>Between [<em><strong>] and [</strong></em>]</td>
<td>[***]</td>
</tr>
<tr>
<td>Greater than [***]</td>
<td>[***]</td>
</tr>
</tbody>
</table>

By way of example, if Karuna’s, its Affiliates and its Sublicensee’s Net Sales of Products in year X amount to [***], Karuna, its Affiliates and its Sublicensees, as applicable, would pay Lilly royalties in the amount of [***] (calculated as [***] of [***] (i.e. [***] plus [***] of [***] (i.e. [***], plus [***] of [***] (i.e., [***]).

**Section 4.04 Payment; Reports.** All royalty amounts payable to Lilly under Section 4.03 shall be paid within [***] after the end of each calendar quarter during the Royalty Term with respect to Net Sales invoiced during such calendar quarter. Each payment of royalty payments shall be accompanied by a statement of Net Sales underlying the royalty that is due, including Net Sales and royalty by country broken down between Licensee and any sub-licensee.

**Section 4.05 Exchange Rate; Manner and Place of Payment.** All payments due hereunder shall be paid in Dollars. For purposes of computing such payments, the Net Sales in currencies other than Dollars shall be converted into Dollars as computed using Karuna’s internal currency conversion systems in accordance with GAAP using the average monthly rate of exchange at the time for such currencies as the rate applicable to the transfer of funds arising from payments as published in the Wall Street Journal. The currency conversion system used by Karuna shall be subject to audit by Lilly as described in Section 4.06. In any country where conversion of the local currency is blocked and such currency cannot be removed from the country, Karuna shall pay Lilly in local currency by deposit in a local bank account designated by Lilly. All payments other than those specified in the foregoing sentence shall be payable to Lilly by wire transfer, in immediately available funds, at such bank as Lilly shall specify from time to time.

**Section 4.06 Records and Audit.** Karuna and its Affiliates shall keep complete and accurate records pertaining to the sale or other disposition of Products and of the royalty payments due under this Agreement in sufficient detail to permit Lilly to confirm the accuracy of all payments due hereunder (and Karuna shall have its Sublicensees keep same records, consistent with Karuna’s obligations under this Section 4.06). Lilly shall have the right, at its expense, to cause an independent, certified public accountant to audit such records necessary to confirm Karuna’s, its Affiliates and its and its Affiliate’s Sublicensees Net Sales and royalty.
payments for the preceding years. Such independent, certified public accountant shall be bound by appropriate confidentiality and non-use obligations. Such audit rights may be exercised no more often than [***] a year, once with respect to records regarding any given accounting period, within [***] after the calendar year to which such records relate, upon reasonable advance notice to Karuna and during normal business hours. The terms of this Section 4.06 shall survive any termination or expiration or termination of this Agreement for a period of [***].

If it is determined that additional royalties are owed, or that royalties were overpaid, during such period, Karuna will pay Lilly the additional royalties, or Lilly will pay Karuna the overpaid royalties within [***] of the date the independent certified public accountants written report is received by the paying party. The fees charged by such accounting firm will be paid by Lilly unless any additional royalties owed exceed [***] the royalties paid for the royalty period subject to the audit, in which case Karuna will pay the reasonable fees of the accounting firm.

Section 4.07 Withholding Taxes. If laws or regulations require that taxes be withheld from milestones and/or royalty payments due to Lilly hereunder, Karuna will (a) deduct those taxes from the remittable payment due to Lilly, (b) pay the taxes to the proper taxing authority, and (c) send evidence of the obligation together with proof of tax payment to Lilly within [***] following that tax payment, all the foregoing in such a manner that will enable Lilly to have proof that it may use to reduce to the extent legally possible the amount withheld by Karuna and to recuperate the tax credit equivalent to the amount so withheld.

Article V REPRESENTATIONS AND WARRANTIES

Section 5.01 Mutual Representations and Warranties. Each Party hereby represents and warrants to the other Party that:

(a) Corporate Existence and Power. The representing and warranting Party is a corporation duly organized, validly existing and in good standing under the laws of the state in which it is incorporated, and has full corporate power and authority and the legal right to own and operate its property and assets and to carry on its business as it is now being conducted and as contemplated in this Agreement, including, without limitation, the right to grant the licenses granted or contemplated to be granted hereunder.

(b) Authority and Binding Agreement. As of the Effective Date, (i) it has the corporate power and authority and the legal right to enter into this Agreement and perform its obligations hereunder; (ii) it has taken all necessary corporate action on its part required to authorize the execution and delivery of the Agreement and the performance of its obligations hereunder; and (iii) the Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid and binding obligation of such Party and is enforceable against it in accordance with its terms.

(c) No Conflict. It has not entered (and covenants that it shall not enter) into any agreement with any Third Party that is in conflict with the rights granted or contemplated to
be granted to the other Party under this Agreement, and has not taken (and covenants that it shall not take) any action that would in any way prevent it from granting the rights granted or contemplated to be granted to the other Party under this Agreement, or that would otherwise materially conflict with or adversely affect the rights granted or contemplated to be granted to the other Party under this Agreement.

Section 5.02 **DISCLAIMER OF CERTAIN WARRANTIES.** LILLY IS TRANSFERRING ALL RIGHTS HEREUNDER “AS IS.” NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION MADE OR WARRANTY GIVEN BY LILLY: (A) THAT THE PRACTICE BY KARUNA OF THE RIGHTS GRANTED HEREUNDER WILL NOT INFRINGE THE PATENT RIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY, (B) REGARDING THE VALIDITY OR SCOPE OF THE PATENT RIGHTS OR THE FREEDOM TO OPERATE AND PRACTICE THE PATENT RIGHTS IN VIEW OF PATENTS OR OTHER INTELLECTUAL PROPERTY OWNED BY THIRD PARTIES, OR (C) THAT COMMERCIALLY ACCEPTABLE RESULTS WILL BE OBTAINED IN USING OR PRACTICING THE PATENT RIGHTS AND OTHER INTELLECTUAL PROPERTY RIGHTS. OTHER THAN AS EXPRESSLY PROVIDED IN THIS AGREEMENT, LILLY MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, AND HEREBY EXPRESSLY DISCLAIMS ANY OTHER WARRANTIES, REPRESENTATIONS, OR WARRANTIES OF ANY KIND AS TO THE PATENT RIGHTS, KNOW-HOW AND OTHER INTELLECTUAL PROPERTY PROVIDED HEREUNDER, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NOTWITHSTANDING ANY PROVISION CONTAINED IN THIS AGREEMENT, LILLY MAKES NO REPRESENTATIONS AND GIVES NO WARRANTIES THAT THE XANOMELINE DATA OR XANOMELINE IND ARE SUITABLE FOR SUBMISSION TO, OR WILL DEEM ACCEPTABLE TO, ANY REGULATORY AGENCY.

Section 5.03 **Disclaimer of Warranties.** EXCEPT FOR THE REPRESENTATIONS AND WARRANTIES EXPLICITLY SET FORTH HEREIN, EACH OF LILLY AND KARUNA HEREBY EXPRESSLY DISCLAIMS ALL REPRESENTATIONS AND WARRANTIES, EXPRESS, STATUTORY OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Article VI INDEMNIFICATION

Section 6.01 **Indemnification by Karuna.** Karuna shall indemnify Lilly, its Affiliates, and their respective officers, directors, employees and agents (the “Lilly Indemnitees”) from and against any and all Losses resulting from any Third Party Claim against them to the extent that such Third Party Claim arises out of (i) the research, development, manufacture, storage, distribution or sale of products developed or commercialized hereunder by Karuna (including product liability (including that which is for personal injury or death) resulting from such activities); (ii) the breach or alleged breach of this Agreement; or (iii) the negligence or willful misconduct of Karuna; provided that the Lilly Indemnitees comply with the procedure set forth in Section 6.02.
Section 6.02  Mechanics. The Lilly Indemnitee is entitled to be indemnified pursuant to this Article 6 by providing prompt notice of the Third Party Claim to Karuna and Karuna shall defend against such Third Party Claim with the reasonable cooperation of Lilly; provided that Karuna shall not settle any such Third Party Claim for anything other than money damages without the prior written consent of Lilly, which consent shall not be unreasonably withheld, conditioned or delayed. Lilly shall have the right to be present in person or through counsel at substantive legal proceedings relating to the Third Party Claim giving rise to Lilly’s right to indemnification hereunder. If the Parties cannot agree as to the application of Sections 6.01 and 6.02 to any Loss or Third Party Claim, the Parties may conduct separate defenses of such Third Party Claim. In such case, each Party further reserves the right to claim indemnity from the other in accordance with Sections 6.01 and 6.02 upon resolution of such underlying Third Party Claim.

Section 6.03  Limitation of Liability. In no event shall Karuna or its Affiliates and Sublicensees be liable for special, exemplary, consequential or punitive damages, whether in contract, warranty, tort, strict liability or otherwise, except to the extent that such damages arise from breach of the obligations set forth in Article 9 (regarding confidentiality). It is understood and agreed that if Lilly is entitled to indemnification under this Article 6 for amounts Karuna is required to pay to a Third Party, this limitation of liability in no way removes the right to indemnity; the payments to the Third Party in that case are considered direct damages for purposes of this limitation of liability.

Article VII  PATENT PROSECUTION

Section 7.01  Responsibility for Patent Rights. Karuna shall have the right to prepare, file, prosecute and maintain, in its sole discretion, all of the Patent Rights. Lilly shall have reasonable opportunities to advise Karuna and shall reasonably cooperate with Karuna in such filing, prosecution and maintenance.

Section 7.02  Payment of Expenses. Payment of all fees and costs, including attorneys fees, incurred after the Effective Date relating to the filing, prosecution and maintenance of the Patent Rights shall be the responsibility of Karuna.

Article VIII  INFRINGEMENT

Section 8.01  Notification of Infringement. Each Party agrees to provide written notice to the other Party promptly after becoming aware of any infringement of the Patent Rights.

Section 8.02  Right to Prosecute Infringements.

(a)  Company Right to Prosecute. So long as Karuna remains the exclusive licensee of the Patent Rights, Karuna, to the extent permitted by law, shall have the right, under its own control and at its own expense, to prosecute any third party infringement of the Patent Rights, subject to Section 8.04. If required by law, Lilly shall permit any action under this Section to be brought in its name, including being joined as a party-plaintiff, provided that Karuna shall hold Lilly harmless from, and indemnify Lilly against, any costs, expenses, or
liability that Lilly incurs in connection with such action. Prior to commencing any such action, Karuna shall consult with Lilly and shall consider the views of Lilly regarding the advisability of the proposed action and its effects. Karuna shall not enter into any settlement, consent judgment, or other voluntary final disposition of any infringement action under this Section 8.02 which admits the invalidity or unenforceability of any Patent Rights without the prior written consent of Lilly. If Karuna does not take commercially reasonable steps to abate the infringement of such Patent Rights within [***] from any infringement notice from Lilly, based upon Karuna’s determination that such action would be commercially unreasonable and Karuna provides Lilly its reasons therefor in writing, then Karuna shall not have the obligation to take any such action or institute any proceeding. In this regard, Karuna shall be entitled to use its reasonable commercial discretion in determining (a) whether to contact and/or institute any action or proceeding against an alleged infringer; (b) the timing of any contact with an alleged infringer or action or proceeding to be instituted against an alleged infringer; (c) the location of any action or proceeding to be instituted against an alleged infringer; and (d) if there is more than one alleged infringer, which alleged infringer to contact regarding its alleged infringement or against which any action or proceeding is to be brought. It is further understood and agreed that, during such time as Karuna is pursuing any action or proceeding against one alleged infringer, Karuna shall have no obligation to contact or pursue additional alleged infringers.

(b) **Lilly Right to Prosecute.** In the event that Karuna is unsuccessful in persuading the alleged infringer to desist or fails to have initiated an infringement action within the time provided in Section 8.02(a) above and the infringement is open, obvious and financially material, Lilly shall have the right, at its sole discretion, to prosecute such infringement under its sole control and at its sole expense, and any recovery obtained shall belong to Lilly.

Section 8.03 **Declaratory Judgment Actions.** In the event that a declaratory judgment action is brought against Lilly or Karuna by a third party alleging invalidity, unenforceability, or non-infringement of the Patent Rights, Lilly, at its option, shall have the right within twenty (20) days after commencement of such action to take over the sole defense of the action at its own expense. If Lilly does not exercise this right, Karuna may take over the sole defense of the action if it deems it to be in the best interest of Karuna.

Section 8.04 **Recovery.** Any recovery obtained in an action brought by Karuna under Sections 8.02 or 8.03 shall be distributed as follows: (i) each Party shall first be reimbursed pari passu for any expenses incurred in the action from the proceeds of such action or settlement and (ii) as to any remaining ordinary, special or punitive damages, such amount shall be treated as Net Sales, and Karuna shall pay to Lilly based upon such amount a reasonable approximation of the royalties and other amounts that Karuna would have paid to Lilly if Karuna had sold the infringing products, processes and services rather than the infringer. Any recovery obtained in an action brought by Lilly under Sections 8.02 or 8.03 shall be distributed as follows: (i) each Party shall be reimbursed pari passu for any expenses incurred in the action from the proceeds of such action or settlement and (ii) all remaining amounts shall be shared [***] to Lilly and [***] to Karuna.
Section 8.05  Cooperation. Each Party agrees to cooperate in any action under this Article which is controlled by the other Party, provided that the controlling Party reimburses the cooperating Party promptly for any costs and expenses incurred by the cooperating Party in connection with providing such assistance.

Section 8.06  Right to Sublicense. So long as Karuna remains the exclusive licensee of the Patent Rights, Karuna shall have the sole right to sublicense any alleged infringer for use of the Patent Rights in accordance with the terms and conditions of this Agreement relating to sublicenses.

Article IX  CONFIDENTIALITY

Section 9.01  Confidential Information. Each Party shall maintain all Confidential Information of the other Party in confidence and shall not disclose any such Confidential Information to any Third Party (except as expressly provided below) or use any such Confidential Information for any purposes other than those necessary or permitted for performance under this Agreement. A Party shall be entitled to use the other Party’s Confidential Information for purposes of exercising a license or right granted to the using Party under this Agreement. Neither Party shall disclose Confidential Information of the other Party to any employee, agent, consultant, Affiliate, or Sublicensee (and in the case of disclosures by Karuna, Third Parties that Karuna engages with respect to development and/or commercialization of Products developed or commercialized through use of the Patent Rights and the Xanomeline Data and the Xanomeline IND) who does not have a reasonable need for such information and who is not subject to binding obligations of confidentiality and limited use at least as restrictive in scope as those of this Article 9 (but may disclose to those that have such a reasonable need and are so bound). The duration of such obligations of confidentiality and limited use of the Parties and their Affiliates and Sublicensees under this Section shall be for the term of this Agreement plus [***]. Each Party shall use at least the same standard of care as it uses to protect its own confidential information of a similar nature to prevent unauthorized disclosures or uses of Confidential Information of the other Party. Each Party shall promptly notify the other Party upon discovery of any unauthorized use or disclosure of the Confidential Information of the other Party.

Section 9.02  Exceptions. Confidential Information shall not include any information which, as shown by competent proof:

(a) is now, or hereafter becomes, through no act or failure to act on the part of the receiving Party in breach hereof, publicly known or available;

(b) is already known by the receiving Party at the time of receiving such information, as shown by contemporaneous written records;

(c) is hereafter communicated to the receiving Party by a Third Party, who has the right to make such communication without restriction on disclosure;
(d) is independently developed by the receiving Party without reference to Confidential Information of the other Party, as shown by contemporaneous written records; or

(e) is the subject of a prior, express, written permission to disclose provided by the disclosing Party.

The Parties agree that the material financial terms of the Agreement will be considered Confidential Information of both Parties. Notwithstanding the foregoing, either Party may disclose such terms to bona fide potential (and actual) corporate partners or licensees, potential (and actual) investors or merger or acquisition partners, and to financial underwriters and legal and financial advisors, provided that all such disclosures shall be made only to such parties under binding written obligations of confidentiality and non-use consistent with the provisions of this Article 9.

Section 9.03 Authorized Disclosure. Notwithstanding any other provision of this Agreement, each Party may disclose Confidential Information of the other Party:

(a) to the extent and to the persons and entities required by an applicable governmental law, rule, regulation or order; provided, however, that the responding Party shall first have given prompt notice to the other Party hereto to enable it to seek any available exemptions from or limitations on such disclosure requirement and shall reasonably cooperate in such efforts by the other Party;

(b) to the extent and to the persons and entities required by rules of the National Association of Securities Dealers or the rules, regulations or demands of the S.E.C., other securities regulators, or exchanges on which such Party’s stock is listed; or

(c) as necessary to file or prosecute patent applications, prosecute or defend litigation or otherwise establish rights or enforce obligations under this Agreement, but only to the extent that any such disclosure is necessary.

Section 9.04 Press Release. The form and content of any public disclosure regarding this Agreement and/or the terms hereof, including press releases, are subject to the mutual written agreement of the Parties. A Party shall not be required to repeat information that has already been publicly disclosed. Each Party must approve disclosures sufficient to permit the other Party to comply with its legal requirements as a public company (as well as the rules and regulations of any stock exchange on which such other Party’s shares are traded). If either Party is required to publicly file this Agreement, it shall seek confidential treatment for the sensitive terms hereof, including seeking confidential treatment for all provisions as requested by the other Party to the extent reasonable in accordance with the law, based on advice from counsel.

Section 9.05 Publications. Karuna recognizes that Lilly may wish to publish the results of its work relating to the studies described in Section 3.03 of this Agreement. Prior to such publication, Lilly will share with Karuna data included in any such publication by Lilly (including its Affiliates and/or sublicensees) that includes information related to the Product, or which otherwise includes proprietary information of Karuna as follows: At least [***]
before a manuscript is to be submitted to a publisher, Lilly shall provide Karuna with a copy of the manuscript. If Lilly wishes to make an oral presentation or publish any abstract, it shall provide Karuna with a summary of such presentation or abstract, as the case may be, at least [***] before such oral presentation or before such abstract is to be submitted. If Karuna believes that a manuscript, abstract or oral presentation refers to Product in a manner in which Karuna disagrees, Karuna shall notify Lilly within [***] of receiving the manuscript, abstract or presentation. If Lilly and Karuna cannot resolve the disagreement regarding the manner in which the Product is referred to within [***] after such notification to Lilly then Karuna shall have the right to ask an independent third party laboratory which is mutually agreeable to Lilly to conduct experimental work to help resolve the dispute. Lilly will withhold publication until work by the independent laboratory has been completed. Notwithstanding the foregoing, Lilly may publish clinical trial information on Lilly’s online database in accordance with its corporate policy.

Article X  TERM AND TERMINATION

Section 10.01   Term. The term of this Agreement shall commence upon the Effective Date and, unless sooner terminated as provided in this Article 10, expire on the later of (i) expiration of the last-to-expire Royalty Term or (ii) the date on which all Milestone Payments have been paid to Lilly pursuant to Section 4.02; provided however that such expiration date shall be no later than the fifteen year anniversary of the First Commercial Sale. As the Royalty Term expires in each country, the license of Section 3.02 shall automatically become nonexclusive, irrevocable, fully paid and royalty-free with respect to such country.

Section 10.02   Licenses and Ownership upon Expiration. Once this Agreement expires entirely as set forth in Section 10.01, the license granted under Section 3.02 shall survive and automatically become a non-exclusive, irrevocable, fully paid, royalty-free license and, for the avoidance of doubt, Karuna shall retain all right title and interest in and to the Xanomeline Data and the Xanomeline IND.

Section 10.03   Elective Termination. Karuna shall have the right to terminate this Agreement at any time (and for any reason, or no reason) upon [***] prior written notice to Lilly,

Section 10.04   Termination for Breach. Either Party may terminate this Agreement if the other Party materially breaches this Agreement, by [***] written notice to the breaching Party, provided that (a) the written notice explicitly states that it is a notice of breach under this Section 10.04 and describes the alleged material breach and (b) the breaching Party fails to cure the breach within such [***] notice period, or in the case of a material breach that is incapable of cure within [***] fails (i) to provide within such [***] notice period a commercially reasonable written plan to cure the breach as soon as practicable and (ii) to initiate measures to cure such breach.
(a) If Lilly Terminates this Agreement pursuant to Section 10.04 above, or Karuna terminates this Agreement pursuant to Section 10.03 above, all rights granted to Karuna hereunder shall terminate and, within [***] following such termination, Karuna shall return to Lilly ownership of the Xanomeline Data and the Xanomeline IND (and all Sublicenses that may have been granted by Karuna to Third Parties shall also terminate, unless Lilly notifies Karuna that it elects to grant to such Third Parties a direct license).

(b) If Karuna terminates this Agreement pursuant to Section 10.04 following Lilly’s uncured material breach of this Agreement, then (i) the license granted Karuna pursuant to Section 3.02 shall survive such termination and (ii) Karuna shall retain ownership of the Xanomeline Data and the Xanomeline IND and Karuna shall pay Lilly [***] of all amounts owed hereunder as such amounts would have become due hereunder.

Section 10.06  Accrued Rights and Obligations; Survival. Expiration or termination of this Agreement shall not affect any rights or obligations (including any payment obligations accruing during the notice period of Section 10.03) accrued prior to such expiration or termination. The provisions of Articles 6, 9, 10 and 11 of this Agreement shall survive expiration or termination of this Agreement for any reason (in accordance with any subsequent dates of termination referred to in such Articles).

Article XI  MISCELLANEOUS

Section 11.01  Dispute Resolution. The Parties recognize that disputes may from time to time arise between the Parties during the term of this Agreement. It is the objective of the Parties to establish procedures to facilitate the resolution of disputes arising under this Agreement in an expedient manner by mutual cooperation and without resort to litigation. To accomplish this objective, the Parties agree to follow the procedures set forth in this Section 11.01 to resolve any dispute arising under this Agreement. If such a dispute between the Parties arises, then either Party, by written notice to the other Party, may have such dispute referred to the Parties’ respective executive officers that each Party will have designated. If the designated executive officers are not able to resolve such dispute, either Party may at any time after [***] from the date of the aforesaid written notice pursue any legal or equitable remedy available to it. A Party is entitled to seek interlocutory relief and/or a preliminary injunction without first following the procedure of this Section 11.01; provided that it also invokes the procedure of this Section 11.01 in parallel.

Section 11.02  Governing Law. This Agreement is made in accordance with and shall be governed and construed under the laws of the State of New York, excluding its choice of law principles.

Section 11.03  No Agency, Joint Venture or Partnership. Neither Party is, nor will be deemed to be, an employee, agent or legal representative of the other Party for any purpose. Neither Party will be entitled to enter into any contracts in the name of, or on behalf of the other Party, nor will a Party be entitled to pledge the credit of the other Party in any way or hold itself out as having authority to do so. This Agreement is an arm’s length agreement between the Parties and shall not constitute or be construed as a joint venture. The parties are independent contractors and this Agreement and the relationship that it governs shall not be construed to be or create any joint venture or partnership.
Section 11.04  Assignment.

(a) Permitted Assignments. Either Party may assign this Agreement (as a whole) [ *** ] times solely (i) to any of its Affiliates, (ii) to a successor to substantially all of the business or assets of the assigning Party to which this Agreement relates, whether through merger, sale of stock, sale of assets or other transaction, without the consent of the other Party. This Agreement shall survive any such merger or reorganization of either Party with or into, or such sale of assets to, another party and no consent for such merger, reorganization or sale shall be required hereunder.

(b) Binding Upon Successors and Assigns. Any permitted successor or assignee of rights and/or obligations hereunder shall, in writing to the other Party, expressly assume performance of such rights and/or obligations. This Agreement shall be binding upon and inure to the benefit of the successors and explicitly permitted assignees of the Parties. Any assignment of this Agreement not made in accordance with this Agreement or that is not explicitly sanctioned by Section 11.04(a) is prohibited hereunder and shall be void.

Section 11.05  Amendment. No amendment or modification hereof shall be valid or binding upon the Parties unless made in writing and signed by both Parties.

Section 11.06  Notices. Any notice or other communication required or permitted to be given to either Party hereto shall be in writing unless otherwise specified and shall be deemed to have been properly given and to be effective (a) on the date of delivery if delivered in person; or (b) two (2) Business Days after sending for next Business Day delivery by internationally recognized expedited courier service:

In the case of Lilly:

Eli Lilly and Company  
Lilly Corporate Center  
Indianapolis, IN 46285  
Facsimile No.: 317-433-3000  
Telephone No.: 317-276-2000  
Attention: General Counsel

In the case of Karuna:

Karuna Pharmaceuticals, Inc.  
Attn: President  
500 Boylston Street, Suite 1600  
Boston, Massachusetts 02116
In the case of (b) (expedited courier service), the Party providing the notice shall (as a courtesy only) additionally provide the notice by a facsimile or electronic courier. Either Party may change its address for communications by a notice to the other Party in accordance with this Section 11.07.

Section 11.07 Force Majeure. Any delay in or failure of performance by any Party under this Agreement shall not be considered a breach of this Agreement if and to the extent caused by occurrences beyond the reasonable control of the Party affected, including but not limited to acts of God, embargoes, governmental restrictions, strikes or other concerted acts of workers, fire, flood, earthquake, explosion, riots, wars, terrorism, civil disorder, rebellion or sabotage. The Party suffering such occurrence shall notify the other Party and any time for performance hereunder shall be extended by the actual time of delay caused by the occurrence, provided that the Party suffering such occurrence use best efforts to overcome such, and notifies the other Party when such occurrence ceases.

Section 11.08 Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original but all of which together shall constitute a single instrument.

Section 11.09 Captions. All section titles or captions contained in this Agreement, in any Exhibit or Schedule referred to herein and the table of contents, if any, to this Agreement are for convenience only, shall not be deemed a part of this Agreement and shall not affect the meaning or interpretation of this Agreement.

Section 11.10 Draftsmanship. Each Party acknowledges that it has participated in the drafting of this Agreement, and any applicable rule of construction to the effect that ambiguities are to be resolved against the drafting Party will not be applied in connection with the construction or interpretation of this Agreement.

Section 11.11 Severability. Should one or several provisions of this Agreement be or become invalid, then the Parties shall substitute such invalid provisions by valid ones, which in their economic effect come so close to the invalid provisions that it can be reasonably assumed that the Parties would have contracted this Agreement also with those new provisions. In case such provisions cannot be found, the invalidity of one or several provisions of this Agreement shall not affect the validity of the Agreement as a whole, unless the invalid provisions are of such essential importance for this Agreement that it is to be reasonably assumed that the Parties would not have contracted this Agreement without the invalid provisions

Section 11.12 Cumulative Rights. The rights, powers and remedies hereunder shall be in addition to, and not in limitation of, all rights, powers and remedies provided at law or in equity. All of such rights, powers and remedies shall be cumulative, and may be exercised successively or cumulatively.

Section 11.13 Waiver. No failure on the part of either Party to exercise any power, right, privilege or remedy under this Agreement, and no delay on the part of either Party in exercising any power, right, privilege or remedy under this Agreement, will operate as a waiver thereof. No
single or partial exercise of any such power, right, privilege or remedy will preclude any other or further exercise thereof or of any other power, right, privilege or remedy. Waivers of powers, rights, privileges and remedies under this Agreement may only be waived in a written document executed by a duly authorized officer of the waiving Party.

Section 11.14 Costs. Each Party shall bear its own legal costs of and incidental to the preparation, negotiation and execution of this Agreement.

Section 11.15 Prohibition of Corrupt Payments. In connection with the work done under this Agreement and in connection with any other business involving a Party, the other Party confirms that it has not given or promised to give, and will not make, offer, agree to make or authorize any payment or transfer anything of value, directly or indirectly, (i) to any Government or Public Official, as defined herein; (ii) any political party, party official or candidate for public or political office; (iii) any person while knowing or having reason to know that all or a portion of the value will be offered, given, or promised, directly or indirectly, to anyone described in items (i) or (ii) above; or (iv) any owner, director, employee, representative or agent of any actual or potential customer of a Party or its Affiliates, other than fair market payments for services performed by such individuals in accordance with applicable law. The parties agree to comply with all applicable anti-bribery laws in the countries where the parties have their principal places of business and where they conduct activities under this Agreement. Additionally, each Party understands and agrees to comply with the U.S. Foreign Corrupt Practices Act (“US FCPA”), as revised, as well as similar applicable laws of the countries in the Territory and to take no action that might cause a Party to be in violation of the US FCPA or similar applicable laws of the country where the parties conduct activities under this Agreement. Additionally, the parties will make reasonable efforts to comply with requests for information, including answering questionnaires and narrowly tailored audit inquiries, to enable the other Party to ensure compliance with applicable anti-bribery laws. For purposes of this Agreement, “Government or Public Official” is any officer or employee or anyone acting in an official capacity on behalf of: a government or any department or agency thereof; a public international organization (such as the United Nations, the International Monetary Fund, the International Red Cross, and the World Health Organization), or any department, agency or institution thereof; or a government-owned or controlled company, institution, or other entity, including a government-owned hospital or university.

Section 11.16 No Affiliation with Government or Public Officials: Disclosure Obligation. Each Party represents that neither it nor any of its owners, directors, employees, agents, or consultants is a Government or Public Official, as defined in Section 11.16, or political party official or candidate for public or political office. In the event that during the term of this Agreement there is a change in the information required to be disclosed in this paragraph, each agrees to promptly notify the other thereof.

Section 11.17 Entire Agreement. This Agreement embodies the entire understanding of the Parties with respect to the subject matter hereof and shall supersede all previous communications, representations or understandings, either oral or written, between the Parties relating to the subject matter of this Agreement, including the Prior CDA with respect to the Parties’ rights and obligations with respect to Confidential.
IN WITNESS WHEREOF, both Lilly and Karuna have executed this Agreement by their respective officers hereunto duly authorized.

KARUNA PHARMACEUTICALS, INC.

By: /s/ Eric Elenko
Name: Eric Elenko, PHD
Title: Director

ELI LILLY AND COMPANY

By: /s/ Jan M Lundberg
Name: Jan M Lundberg
Title: Exec. VP Sci & Tech, Pres. LU
EXCLUSIVE PATENT LICENSE AGREEMENT

by and between

PURETECH VENTURES LLC

and

KARUNA PHARMACEUTICALS, INC.

1
EXCLUSIVE PATENT LICENSE AGREEMENT

This Agreement, effective as of the date set forth above the signatures of the parties below (the “Effective Date”), is between PureTech Ventures LLC, a Delaware limited liability company (“PureTech”), and Karuna Pharmaceuticals, Inc., a Delaware corporation (the “Company”). PureTech and the Company are sometimes referred to herein individually as a “Party” and collectively as the “Parties.”

RECITALS

WHEREAS, PureTech is the owner of certain Patent Rights (as later defined herein) and has the right to grant licenses under said Patent Rights;

WHEREAS, PureTech desires to have the Patent Rights developed and commercialized by the Company and is willing to grant a license thereunder; and

WHEREAS, the Company desires to obtain a license under the Patent Rights and PureTech is willing to grant the same to the Company upon the terms and conditions hereinafter set forth.

NOW, THEREFORE, PureTech and the Company hereby agree as follows:

1. DEFINITIONS

1.1 “Affiliate” shall mean any legal entity (such as a corporation, partnership, or limited liability company) that is controlled by a Party. For purposes of this definition, the term “control” means as to such entity, direct or indirect ownership of (i) more than fifty percent (50%) in the aggregate of the voting power of all outstanding shares entitled to vote at a general election of directors of such entity, (H) more than fifty percent (50%) of the equity interests in such entity, or (iii) more than fifty percent (50%) of the assets of such entity.

1.2 “Field” shall mean all uses and applications.

1.3 “Licensed Product” shall mean any product that cannot be manufactured, used, leased or sold, in whole or in part, without infringing one or more Valid Claims under the Patent Rights.

1.4 “Net Sales” means [ *** ].
1.5 "Patent Rights" shall mean all of PureTech’s right, title and interest in:

(a) the United States patent applications listed on Appendix A, their foreign counterparts, and the resulting patents;

(b) any divisionals, continuations, continuation-in-part applications, continued prosecution applications, or any other application claiming priority to one or more of the patent applications listed on Appendix A to the extent the claims are directed to subject matter specifically described in the patent applications listed on Appendix A, and the resulting patents; and

(c) any patents resulting from reissues, reexaminations, extensions, or restorations (and their relevant international equivalents) of the patents described in (a) and (b) above.

1.6 "Reporting Period" shall begin on the first day of each calendar quarter and end on the last day of such calendar quarter.

1.7 "Sublicense Income" shall mean all consideration received by the Company or any of its Affiliates from Sublicensees in exchange for the sublicensing of rights granted to the Company pursuant to Article 2 herein, but specifically excluding royalties. Sublicensing Income includes, without limitation, upfront payments, milestone payments, license maintenance fees, research and development funding (subject to (a), below) and equity investments (whether in the form of stock purchase, options, warrants, convertible debt or other forms) (subject to (a), below) paid directly or indirectly to the Company (or any of its Affiliates) from (or on behalf of) any Sublicensee. Notwithstanding the foregoing:

(a) funding of activities directly in furtherance of Licensed Product research and clinical, regulatory and manufacturing process development are excluded from Sublicense Income; and
(b) Sublicense Income shall not include amounts paid to the Company as an equity investment in the Company or any of its Affiliates (whether in the form of stock purchase, options, warrants or other forms) to the extent that the amount of such investment (calculated in case of options, warrants and the like as if exercised and including all amounts due on exercise) does not involve any premium over fair market value of the equity investment.

To avoid any doubt, Sublicensing Income extends to and includes consideration that is paid on the basis of rights (including covenants not to sue) under any intellectual property licensed to the Company pursuant to Article 2 of this Agreement even if the Company structures its grant of rights to the Sublicensee so that the grant of rights under the Patent Rights formally occurs in a separate written agreement from the grant of rights under other intellectual property of the Company relating to the Licensed Product.

1.8 “Sublicensee” shall mean any non-Affiliate sublicensee of the rights granted the Company under Section 2.2.

1.9 “Term” shall mean the term of this Agreement, which shall commence on the Effective Date and shall remain in effect until the expiration or abandonment of all issued patents and filed patent applications within the Patent Rights, unless earlier terminated in accordance with the provisions of this Agreement.

1.10 “Territory” shall mean worldwide.

1.11 “Valid Claim” shall mean a claim of any filed patent application included within the Patent Rights which has not been held finally revoked, unenforceable or invalid by a decision of a court or other governmental agency of competent jurisdiction and which (i) has not been admitted to be invalid or unenforceable through reissue or disclaimer or otherwise, (ii) has not been withdrawn or abandoned, or (iii) has not been lost through an interference proceeding.

2. GRANT OF RIGHTS.

2.1 License Grants. Subject to the terms of this Agreement, PureTech hereby grants to the Company for the Term a royalty-bearing exclusive license (even as against PureTech) under the Patent Rights to research, develop, make, have made, use, offer for sale, sell, lease, import and otherwise exploit Licensed Products in the Field in the Territory.

2.2 Sublicenses. The Company shall have the right to grant sublicenses of its rights hereunder. The Company shall incorporate terms and conditions into such sublicense agreements sufficient to enable the Company to comply with this Agreement. Within [ *** ] following the execution thereof, the Company shall furnish PureTech with a fully signed photocopy of any sublicense agreement.

2.3 No Additional Rights. Nothing in this Agreement shall be construed to confer any rights upon the Company by implication, estoppel or otherwise as to any technology or patent rights of PureTech or any other entity other than the Patent Rights, regardless of whether such technology or patent rights shall be dominant or subordinate to any Patent Rights.
2.4 Due Diligence Obligations. The Company shall use diligent efforts, and shall cause its Affiliates and any Sublicensees to use diligent efforts, to develop Licensed Products and to introduce Licensed Products into the commercial market; thereafter, the Company and its Affiliates and any Sublicensees shall maximize the commercial sales of such Licensed Products. Specifically, the Company and its Affiliates and any Sublicensees shall fulfill the following obligations:

(a) Within [ *** ] of the Effective Date, the Company shall initiate, defined as first dosing of patient, a trial using a Licensed Product where the primary outcome measure is a statistically significant separation by a Licensed Product from placebo on the positive and negative symptom scale (PANSS) or equivalent scale that has previously been used as a primary endpoint for U.S. Food and Drug Administration registration for the treatment of schizophrenia and the total number of patients that will enroll in the study is greater than [ *** ].

(b) At any time prior to approval of a Licensed Product by the U.S. Food and Drug Administration, the Company shall not, for any consecutive [ *** ] period, fail to initiate, defined as first dosing of patient, a human clinical study with a Licensed Product or make a regulatory submission to the U.S. Food and Drug Administration, the European Medicines Evaluation Agency, or the Japanese Ministry of Health and Welfare seeking the marketing of a License Product for the treatment of a disease.

(c) The Company shall not (i) become insolvent; (ii) make an assignment for the benefit of creditors; (iii) have a bona fide petition in bankruptcy filed for or against it, which petition is withdrawn or dismissed within [ *** ] of its filing; or (iv) cease operations (at an activity level sufficient for the continued development of Products) for more than one [ *** ].

In the event that PureTech determines that the Company (or an Affiliate or Sublicensee) has failed to fulfill its obligations under this Section 2.4, then PureTech may treat such failure as a material breach in accordance with Section 11.2(b).

3. ROYALTIES AND PAYMENT TERMS.

3.1 Consideration for Grant of Rights.

(a) Running Royalties. The Company shall pay to PureTech a running royalty of [ *** ] of annual Net Sales by the Company, its Affiliates and any Sublicensees. Running royalties shall be payable for each Reporting Period and shall be due to PureTech within [ *** ] of the end of each Reporting Period.

(b) Milestone Payments. The Company shall pay to PureTech the following milestone payments in connection with the achievement of the following events by the Company, any of its Affiliates or any Sublicensee (each such event is hereafter referred to as a "Milestone"):

(i) [ *** ] within [ *** ] following the commencement of a Phase III Clinical Trial of a Licensed Product;
(ii) [ *** ] following approval by the U.S. Food and Drug Administration, or any successor thereto, to offer for sale and sell (including any necessary price approvals) any Licensed Product;

(iii) [ *** ] following approval by the European Medicines Evaluation Agency or any other European regulatory authority, or any successor thereto, to offer for sale and sell (including any necessary price approvals) any Licensed Product; and

(iv) [ *** ] following approval by the Japanese Ministry of Health and Welfare or, any successor entity to offer for sale and sell (including any necessary price approvals) any Licensed Product.

(c) Sharing of Sublicense Income. The Company shall pay PureTech [ *** ] all Sublicense Income received by the Company or its Affiliates, excluding running royalties on Net Sales of Sublicensees. Such amount shall be payable for each Reporting Period and shall be due to PureTech within [ *** ] of the end of each Reporting Period.

3.2 Payments

(a) Method of Payment. All payments under this Agreement shall be made payable to PureTech and sent to the address identified in Section 13.1. Each payment should reference this Agreement and identify the obligation under this Agreement that the payment satisfies.

(b) Payments in U.S. Dollars. All payments due under this Agreement shall be payable in United States dollars. Conversion of foreign currency to U.S. dollars shall be made at the conversion rate existing in the United States (as reported in The Wall Street Journal) for the last working day of the calendar quarter of the applicable Reporting Period. Such payments shall be without deduction of exchange, collection or other charges. Each Party is solely responsible for timely and properly filing and payment of its own taxes of any kind and in any jurisdiction. All payments under this Agreement shall be made in full without any deduction or withholding for or on account of any tax unless such deduction or withholding is required by applicable governmental laws, tax treaty, or regulations. Any tax required to be withheld by the Company under the laws of any foreign country for the account of PureTech shall be promptly paid by the Company for and on behalf of PureTech to the appropriate governmental authority, and the Company shall use its best efforts to furnish PureTech with proof of payment of such tax together with official or other appropriate evidence issued by the applicable government authority. Any such tax actually paid on PureTech’s behalf shall be deducted from royalty payments due PureTech.

(c) Late Payments. Any payments by the Company that are not paid on or before the date such payments are due under this Agreement shall bear interest, to the extent permitted by law, at [ *** ] above the Prime Rate of interest as reported in The Wall Street Journal on the date payment is due.
4. **REPORTS AND RECORD KEEPING.**

4.1 **Frequency of Reports.**

(a) **Before First Commercial Sale.** Prior to the first commercial sale of any Licensed Product, the Company shall deliver reports to PureTech annually, within [***] the end of each calendar year, containing information concerning the progress of research and development pertaining to the Licensed Product.

(b) **Upon First Commercial Sale.** The Company shall report to PureTech the date of first commercial sale of a Licensed Product within [***] of occurrence thereof in each country.

(c) **After First Commercial Sale.** After the first commercial sale of a Licensed Product, the Company shall deliver reports to PureTech within [***] of the end of each Reporting Period, containing information concerning the immediately preceding Reporting Period, as further described in Section 4.2.

4.2 **Content of Reports and Payments.** Each report delivered by the Company to PureTech shall contain at least the following information for the immediately preceding Reporting Period:

(a) the number of Licensed Products sold, leased or distributed by the Company, its Affiliates and any Sublicensees to independent third parties in each country;

(b) the gross price charged by the Company, its Affiliates and any Sublicensees for each Licensed Product;

(c) the calculation of Net Sales for the applicable Reporting Period in each country, including a listing of applicable deductions;

(d) the total royalty payable on Net Sales in U.S. dollars, together with the exchange rates used for conversion;

(e) the amount of Sublicense Income received by the Company from each Sublicensee and the amount due to PureTech from such Sublicense Income, including an itemized breakdown of the sources of income comprising the Sublicense Income; and

(f) the number of sublicenses entered into for the Patent Rights and/or Licensed Products.

If no amounts are due to PureTech for any Reporting Period, the report shall so state.

4.3 **Financial Statements.** On or before the [***] following the close of the Company’s fiscal year, the Company shall provide PureTech with the Company’s financial statements for the preceding fiscal year including, at a minimum, a balance sheet and an income statement, certified by the Company’s treasurer or chief financial officer or by an independent auditor.
4.4 Record Keeping. The Company shall maintain, and shall require its Affiliates and any Sublicensees to maintain, complete and accurate records relating to research and development under this Agreement and any amounts payable to PureTech in relation to this Agreement, which records shall contain sufficient information to permit PureTech to confirm the accuracy of any reports delivered to PureTech and compliance in other respects with this Agreement. The relevant party shall retain such records for at least [***] following the end of the calendar year to which they pertain, during which time PureTech, or PureTech’s appointed agents, shall have the right, at PureTech’s expense, to inspect such records during normal business hours upon minimum advance notice of [***] to verify any reports and payments made or compliance in other respects under this Agreement. Any person inspecting the books and records of the Company on behalf of PureTech pursuant to this Section 4.4 shall enter into a confidentiality agreement with the Company in its standard form covering the receipt of confidential information from the Company. In the event that any audit performed under this Section reveals an underpayment in excess of [***] the Company shall bear the full cost of such audit. Any auditor shall report to PureTech only the amount of any underpayment or overpayment to PureTech or that the payments made by the Company were correct. The auditor shall deliver a copy of its audit report to the Company at the same time it remits such audit report to PureTech. The Company shall remit any amounts due to PureTech and PureTech shall refund any overpayment to the Company, within [***] of receiving the report of the auditor.

5. PATENT PROSECUTION.

5.1 Responsibility for Patent Rights. The Company shall prepare, file, diligently prosecute and maintain all of the Patent Rights. PureTech shall have reasonable opportunities to advise the Company with respect to such preparation, filing, prosecution and maintenance and PureTech and the Company shall cooperate with each other (any each other’s respective legal counsel) in such filing, prosecution and maintenance.

5.2 Payment of Expenses. Payment of all fees and costs, including attorneys fees, incurred after the Effective Date relating to the filing, prosecution and maintenance of the Patent Rights shall be the responsibility of the Company.

5.3 Reversion of Patent Rights. In its sole discretion, the Company may elect not to prosecute certain of the Patent Rights (including rights in certain countries or territories) if and only if the Company shall notify PureTech of such decision within [***] prior to any filing deadline in respect of such Patent Rights; provided however that if the Company elects not to prosecute such Patent Rights, such Patent Rights shall revert to PureTech and shall automatically be excluded from the definition of “Patent Rights” hereunder.

6. INFRINGEMENT.

6.1 Notification of Infringement. Each Party agrees to provide written notice to the other Party promptly after becoming aware of any infringement of the Patent Rights.
6.2 Right to Prosecute Infringements.

(a) Company Right to Prosecute. So long as the Company remains the exclusive licensee of the Patent Rights in the Field in the Territory, the Company, to the extent permitted by law, shall have the right, under its own control and at its own expense, to prosecute any third party infringement of the Patent Rights in the Field in the Territory, subject to Section 6.4. If required by law, PureTech shall permit any action under this Section 6.2 to be brought in its name, including being joined as a party-plaintiff, provided that the Company shall hold PureTech harmless from, and indemnify PureTech against, any costs, expenses, or liability that PureTech incurs in connection with such action. Prior to commencing any such action, the Company shall consult with PureTech and shall consider the views of PureTech regarding the advisability of the proposed action and its effects. The Company shall not enter into any settlement, consent judgment, or other voluntary final disposition of any infringement action under this Section 6.2 which admits the invalidity or unenforceability of any Patent Rights without the prior written consent of PureTech. If the Company does not take commercially reasonable steps to abate the infringement of such Patent Rights within *** from any infringement notice from PureTech, based upon the Company’s determination that such action would be commercially unreasonable and the Company provides PureTech its reasons therefor in writing, then the Company shall not have the obligation to take any such action or institute any proceeding. In this regard, the Company shall be entitled to use its reasonable commercial discretion in determining (a) whether to contact and/or institute any action or proceeding against an alleged infringer; (b) the timing of any contact with an alleged infringer or action or proceeding to be instituted against an alleged infringer; (c) the location of any action or proceeding to be instituted against an alleged infringer; and (d) if there is more than one alleged infringer, which alleged infringer to contact regarding its alleged infringement or against which any action or proceeding is to be brought. It is further understood and agreed that, during such time as the Company is pursuing any action or proceeding against one alleged infringer, the Company shall have no obligation to contact or pursue additional alleged infringers.

(b) PureTech Right to Prosecute. In the event that the Company is unsuccessful in persuading the alleged infringer to desist or fails to have initiated an infringement action within the time provided in Section 6.2(a) above and the infringement is open, obvious and financially material, PureTech shall have the right, at its sole discretion, to prosecute such infringement under its sole control and at its sole expense, and any recovery obtained shall belong to PureTech.

6.3 Declaratory Judgment Actions. In the event that a declaratory judgment action is brought against PureTech or the Company by a third party alleging invalidity, unenforceability, or non-infringement of the Patent Rights, PureTech, at its option, shall have the right within *** commencement of such action to take over the sole defense of the action at its own expense. If PureTech does not exercise this right, the Company may take over the sole defense of the action at the Company’s sole expense, subject to Section 6.4.

6.4 Recovery. Any recovery obtained in an action brought by the Company under Sections 6.2 or 6.3 shall be distributed as follows: (i) each Party shall be reimbursed *** for any expenses incurred in the action from the proceeds of such action or settlement, (ii) as to
ordinary damages, such amount shall be treated as Net Sales, and the Company shall pay to PureTech based upon such amount a reasonable approximation of the royalties and other amounts that the Company would have paid to PureTech if the Company had sold the infringing products, processes and services rather than the infringer, and (iii) as to special or punitive damages, the parties shall share equally in any award. Any recovery obtained in an action brought by PureTech under Sections 6.2 or 6.3 shall be distributed as follows: (i) each Party shall be reimbursed [***] for any expenses incurred in the action from the proceeds of such action or settlement and all remaining amounts shall be shared [***] to PureTech and [***] to the Company.

6.5 Cooperation. Each party agrees to cooperate in any action under this Article which is controlled by the other party, provided that the controlling party reimburses the cooperating party promptly for any costs and expenses incurred by the cooperating party in connection with providing such assistance.

6.6 Right to Sublicense. So long as the Company remains the exclusive licensee of the Patent Rights in the Field in the Territory, the Company shall have the sole right to sublicense any alleged infringer in the Field in the Territory for use of the Patent Rights in accordance with the terms and conditions of this Agreement relating to sublicenses.

7. INDEMNIFICATION

7.1 Indemnity.

(a) By the Company. The Company shall indemnify, defend, and hold harmless PureTech and its members, directors, officers, employees, agents and Affiliates and their respective successors, heirs and assigns (the “PureTech Indemnites”), against any liability, damage, loss, or expense (including reasonable attorneys fees and expenses) incurred by or imposed upon any of the PureTech Indemnites in connection with any third party claims, suits, actions, demands or judgments arising out of any theory of liability (including without limitation actions in the form of tort, warranty, or strict liability and regardless of whether such action has any factual basis) (a “Loss”) (i) concerning any product, process or service that is made, used, sold, imported or performed pursuant to any right or license granted under this Agreement or (ii) due to a breach of this Agreement by the Company; provided, however, that the foregoing indemnification shall not apply to any Loss to the extent such Loss is caused by the breach of this Agreement or the gross negligence or willful misconduct of a PureTech Indemnitee.

7.2 Procedures. A party seeking indemnification pursuant to Section 7.1 shall provide the indemnifying Party with prompt written notice of any claim, suit, action, demand, or judgment for which indemnification is sought under this Agreement. The indemnifying Party, at its own expense, shall provide attorneys reasonably acceptable to the indemnified party to defend against any such claim. The indemnified party shall cooperate fully with the indemnifying Party in such defense and shall permit the indemnifying Party to conduct and control such defense and the disposition of such claim, suit, or action (including all decisions relative to litigation, appeal, and settlement); provided, however, that any indemnified party shall have the right to retain its own counsel, at the expense of the indemnifying Party, if representation of such indemnified party by the counsel retained by the indemnifying Party would be inappropriate because of actual
legal conflicts between such indemnified party and any other party represented by such counsel. The indemnifying Party agrees to keep the other Party informed of the progress in the defense and disposition of such claim and to consult with such Party with regard to any proposed settlement.

7.3 Insurance. Beginning at such time as any such product, process or service is being commercially distributed, sold, leased or otherwise transferred, or performed or used, by the Company, an Affiliate or any Sublicensee, the Company shall, at its sole cost and expense, procure and maintain commercial general liability insurance in amounts not less than [***] per incident and [***] annual aggregate and naming the Indemnitees as additional insureds. Such commercial general liability insurance shall provide (i) product liability coverage and (ii) broad form contractual liability coverage for Company’s indemnification under Section 7.1 of this Agreement. If Company elects to self-insure all or part of the limits described above (including deductibles or retentions which are in excess of [***] annual aggregate) such self-insurance program must be acceptable to the PureTech. The minimum amounts of insurance coverage required under this Section 7.3 shall not be construed to create a limit of the Company’s liability with respect to its indemnification under Section 7.1 of this Agreement. The Company shall provide PureTech with written evidence of such insurance upon request of PureTech. The Company shall provide PureTech with written notice at least [***] prior to the cancellation, non-renewal or material change in such insurance; if the Company does obtain replacement insurance providing comparable coverage prior to the expiration of such [***] period. PureTech shall have the right to terminate this Agreement effective at the end of such [***] period without notice or any additional waiting periods. The Company shall maintain such commercial general liability insurance beyond the expiration or termination of this Agreement during (i) the period that any such product, process, or service is being commercially distributed, sold, leased or otherwise transferred, or performed or used (other than for the purpose of obtaining regulatory approvals), by the Company or by a licensee, affiliate or agent of Company and (ii) a reasonable period after the period referred to in (i) above which in no event shall be less than [***]. This section 7.3 shall survive expiration or termination of this Agreement.

8. REPRESENTATIONS, WARRANTIES AND COVENANTS

8.1 Representations and Warranties by each Party. Each of PureTech and the Company, with respect to itself, represents, warrants and covenants to the other that:

(a) it is a corporation or entity duly organized and validly existing under the laws of the state or jurisdiction of its incorporation;

(b) the execution, delivery and performance of this Agreement has been duly authorized by all requisite corporate or other action and does not require any shareholder or member action or approval;

(c) it has the full right, power, and authority to enter into and deliver this Agreement, and that the execution of this Agreement creates a valid and binding Agreement enforceable against it in accordance with its terms;
(d) the execution, delivery, and performance of this Agreement and its compliance with the terms and provisions hereof does not, and will not, conflict with or result in a breach of any of the terms or provisions of, or constitute a default under (i) a loan agreement, guaranty, financing agreement, agreement affecting a product or other agreement or instrument binding or affecting it or its property; (ii) the provisions of its charter or operative documents or by-laws; or (iii) any order, writ, injunction, or decree of any court or governmental authority entered against it or by which any of its property is bound; and

(e) to its knowledge, there are no existing or threatened actions, suits or claims pending against it with respect to its right to enter into and perform its obligations under this Agreement.

8.2 No Further Representations or Warranties: Damages. EXCEPT AS MAY OTHERWISE BE EXPRESSLY SET FORTH IN THIS AGREEMENT, PURETECH MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND CONCERNING (A) THE PATENT RIGHTS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, VALIDITY OF PATENT RIGHTS CLAIMS, WHETHER ISSUED OR PENDING, (2) THE ABSENCE OF LATENT OR OTHER DEFECTS, WHETHER OR NOT DISCOVERABLE, (3) REGARDING THE VALIDITY OR SCOPE OF THE PATENT RIGHTS OR (4) THAT THE EXPLOITATION OF THE PATENT RIGHTS OR ANY LICENSED PRODUCT WILL NOT INFRINGE ANY PATENTS OR OTHER INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY.

IN NO EVENT SHALL EITHER PARTY, ITS MEMBERS, DIRECTORS, OFFICERS, EMPLOYEES, AGENTS OR AFFILIATES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ECONOMIC DAMAGES FOR INJURY TO PROPERTY AND LOST PROFITS, REGARDLESS OF WHETHER SUCH PARTY SHALL BE ADVISED, SHALL HAVE OTHER REASON TO KNOW, OR IN FACT SHALL KNOW OF THE POSSIBILITY OF THE FOREGOING.

9. ASSIGNMENT.

Neither Party may assign this Agreement without the written consent of the other Party, which consent shall not be unreasonably withheld or delayed. Notwithstanding the foregoing, upon written notice to the other Party, either Party may assign this Agreement to a successor to its business (whether by merger, a sale or other transfer of all or substantially all of its assets, a sale of a controlling interest of its capital stock, or otherwise) which agrees in writing to assume its obligations hereunder. This Agreement will be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

10. COVENANTS

10.1 Compliance with Laws. The Company and its Affiliates and any Sublicensees shall comply in all material respects with all commercially material applicable local, state, federal, and foreign laws and regulations relating to the development, manufacture, use, and sale of Licensed Products.
10.2 **Export Control.** The Company and its Affiliates and any Sublicensees shall comply with all United States laws and regulations controlling the export of certain commodities and technical data, including without limitation all Export Administration Regulations of the United States Department of Commerce. Among other things, these laws and regulations prohibit or require a license for the export of certain types of commodities and technical data to specified countries. The Company hereby gives written assurance that it will comply with, and will require its Affiliates and any Sublicensees to comply with, all United States export control laws and regulations, that it bears sole responsibility for any violation of such laws and regulations by itself or its Affiliates or any Sublicensees, and that it will indemnify, defend, and hold PureTech harmless (in accordance with Section 7) for the consequences of any such violation.

10.3 **Non-Use of PureTech Name.** The Company and its Affiliates and any Sublicensees shall not use the name of PureTech or any variation, adaptation, or abbreviation thereof, or of any of its employees, or agents, or any trademark owned by PureTech, or any terms of this Agreement in any promotional material or other public announcement or disclosure without the prior written consent of PureTech, except as may be required by law, stock exchange rule or other securities trading system rule.

10.4 **Marking of Licensed Products.** To the extent commercially feasible and consistent with prevailing business practices, the Company shall mark, and shall cause its Affiliates and any Sublicensees to mark, all Licensed Products that are manufactured or sold under this Agreement with the number of each issued patent under the Patent Rights that applies to such Licensed Product.

11. **TERMINATION**

11.1 **Voluntary Termination by the Company.** The Company shall have the right to terminate this Agreement, for any reason, from time to time upon at least [ *** ] prior written notice to PureTech, such notice to state the date at least [ *** ] in the future upon which termination is to be effective. Within [ *** ] following such termination effective date, the Company shall pay to PureTech all amounts due to PureTech through such termination effective date.

11.2 **Termination for Default.**

(a) **Nonpayment.** In the event the Company fails to pay any amounts due and payable to PureTech hereunder, and fails to make such payments within [ *** ] after receiving written notice (by certified US mail) of such failure, PureTech may terminate this Agreement immediately upon written notice to the Company.

(b) **Material Breach by the Company.** In the event the Company commits a material breach of its obligations under this Agreement, including a breach of any of the obligations set forth in Section 2.4 and not including for a breach as described in Section 11.2(a), and fails to cure that breach within [ *** ] after receiving written notice thereof (by certified US mail), PureTech may terminate this Agreement immediately upon written notice to the Company.
11.3 Effect of Termination.

(a) Survival. The following provisions shall survive the expiration or termination of this Agreement: Articles 1, 3 (to the extent necessary to satisfy Section 11.3(b) and (c)), 4 (to the extent necessary to provide final reports), 7, 9, 10, 11, 12 and 13.

(b) Inventory. Upon the early termination of this Agreement, the Company and its Affiliates and any Sublicensees may complete and sell any work-in-progress and inventory of Licensed Products that exist as of the Effective Date of termination, provided that (i) the Company pays PureTech the applicable running royalty or other amounts due on such sales of Licensed Products in accordance with the terms and conditions of this Agreement, and (ii) the Company and its Affiliates and any Sublicensees shall complete and sell all work-in-progress and inventory of Licensed Products within six (6) months after the Effective Date of termination.

(c) Pre-termination Obligations. In no event shall termination of this Agreement release the Company, its Affiliates, or any Sublicensees from the obligation to pay any amounts that became due on or before the effective date of such termination.

12. DISPUTE RESOLUTION.

12.1 Mandatory Procedures. The Parties agree that any dispute arising out of or relating to this Agreement shall be resolved solely by means of the procedures set forth in this Article, and that such procedures constitute legally binding obligations that are an essential provision of this Agreement. If either Party fails to observe the procedures of this Article, as may be modified by their written agreement, the other Party may bring an action for specific performance of these procedures in any court of competent jurisdiction.

12.2 Equitable Remedies. Although the procedures specified in this Article are the sole and exclusive procedures for the resolution of disputes arising out of or relating to this Agreement, either Party may seek a preliminary injunction or other provisional equitable relief if, in its reasonable judgment, such action is necessary to avoid irreparable harm to itself or to preserve its rights under this Agreement.

12.3 Dispute Resolution Procedures.

(a) Negotiation. In the event of any dispute arising out of or relating to this Agreement, the affected Party shall notify the other Party, and the Parties shall attempt in good faith to resolve the matter within [ *** ] after the date of such notice (the "Notice Date"). Any disputes not resolved by good faith discussions shall be referred to senior executives of each Party, who shall meet at a mutually acceptable time and location within [ *** ] after the Notice Date and attempt to negotiate a settlement.
Arbitration. If the matter remains unresolved within [***] after the Notice Date, or if the senior executives fail to meet within [***] after the Notice Date, either Party shall be entitled to submit the matter to binding arbitration under the commercial arbitration rules of the American Arbitration Association. Any such arbitration shall be conducted by a panel of three arbitrators (the “Arbitration Panel”) and shall be conducted in Boston, Massachusetts. PureTech on the one hand, and the Company on the other, shall each appoint one arbitrator, and the third arbitrator shall be appointed by the two arbitrators appointed by PureTech and the Company. The Arbitration Panel shall have the authority to grant specific performance and to allocate between the parties the costs of arbitration in such equitable manner as it shall determine. Judgments upon the award so rendered may be entered in any court having jurisdiction or application may be made to such court for judicial acceptance of any award and an order of enforcement, as the case may be.

13. MISCELLANEOUS.

13.1 Notice. Any notices required or permitted under this Agreement shall be in writing, shall specifically refer to this Agreement, and shall be sent by hand, recognized national overnight courier, confirmed facsimile transmission or registered or certified mail, postage prepaid, return receipt requested, to the following addresses or facsimile numbers of the parties:

If to PureTech: Daphne Zohar
PureTech Ventures, LLC
500 Boylston Street, Suite 1400
Boston, Massachusetts 02116
Tel: 617.482.2333
Fax: 617.482.3337

If to the Company: President
Karuna Pharmaceuticals, Inc.
500 Boylston Street, Suite 1040
Boston, Massachusetts 02116
Tel: 617.482.2333
Fax: 617.482.3337

All notices under this Agreement shall be deemed effective upon receipt. A party may change its contact information immediately upon written notice to the other party in the manner provided in this Section 13.1.

13.2 Governing Law. This Agreement and all disputes arising out of or related to this Agreement, or the performance, enforcement, breach or termination hereof, and any remedies relating thereto, shall be construed, governed, interpreted and applied in accordance with the laws of the Commonwealth of Massachusetts, U.S.A., without regard to conflict of laws principles, except that questions affecting the construction and effect of any patent shall be determined by the law of the country in which the patent shall have been granted.

13.3 Force Majeure. Neither party will be responsible for delays resulting from causes beyond the reasonable control of such party, including without limitation fire, explosion, flood,
war, strike, or riot, provided that the nonperforming party uses commercially reasonable efforts to avoid or remove such causes of nonperformance and continues performance under this Agreement with reasonable dispatch whenever such causes are removed.

13.4 Amendment and Waiver. This Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties. Any waiver of any rights or failure to act in a specific instance shall relate only to such instance and shall not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

13.5 Severability. In the event that any provision of this Agreement shall be held invalid or unenforceable for any reason, such invalidity or unenforceability shall not affect any other provision of this Agreement, and the parties shall negotiate in good faith to modify the Agreement to preserve (to the extent possible) their original intent. If the Parties fail to reach a modified agreement within thirty (30) days after the relevant provision is held invalid or unenforceable, then the dispute shall be resolved in accordance with the procedures set forth in Article 13. While the dispute is pending resolution, this Agreement shall be construed as if such provision were deleted by agreement of the parties.

13.6 Binding Effect. This Agreement shall be binding upon and inure to the benefit of the parties and their respective permitted successors and assigns.

13.7 Headings. All headings are for convenience only and shall not affect the meaning of any provision of this Agreement.

13.8 Entire Agreement. This Agreement constitutes the entire agreement between the parties with respect to its subject matter and supersedes all prior agreements or understandings between the parties relating to its subject matter.
The Effective Date of this Agreement is March 4, 2011.

PURETECH VENTURES LLC

By: /s/ Daphne Zdhar
Name: Daphne Zdhar
Title: Managing Partner

KARUNA PHARMACEUTICALS, INC.

By: /s/ Edmund Harrigan
Name: Edmund Harrigan MD
Title: Chief Executive Officer
This Amendment No. 1 ("Amendment No. 1") to the Exclusive Patent License Agreement dated as of March 1, 2011 (the "Agreement") by and among PureTech Ventures, LLC, (the "Company"), and Karuna Pharmaceuticals, Inc. (the "licensee") is entered into on this 1st day of February, 2013 (the "Amendment No. 1 Effective Date"). For purposes hereof, all capitalized terms used herein but not defined herein shall have the meanings given to them in the Agreement.

Pursuant to Section 13.4 of the Agreement, the Company and the Licensee hereby agree as follows:

1. Section 2.4 of the Agreement is hereby deleted and replaced in its entirety as follows:

**Due Diligence Obligations.** The Company shall use diligent efforts, and shall cause its Affiliates and any Sublicensees to use diligent efforts, to develop Licensed Products and to introduce Licensed Products into the commercial market; thereafter, the Company and its Affiliates and any Sublicensees shall maximize the commercial sales of such Licensed Products. Specifically, the Company and its Affiliates and any Sublicensees shall fulfill the following obligations:

   a. Within [ *** ] of the Amendment No. 1 Effective Date, the Company shall initiate, defined as first dosing of patient, a trial using a Licensed Product.

   b. At any time prior to approval of a Licensed Product by the U.S. Food and Drug Administration, the Company shall not, for any consecutive [ *** ] period, fail to initiate, defined as first dosing of patient, a human clinical study with a Licensed Product or make a regulatory submission to the U.S. Food and Drug Administration, the European Medicines Evaluation Agency, or the Japanese Ministry of Health and Welfare seeking the marketing of a License Product for the treatment of a disease.

   c. The Company shall not (i) become insolvent; (ii) make an assignment for the benefit of creditors; or (iii) have a bona fide petition in bankruptcy filed for or against it, which petition is withdrawn or dismissed within [ *** ] of its filing.

In the event that PureTech determines that the Company (or an Affiliate or Sublicensee) has failed to fulfill its obligations under this Section 2.4, then PureTech may treat such failure as a material breach in accordance with Section 11.2(b).

2. The parties agree that the Agreement is in full force and effect as of the Amendment No. 1 Effective Date, as amended as set forth above.

IN WITNESS WHEREOF, the parties have caused this Amendment No. 1 to be executed by their duly authorized representatives as of the Amendment No. 1 Effective Date.
Karuna Pharmaceuticals, Inc.

By:     /s/ Eric Elenko
Name:   Eric Elenko
Title:  Director

PureTech Ventures, LLC

By:     /s/ Stephen Muniz
Name:   Stephen Muniz
Title:  Partner
AMENDMENT NO. 2 TO EXCLUSIVE PATENT LICENSE AGREEMENT

This Amendment No. 2 ("Amendment No. 2") to the Exclusive Patent License Agreement dated as of March 4, 2011 (the "Agreement") by and among PureTech Ventures, LLC (the "Company"), and Karuna Pharmaceuticals, Inc. (the "licensee") is entered into on this 25th day of February, 2015 (the "Amendment No. 2 Effective Date"). For purposes hereof, all capitalized terms used herein but not defined herein shall have the meanings given to them in the Agreement.

Pursuant to Section 13.4 of the Agreement, the Company and the Licensee hereby agree as follows:

1. Section 2.4 of the Agreement, which was first amended by Amendment No. 1 to Exclusive License Agreement dated February 1, 2013 ("Amendment No. 1"), which Amendment No. 1 deleted and replaced Section 2.4 in its entirety is hereby deleted and replaced in its entirety a second time to read as follows:

Due Diligence Obligations. The Company shall use diligent efforts, and shall cause its Affiliates and any Sublicensees to use diligent efforts, to develop Licensed Products and to introduce Licensed Products into the commercial market; thereafter, the Company and its Affiliates and any Sublicensees shall maximize the commercial sales of such Licensed Products. Specifically, the Company and its Affiliates and any Sublicensees shall fulfill the following obligations:

a. Within [***] of the Amendment No. 2 Effective Date, the Company shall initiate, defined as first dosing of patient, a trial using a Licensed Product.

b. At any time prior to approval of a Licensed Product by the U.S. Food and Drug Administration, the Company shall not, for any consecutive [***] period, fail to initiate, defined as first dosing of patient, a human clinical study with a Licensed Product or make a regulatory submission to the U.S. Food and Drug Administration, the European Medicines Agency, or the Japanese Ministry of Health, Labour and Welfare seeking the marketing of a Licensed Product for the treatment of a disease.

c. The Company shall not (i) become insolvent; (ii) make an assignment for the benefit of creditors; or (iii) have a bona fide petition in bankruptcy filed for or against it, which petition is withdrawn or dismissed within [***] of its filing.

In the event that PureTech determines that the Company (or an Affiliate or Sublicensee) has failed to fulfill its obligations under this Section 2.4, then PureTech may treat such failure as a material breach in accordance with Section 11.2(b).”

2. The parties agree that the Agreement is in full force and effect as of the Amendment No. 2 Effective Date, as amended as set forth above.

IN WITNESS WHEREOF, the parties have caused this Amendment No. 2 to be executed by their duly authorized representatives as of the Amendment No. 2 Effective Date.
AMENDMENT NO. 3 TO EXCLUSIVE PATENT LICENSE AGREEMENT

This Amendment No. 3 ("Amendment No. 3") to the Exclusive Patent License Agreement dated as of March 4, 2011 (the "Agreement") by and among PureTech Health LLC (f/k/a PureTech Ventures, LLC) ("PureTech"), and Karuna Pharmaceuticals, Inc. (the "Company"), as previously amended by Amendment No. 1 to Exclusive License Agreement dated February 1, 2013 ("Amendment No. 1") and Amendment No. 2 to Exclusive License Agreement dated February 25, 2015 ("Amendment No. 2"), is entered into effective as of July 31, 2015 (the "Amendment No. 3 Effective Date"). For purposes hereof, all capitalized terms used herein but not defined herein shall have the meanings given to them in the Agreement.

Pursuant to Section 13.4 of the Agreement, PureTech and the Company hereby agree as follows:

1. Section 5.3 of the Agreement, as amended pursuant to Amendment 1 and Amendment 2, is hereby deleted and replaced in its entirety to read as follows:

   "5.3 Reversion of Patent Rights. The Company may elect not to prosecute certain of the Patent Rights (including rights in certain countries or territories). If (i) the Company has elected not to prosecute any such Patent Rights, and (ii) any third party with a binding contractual right to prosecute such Patent Rights on behalf of the Company has waived or otherwise affirmatively elected not to exercise such right, then the Company may notify PureTech of the same and upon such notice such Patent Rights shall automatically revert to PureTech and be excluded from the definition of "Patent Rights" hereunder."

2. PureTech and the Company agree that the Agreement, as amended by Amendment No. 1 and Amendment No. 2, is in full force and effect as of the Amendment No. 3 Effective Date as amended as set forth herein.

IN WITNESS WHEREOF, the undersigned parties have caused this Amendment No. 3 to be executed by their duly authorized representatives as of the Amendment No. 3 Effective Date.

KARUNA PHARMACEUTICALS, INC.

By: /s/ Eric Elenko
Name: Eric Elenko
Title: President

PURETECH HEALTH LLC

By: /s/ Stephen Muniz
Name: Stephen Muniz
Title: EVP, Legal, Finance & Operations
OFFICE LEASE
by and between
T-C 33 ARCH STREET LLC
a Delaware limited liability company
(“Landlord”)
and
KARUNA PHARMACEUTICALS, INC.
a Delaware corporation
(“Tenant”)
Dated as of
November 2, 2018
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OFFICE LEASE

THIS OFFICE LEASE (this “Lease”) is made between T-C 33 Arch Street LLC, a Delaware limited liability company (“Landlord”), and the Tenant described in Item 1 of the Basic Lease Provisions.

LEASE OF PREMISES

Landlord hereby leases to Tenant and Tenant hereby leases from Landlord, subject to all of the terms and conditions set forth herein, those certain premises (the “Premises”) described in Item 3 of the Basic Lease Provisions and as shown in the drawing attached hereto as Exhibit A-1. The Premises are located in the Building described in Item 2 of the Basic Lease Provisions. The Building is located on that certain land (the “Land”) more particularly described on Exhibit A-2 attached hereto, which is also improved with landscaping and other improvements, fixtures and common areas and appurtenances now or hereafter placed, constructed or erected on the Land.

BASIC LEASE PROVISIONS

1. Tenant: Karuna Pharmaceuticals, Inc., a Delaware corporation (“Tenant”)
2. Building: 33 Arch Street 33 Arch Street Boston, Massachusetts 02110
3. Description of Premises: Suite 3110 comprising approximately 7,050 rentable square feet on the thirty first (31st) floor of the Building.

The Premises do not include the area above dropped ceilings, below the upper surface of floor slabs or the areas outside of the inner surface of interior walls and plate glass (the areas above dropped ceilings up to the underside of the slab above such dropped ceiling and outside the inner surface of interior walls until the edge of the Premises are referred to in this Lease as “Installation Areas”).

Rentable Area: Approximately 7,050 rentable square feet
Rentable Area of Building: 603,309 rentable square feet (subject to Paragraph 18)
4. Tenant’s Proportionate Share: 1.169% (7,050 rsf /603,309 rsf) (See Paragraph 3)
5. Base Rent:

<table>
<thead>
<tr>
<th>Period</th>
<th>Annual Base Rent</th>
<th>Monthly Installment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commencement Date—day before the Rent Commencement Date*</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Lease Year 1</td>
<td>$493,500.00</td>
<td>$41,125.00</td>
</tr>
<tr>
<td>Lease Year 2</td>
<td>$500,550.00</td>
<td>$41,712.50</td>
</tr>
<tr>
<td>Lease Year 3</td>
<td>$507,600.00</td>
<td>$42,300.00</td>
</tr>
<tr>
<td>Lease Year 4</td>
<td>$514,650.00</td>
<td>$42,887.50</td>
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Tenant shall have no obligation to pay Annual Base Rent for the period commencing as of the Commencement Date, and expiring at the expiration of the day before the Rent Commencement Date (the “Rent Abatement Period”). During the Rent Abatement Period, only Annual Base Rent shall be abated, and all Additional Rent (as hereinafter defined) and other costs and charges specified in the Lease shall remain as due and payable pursuant to the provisions of the Lease.

As used in this Lease, “Lease Year” means each period of one year during the Term commencing on the Rent Commencement Date or on any anniversary thereof, or, if such Rent Commencement Date does not fall on the first day of a calendar month, the first Lease Year shall consist of the partial calendar month following the Rent Commencement Date and the succeeding twelve full calendar months, and each succeeding Lease Year shall consist of a one-year period commencing on the first day of the calendar month following the calendar month in which such Rent Commencement Date fell.

(See Paragraph 2)

6. Installment of Base Rent Payable Upon Execution: $41,125.00

7. Security Deposit Payable Upon Execution: $123,375.00, in the form of a Letter of Credit, subject to possible reduction pursuant to Paragraph 2(c) (See Paragraph 2(c))

8. Base Year for Operating Expenses: Calendar year 2019 (See Paragraph 3)

9. Base Year for Real Estate Taxes: Fiscal tax year 2019 (See Paragraph 3)

9. Term: A period of fifty-one (51) calendar months (plus the partial month, if any, immediately following the Commencement Date), commencing on the Commencement Date and terminating on the Termination Date. (See Paragraph 1).

10. Commencement Date: The date on which Landlord shall deliver possession of the Premises to Tenant with Landlord’s Work Substantially Complete, in accordance with the provisions of this Lease. Landlord estimates that such date shall be on or about December 1, 2018 (the “Estimated Commencement Date”) (See Paragraph 1 and Exhibit B)

11. Rent Commencement Date The date that is three (3) months following the Commencement Date. (See Paragraph 1).
12. Termination Date: The date that is fifty-one (51) calendar months (plus the partial month, if any) immediately following the Commencement Date.

13. Broker(s) (See Paragraph 19(k))
   Landlord’s Broker: CBRE-N.E. Partners, L.P.
   Tenant’s Broker: Jones Lang LaSalle

14. Number of Parking Spaces: Three (3) parking spaces on the terms described in Paragraph 18.

15. Address for Notices:
   To: TENANT:
   Prior to occupancy of the Premises:
   Karuna Pharmaceuticals, Inc.
   c/o PureTech Health LLC
   501 Boylston Street
   Suite 6102 Boston, Massachusetts 02116
   Attn: President
   After occupancy of the Premises:
   Karuna Pharmaceuticals, Inc.
   33 Arch Street, Suite 3110
   Boston, Massachusetts 02110
   Attn: President
   With a copy to:
   Anderson & Kreiger LLP
   50 Milk Street, 21st Floor
   Boston, Massachusetts 02109
   Attn: David L. Wiener, Esq.

   To: LANDLORD:
   Office of the Building
   T-C 33 Arch Street LLC
   33 Arch Street
   Boston, Massachusetts 02110
   Attention: Property Manager
   With a copy to:
   T-C 33 Arch Street LLC
   c/o TH Real Estate
   100 Federal Street, 33rd Floor
   Boston, Massachusetts 02110
   Attention: William K. Abramowitz

16. Address for Payment of Rent: All payments payable under this Lease shall be sent to
   Landlord at:
   Office of the Building
   33 Arch Street
   Boston, Massachusetts 02110
   Or to such other address as Landlord may designate to Tenant from time to time in writing.

17. Guarantor: N/A

18. Tenant Improvement Allowance: $141,000.00. (See Paragraph 4(a)).


This Lease consists of the foregoing introductory paragraphs and Basic Lease Provisions, the provisions of the Standard Lease Provisions (the “Standard Lease Provisions”) (consisting of Paragraph 1 through Paragraph 19 which follow) and Exhibits A-1 through Exhibits A-2 and Exhibits B through Exhibit F, all of which are incorporated herein by this reference. In the event of any conflict between the provisions of the Basic Lease Provisions and the provisions of the Standard Lease Provisions, the Standard Lease Provisions shall control.
1. TERM.
   (a) The Term of this Lease shall commence on the Commencement Date (as defined in Item 10 of the Basic Lease Provisions) and the Rent (defined below) shall commence on the Rent Commencement Date (as defined in Item 11 of the Basic Lease Provisions). Unless earlier terminated in accordance with the provisions hereof, the Term of this Lease shall be the period shown in Item 9 of the Basic Lease Provisions. As used herein, “Lease Term” shall mean the Term referred to in Item 9 of the Basic Lease Provisions, subject to any early termination thereof and the “Expiration Date” shall be the last day of the Lease Term. Unless Landlord is terminating this Lease prior to the Termination Date (as defined in Item 12 of the Basic Lease Provisions) in accordance with the provisions hereof, Landlord shall not be required to provide notice to Tenant of the Expiration Date. This Lease shall be a binding contractual obligation effective upon execution and delivery hereof by Landlord and Tenant, notwithstanding the later commencement of the Initial Term of this Lease.
   (b) The Premises will be delivered to Tenant on the Commencement Date. If the Commencement Date is delayed, this Lease shall not be void or voidable, nor shall Landlord be liable to Tenant for any loss or damage resulting therefrom.
   (c) Upon Landlord’s preparation and delivery to Tenant of Tenant’s Commencement Letter in the form of Exhibit E attached hereto (the “Commencement Letter”), and, absent manifest error, Tenant shall acknowledge the same by executing a copy and shall return it to Landlord. If, within thirty (30) days of its receipt from Landlord, Tenant (i) fails to sign and return the Commencement Letter to Landlord or (ii) fails to identify in writing to Landlord the terms and provisions of the Commencement Letter which are incorrect, the Commencement Letter as sent by Landlord shall be deemed to have correctly set forth the Commencement Date and the other matters addressed in the Commencement Letter. Failure of Landlord to send the Commencement Letter shall have no effect on the Commencement Date.

2. BASE RENT AND SECURITY DEPOSIT.
   (a) Except as expressly provided to the contrary in this Lease, Tenant agrees to pay with respect to each calendar month (and proportionately on a per diem basis for any partial calendar month of the Lease Term) from and after the Rent Commencement Date as Base Rent (“Base Rent”) for the Premises the sums shown for such periods in Item 5 of the Basic Lease Provisions.
   (b) Except as expressly provided to the contrary in this Lease, Base Rent shall be payable in consecutive monthly installments, in advance, without demand, deduction or offset, commencing on the Rent Commencement Date and continuing on the first day of each calendar month thereafter until the expiration of the Lease Term. The first full monthly installment of Base Rent shall be payable upon Tenant’s execution of this Lease and shall be credited against the Rent next coming due. The obligation of Tenant to pay Rent and other sums to Landlord and the obligations of Landlord under this Lease are independent obligations. In the event Landlord delivers possession of the Premises to Tenant prior to the Commencement Date, Tenant agrees it
shall be bound by and subject to all terms, covenants, conditions and obligations of this Lease during the period if any between the date possession is delivered and the Commencement Date, other than the payment of Base Rent, Operating Expenses, Additional Rent and Taxes Additional Rent in the same manner as if delivery had occurred on the Commencement Date.

(c)

(i) Tenant shall deliver to Landlord simultaneously with the delivery of this Lease as executed by Tenant, as collateral for the full performance by Tenant of all of its obligations under this Lease and for all losses and damages Landlord may suffer as a result of Tenant’s failure to comply with one or more provisions of this Lease, a Letter of Credit (hereinafter defined) containing the terms required herein, in the face amount of $123,375.00 (the “Letter of Credit Amount”).

“Letter of Credit” shall mean a clean, irrevocable, non-documentary and unconditional letter of credit, permitting multiple and partial draws thereon, and otherwise in form acceptable to Landlord in its sole, reasonable discretion issued by and drawable upon a commercial bank (the “Issuing Bank”), which is satisfactory to Landlord and which satisfies both the Minimum Rating Agency Threshold (as hereinafter defined) and the Minimum Capital Threshold (as hereinafter defined). The “Minimum Rating Agency Threshold” shall mean that the Issuing Bank has outstanding unsecured, uninsured and unguaranteed senior long-term indebtedness that is then rated (without regard to qualification of such rating by symbols such as “+”, – or numerical notation) “Baa” or better by Moody’s Investors Service, Inc. and/or “BBB” or better by Standard & Poor’s Rating Services, or a comparable rating by a comparable national rating agency designated by Landlord in its discretion. The “Minimum Capital Threshold” shall mean that the Issuing Bank has combined capital, surplus and undivided profits of not less than $2,000,000,000.

If, at any time or from time to time, Landlord determines that an Issuing Bank (i) no longer satisfies the Minimum Rating Agency Threshold, (ii) no longer satisfies the Minimum Capital Threshold, (iii) has been seized or closed by the Federal Reserve Board, the Federal Deposit Insurance Corporation, the Office of the Comptroller of the Currency, or another governmental or regulatory agency or authority, (iv) has become insolvent, or (v) is unwilling or unable to honor the Letter of Credit or to perform its obligations to honor a draw upon the Letter of Credit, then within thirty (30) days after demand, Tenant shall deliver to Landlord a replacement Letter of Credit, issued by a replacement Issuing Bank which satisfies the Minimum Rating Agency Threshold and the Minimum Capital Threshold and is otherwise satisfactory to Landlord in its discretion.

Tenant shall cause each Letter of Credit to be continuously maintained in effect (whether through replacement, renewal or extension) in the Letter of Credit Amount through the date (the “Final LC Expiration Date”) that is 30 days after the scheduled expiration date of the Term or any renewal Term. If the Letter of Credit held by Landlord expires earlier than the Final LC Expiration Date (whether by reason of a stated expiration date or a notice of termination or nonrenewal given by the issuing bank), Tenant shall deliver a new Letter of Credit or certificate of renewal or extension (a “Renewal or Replacement LC”) to Landlord not later than 30 days prior to the expiration date of the Letter of Credit then held by Landlord. Any Renewal or Replacement LC shall comply with all of the provisions of this Paragraph 2(c), shall be irrevocable, transferable and shall remain in effect (or be automatically renewable) through the Final LC Expiration Date upon the same terms as the expiring Letter of Credit or such other terms as may be acceptable to Landlord in its sole, reasonable discretion.
(ii) Drawings under Letter of Credit. Upon default by Tenant, Landlord may, without prejudice to any other remedy provided in this Lease or by Law, draw on the Letter of Credit and use all or part of the proceeds to satisfy any amounts due to Landlord from Tenant. In addition, if Tenant fails to furnish a Renewal or Replacement LC complying with all of the provisions of this Paragraph 2(c) at least 30 days prior to the stated expiration date of the Letter of Credit then held by Landlord, Landlord may draw upon such Letter of Credit and hold the proceeds thereof (and such proceeds need not be segregated) in accordance with the terms of this Paragraph 2(c) (the “LC Proceeds Account”).

(iii) Use of Proceeds by Landlord. The proceeds of the Letter of Credit shall constitute Landlord’s sole and separate property (and not Tenant’s property or the property of Tenant’s bankruptcy estate) and Landlord may immediately upon any draw (and without notice to Tenant) apply or offset the proceeds of the Letter of Credit: (a) against any Rent payable by Tenant under this Lease that is not paid when due; (b) against all losses and damages that Landlord has suffered or that Landlord reasonably estimates that it may suffer as a result of Tenant’s failure to comply with one or more provisions of this Lease; (c) against any costs incurred by Landlord in connection with the Lease (including reasonable attorneys’ fees); and (d) against any other amount that Landlord may spend or become obligated to spend by reason of Tenant’s Default. Provided Tenant has performed all of its obligations under this Lease, Landlord agrees to pay to Tenant within 30 days after the Final LC Expiration Date the amount of any proceeds of the Letter of Credit received by Landlord and not applied as allowed above; provided, that if prior to the Final LC Expiration Date a voluntary petition is filed by Tenant, or an involuntary petition is filed against Tenant by any of Tenant’s creditors, under the Federal Bankruptcy Code, then Landlord shall not be obligated to make such payment in the amount of the unused Letter of Credit proceeds until either all preference issues relating to payments under this Lease have been resolved in such bankruptcy or reorganization case or such bankruptcy or reorganization case has been dismissed, in each case pursuant to a final court order not subject to appeal or any stay pending appeal.

(iv) Additional Covenants of Tenant. If, as result of any application or use by Landlord of all or any part of the Letter of Credit, the amount of either Letter of Credit shall be less than the Letter of Credit Amount, Tenant shall, within 5 business days thereafter, provide Landlord with additional letter(s) of credit in an amount equal to the deficiency (or a replacement letter of credit in the total Letter of Credit Amount), and any such additional (or replacement) letter of credit shall comply with all of the provisions of this Paragraph 2(c), and if Tenant fails to comply with the foregoing, notwithstanding anything to the contrary contained in this Lease, the same shall constitute an incurable Default by Tenant. Tenant further covenants and warrants that it will neither assign nor encumber the Letter of Credit or any part thereof and that neither Landlord nor its successors or assigns will be bound by any such assignment, encumbrance, attempted assignment or attempted encumbrance.
(v) Tenant shall be entitled to a reduction in the amount of the Letter of Credit to $41,125.00 on the third (3rd) anniversary of the Rent Commencement Date if there exists no uncured Event of Default under the terms of this Lease, and (ii) Landlord has not applied the Letter of Credit, or any portion thereof, to Landlord’s damages arising from any default on the part of Tenant, whether or not Tenant has restored the amount so applied by Landlord. If an Event of Default exists under the Lease as of the third (3rd) anniversary of the Rent Commencement Date and thereafter Tenant has caused the Event of Default to be cured, then, provided that Landlord shall not have applied the Letter of Credit, or any portion thereof, to Landlord’s damages arising from any default on the part of Tenant, Tenant shall be entitled to such reduction at such time thereafter as no uncured Event of Default exists.

If Tenant believes that it has satisfied all the conditions precedent to a reduction in the amount of the Letter of Credit, then it shall request such reduction in writing to Landlord. If Landlord determines that all of the aforesaid conditions are met, the Security Deposit shall be so reduced in accordance with this Paragraph 2(c)(v). No Letter of Credit shall automatically reduce, but any reduction in the amount thereof shall require Landlord’s prior written notice to the issuer of the Letter of Credit of the reduced amount. Promptly after Landlord’s receipt of Tenant’s written request for a reduction as described above, Landlord shall determine whether such a reduction is permitted in accordance with this Paragraph 2(c)(v), and if it is, Landlord shall promptly notify the issuer of the Letter of Credit in writing of the amount to which the Letter of Credit shall be reduced, and Landlord shall at its election either (i) exchange the Letter of Credit initially delivered hereunder by Tenant for a replacement Letter of Credit delivered by Tenant which reduces the amount of the Letter of Credit and otherwise in strict conformity with the requirements herein, or (ii) permit the Issuing Bank to amend the Letter of Credit to reduce the amount of the Letter of Credit in accordance with this Paragraph 2(c)(v).

(d) The parties agree that for all purposes hereunder the Premises and the Building shall be stipulated to contain the number of square feet of Rentable Area respectively described in Item 3 of the Basic Lease Provisions.

(e) Base Rent shall be paid to Landlord absolutely net of all costs and expenses. The provisions for payment of Operating Expenses by means of periodic payment of Tenant’s Proportionate Share of estimated Operating Expenses and the year end adjustment of such payments are intended to pass on to Tenant and reimburse Landlord for Tenant’s Proportionate Share of all costs and expenses of the nature described in Paragraph 3 of this Lease.

3. ADDITIONAL RENT

(a) If Operating Expenses (defined below) for the Land and Building for any calendar year during the Lease Term exceed Base Operating Expenses (defined below), Tenant shall pay to Landlord, concurrent with each installment of Base Rent as additional rent (together with all other amounts payable under this Lease, “Operating Expenses Additional Rent”) an amount equal to Tenant’s Proportionate Share (defined below) of such excess (“Operating Expenses Excess”). If Real Estate Taxes (defined below) for the Land and Building for any calendar year during the Lease Term exceed Base Real Estate Taxes (defined below), Tenant shall pay to Landlord as additional rent (“Taxes Additional Rent”) an amount equal to Tenant’s Proportionate Share of such excess (“Taxes Excess”). The term “Additional Rent” shall mean, collectively, the Operating Expenses Additional Rent and Taxes Additional Rent.
(b) “Tenant’s Proportionate Share” is, subject to the provisions of Paragraph 18, the percentage number described in Item 4 of the Basic Lease Provisions. Tenant’s Proportionate Share represents, subject to the provisions of Paragraph 18, a fraction, the numerator of which is the number of square feet of Rentable Area in the Premises and the denominator of which is the number of square feet of Rentable Area for lease to third parties in the Building, as determined by Landlord pursuant to Paragraph 18.

(c) “Base Operating Expenses” means all Operating Expenses incurred or payable by Landlord during the calendar year specified as Tenant’s Base Year for Operating Costs in Item 8 of the Basic Lease Provisions. The term “Base Real Estate Taxes” shall mean all Real Estate Taxes incurred or payable by Landlord during the calendar year specified as Tenant’s Base Year for Real Estate Taxes in Item 8 of the Basic Lease Provisions.

(d) “Operating Expenses” means all costs, expenses and obligations incurred or payable by Landlord in connection with the operation, ownership, management, repair or maintenance of the Land and Building during or allocable to the Lease Term, including without limitation, the cost of services and utilities (including taxes and other charges incurred in connection therewith) provided to the Premises (other than those separately metered utilities for which Tenant is responsible under this Lease), the Building or the Land, including, without limitation, water, power, gas, sewer, waste disposal, telephone and cable television facilities, fuel, supplies, equipment, tools, materials, service contracts, janitorial service, waste and refuse disposal, window cleaning, maintenance and repair of sidewalks and Building exterior and services areas, gardening and landscaping; insurance, including, but not limited to, public liability, fire, property damage, wind, hurricane, earthquake, terrorism, flood, rental loss, rent continuation, boiler machinery, business interruption, contractual indemnification and property/casualty coverage insurance for the Land and/or Building and such other insurance as is carried by Landlord in its discretion, and the deductible portion of any insured loss otherwise covered by such insurance; the cost of compensation, including employment, welfare and social security taxes, paid vacation days, disability, pension, medical and other fringe benefits of all persons (including independent contractors) who perform services connected with the operation, maintenance, repair or replacement of the Land and/or Building at or below the level of building manager (as described below); any association assessments, costs, dues and/or expenses relating to the Land and/or Building; personal property taxes on and maintenance and repair of equipment and other personal property used in connection with the operation, maintenance or repair of the Land and/or Building; repair and replacement of window coverings provided by Landlord in the premises of tenants in the Building; such reasonable auditors’ fees and legal fees as are incurred in connection with the operation, maintenance or repair of the Land and/or Building, except as excluded below; a property management fee, which fee shall not exceed 3% of the gross revenue of the Building (and which fee may be imputed if Landlord has internalized management or otherwise acts as its own property manager); the maintenance of any easements or ground leases benefiting the Land and/or Building, whether by Landlord or by an independent contractor; a reasonable allowance for depreciation of personal property used in the operation, maintenance or repair of the Land and/or Building; license, permit and inspection fees unless incurred as a result of violations of Laws (defined below) by Landlord or another tenant in the Building; all costs and expenses required by any governmental or quasi-governmental authority to make the Land or the Building conform with applicable law not in effect as of the Date of this Lease, for any reason, including capital improvements, whether capitalized or expensed for accounting or tax purposes, and the cost of any capital improvements.
made to the Land or Building by Landlord which are (i) intended to effect economies in the operation or maintenance of the Land or building, reduce future Operating Expenses, enhance the safety or security of the Land or Buildings or its occupants or reduce the environmental impact of the Building and (ii) and the costs to replace (rather than repair which would be included in any event) items which Landlord would be obligated to repair under the Lease (provided that with respect to all such costs which are capital in nature there shall be included in any calendar year only the amount of the straight-line amortization of such cost over the lesser of (A) the useful life of the associated item and (B) the Payback Period (as hereinafter defined), together in either case with interest thereon at the rate of eight percent (8%) per annum or such higher rate as may have been paid by Landlord on funds borrowed for the purpose of funding such improvements); the cost of air conditioning, heating, ventilating, plumbing, elevator maintenance and repair (to include the replacement of components which are in the nature of repairs as hereinafter described) and other mechanical and electrical systems repair and maintenance (including the replacement of components of the systems which are in the nature of repairs and are not required to be considered capital expenses under first class office building accounting standards even if such item might be classified as a capital expenditure under generally accepted accounting principles (by way of example, a fan motor in an HVAC distribution box might be a capital expense under generally accepted accounting principles but would be considered as a repair under first class office building accounting standards as in use by the Building)); sign maintenance; and Common Area (defined below) repair, resurfacing, operation and maintenance; the reasonable cost for temporary lobby displays and events commensurate with the operation of a similar class building, and the cost of providing security services, if any, deemed appropriate by Landlord from time to time. “Payback Period” means the period of time that Landlord reasonably estimates in accordance with generally accepted accounting principles it will take for the cost savings resulting from a capital improvement to equal the total cost of the capital improvement.

The following items shall be excluded from Operating Expenses:

(i) leasing commissions, attorneys’ fees, advertising costs, promotional costs, public relation fees, and all other costs and disbursements and other expenses incurred in connection with leasing, renovating or improving vacant space in the Building for tenants or prospective tenants of the Building;

(ii) costs (including permit, license and inspection fees) incurred in renovating or otherwise improving or decorating, painting or redecorating space for tenants or vacant space;

(iii) Landlord’s costs of any services provided to tenants to the extent (i) comparable services are not provided to Tenant, or (ii) Landlord is entitled to be reimbursed by such tenants as an additional charge or rental over and above the base rent and operating expenses payable under the lease with such tenant or other occupant;

(iv) any depreciation or amortization of the Building or equipment used in connection with the operation or maintenance of the Building except as expressly permitted herein;
(v) costs incurred due to a violation of Law (defined below) by Landlord relating to the Land or Building;

(vi) interest on debt or amortization payments on any mortgages or deeds of trust or any other debt for borrowed money, except as expressly permitted herein;

(vii) repairs or other work occasioned by fire, windstorm or other work to the extent paid for through insurance or condemnation proceeds (excluding any deductible);

(viii) legal fees and expenses or other professional or consulting fees and expenses incurred for (i) negotiating lease terms for prospective tenants, (ii) negotiating termination or extension of leases with existing tenants, (iii) proceedings against any other specific tenant, including, without limitation, rent collection proceedings; (iv) the purchase or sale of the Building or (v) negotiating or enforcing any ground lease related to all or any portion of the Land;

(ix) except as expressly set forth above in this Paragraph 3(d), the cost of alterations, additions, capital improvements, equipment replacements and other items which under generally accepted accounting principles are properly classified as capital expenditures; it being further understood and agreed to by the parties that, with respect to capital expenditures for the purpose of reducing Operating Expenses, the annual amortization to be included in Operating Expenses shall not exceed Landlord’s reasonable estimate of the annual savings realized by such capital expenditures;

(x) ground rent or similar payments to a ground lessor, if any;

(xi) repairs necessitated by the negligence or willful misconduct of Landlord;

(xii) compensation paid to officers, executives or employees above the level of building manager (however titled) of Landlord and/or Landlord’s property manager;

(xiii) overtime HVAC costs or excess electricity costs that are separately charged to Building tenants, including without limitation Tenant;

(xiv) operating expenses which are individually responsibility of Tenant or of other tenants and the cost of performing additional services that are separately charged to Building tenants, including without limitation Tenant;

(xv) any amounts payable by Landlord as a result of Landlord’s failure to perform its obligations on a timely basis, or by way of indemnity or for damages or which constitute a fine, interest, or penalty, including interest or penalties for any late payments of Operating Expenses;

(xvi) any costs representing an amount paid for services or materials to a related person, firm, or entity to the extent such amount exceeds the amount that would be paid for such services or materials at the then existing market rates to an unrelated person, firm or corporation;
(xvii) the cost of overtime or other expenses to Landlord in curing its defaults;
(xviii) income and franchise taxes of Landlord;
(xix) any bad debt loss, rent loss, or reserves for bad debts or rent loss;
(xx) attorneys’ fees and other costs and expenses awarded to any tenant pursuant to any lease, or incurred as a result of Landlord’s failure to maintain any insurance required of Landlord under this Lease or any other lease;
(xxi) costs associated with the operation of the legal entity which constitutes the Landlord or persons or entities which constitute or are affiliated with the Landlord or its partners or members, as such costs are separate and apart from costs associated with the operation of the Building, including legal entity formation, internal entity accounting and internal legal matters;
(xxii) costs resulting from Landlord’s breach of this Lease;
(xxiii) costs imposed by a governmental authority as a result of a violation of any Laws where such violation is not caused by Tenant;
(xxiv) the cost of any electric service provided to any leased space in the Building (i.e., other than to Common Areas);
(xxv) costs arising from the removal of Hazardous Materials (as hereinafter defined), in, about or below the Building or the property due to governmental regulations enacted prior to the date hereof;
(xxvi) reserves with respect to any anticipated Operating Expenses;
(xxvii) costs recoverable under any warranties carried by Landlord;
(xxviii) political contributions;
(xxix) Landlord’s advertising and promotional expenses for the Building;
(xxx) the cost of the improvements to the Building’s lobby presently planned by the Landlord;
( xxxi) the cost of the repair, maintenance, and operation of the Parking Garage (defined below); and
( xxxii) artwork.
(e) “Real Estate Taxes”. Any form of assessment, license fee, license tax, business license fee, levy, charge, improvement bond, tax, water and sewer rents and charges, utilities and communications taxes and charges or similar or dissimilar imposition imposed by any authority having the direct power to tax, including any city, county, state or federal government, or any school, agricultural, lighting, drainage or other improvement or special assessment district thereof, or any other governmental charge, general and special, ordinary and extraordinary, foreseen and unforeseen, which may be assessed against any legal or equitable interest of Landlord in the Premises, Building or the Land. Real Estate Taxes shall also include, without limitation:

(i) any hereafter adopted assessment, tax, fee, levy or charge in substitution, partially or totally, of any assessment, tax, fee, levy or charge previously included within the ad valorem real property taxes. It is the intention of Tenant and Landlord that all such new and increased assessments, taxes, fees, levies and charges be included within the definition of “Real Estate Taxes” for the purposes of this Lease;

(ii) any assessment, tax, fee, levy or charge allocable to or measured by the area of the Premises or other premises in the Building or the rent payable by Tenant hereunder or other tenants of the Building, including, without limitation, any gross receipts tax or excise tax levied by state, city or federal government, or any political subdivision thereof, with respect to the receipt of such rent, or upon or with respect to the possession, leasing, operation, management, maintenance, alteration, repair, use or occupancy by Tenant of the Premises, or any portion thereof but not on Landlord’s other operations;

(iii) any business improvement district assessments or charges, or PILOT (i.e., payments in lieu of taxes payments); and with respect to any betterment assessments or other special assessments included in Real Estate Taxes, Landlord shall be deemed to have elected to pay the same over the longest period permitted by law (whether or not Landlord actually elects to do so) and only the annual amount so payable shall be included in Real Estate Taxes for any fiscal year;

(iv) any assessment, tax, fee, levy or charge by any governmental agency related to any transportation plan, fund or system (including assessment districts) instituted within the geographic area of which the Land is a part; and/or

(v) any costs and expenses (including, without limitation, reasonable attorneys’ fees) incurred in attempting to protest, reduce or minimize Real Estate Taxes.

Notwithstanding anything to the contrary contained in this Lease, “Real Estate Taxes” shall not include any inheritance, estate, succession, transfer gift, franchise, corporation, income or profit tax or capital levy that is or may be imposed upon Landlord. Real Estate Taxes shall also not include interest and penalties for late payment so long as Tenant has paid Tenant’s Proportionate Share of Tax Excess on account of such Real Estate Taxes on or before the date when payable to Landlord. In the event that Landlord receives an abatement or refund of Real Estate Taxes, the Real Estate Taxes for the year or years for which the abatement was obtained shall be recalculated by subtracting the amount of the abatement or refund for such year (after first deducting therefrom the costs and expenses of obtaining such abatement or refund, including attorneys’ fees). The Tax Excess and Tenant’s Proportionate Share of the Tax Excess for such
years shall be adjusted accordingly and Tenant shall receive a credit for any overpayment of Taxes Additional Rent against the next payment(s) becoming due on account of Tenant’s Proportionate Share of Tax Excess. If upon the expiration of the Lease any credits remain after application to any amounts that may become payable as aforesaid, Landlord shall refund the balance of the overpayment to Tenant.

(f) Operating Expenses for any calendar year during which actual occupancy of the Building is less than one hundred percent (100%) of the Rentable Area of the Building shall be appropriately adjusted to reflect one hundred percent (100%) occupancy of the existing Rentable Area of the Building during such period. In determining Operating Expenses, if any services or utilities are separately charged to tenants of the Building or others, Operating Expenses shall be adjusted by Landlord to reflect the amount of expense which would have been incurred for such services or utilities on a full time basis for normal Building operating hours. Operating Expenses for the Tenant’s Base Year for Operating Expenses (as defined in Item 8 of the Basic Lease Provisions) shall not include Operating Expenses attributable to temporary market-wide labor-rate increases and/or utility rate increases due to extraordinary circumstances, including, but not limited to Force Majeure, conservation surcharges, boycotts, embargoes, or other shortages. In no event shall the components of utilities for any calendar year related to electrical costs be less than the components of electrical costs in the Base Year for Operating Expenses. In the event (i) the Commencement Date shall be a date other than January 1, (ii) the date fixed for the expiration of the Lease Term shall be a date other than December 31, (iii) of any early termination of this Lease, or (iv) of any increase or decrease in the size of the Premises, then in each such event, an appropriate adjustment in the application of this Paragraph 3 shall, subject to the provisions of this Lease, be made to reflect such event on a basis reasonably determined by Landlord to be consistent with the principles underlying the provisions of this Paragraph 3. Landlord shall also have the right, in its sole discretion, to allocate and prorate any portion or portions of the Operating Expenses in any reasonable manner, provided that in all cases the allocation and proration is handled the same way in the Base Operating Expense and in Base Real Estate Taxes as in subsequent years. Without limiting the generality of the foregoing, Landlord shall have the right, from time to time, to fairly and equitably allocate and prorate on a commercially reasonable basis some or all of the Operating Expenses among different tenants (the “Cost Pools”), adjusting Tenant’s Proportionate Share as to each of the separately allocated costs based on the ratio of the Rentable Area of the Premises to the Rentable Area of all of the premises to which such costs are allocated. In placing Tenant in any Cost Pools, Landlord shall not treat Tenant in any unfair, arbitrary or inequitable manner. Such Cost Pools may include, without limitation, the office space tenants and retail space tenants of the Building.

(g) Prior to the commencement of each calendar year of the Lease Term following the Commencement Date, Landlord shall give to Tenant a written estimate of Tenant’s Proportionate Share of Operating Expenses Excess and/or Taxes Excess, if any, for the Building and/or the Land for the ensuing year. Tenant shall pay such estimated amount to Landlord in equal monthly installments, in advance on the first day of each month, concurrent with each payment of Base Rent. For the avoidance of doubt, no estimated amounts shall be payable on account of Tenant’s Proportionate Share of Operating Expenses Excess during the Base Year for Operating Expenses and no estimated amounts shall be payable on account of Tenant’s Proportionate Share of Tax Excess during the Base Year for Real Estate Taxes. Within one hundred eighty (180) after the end of each calendar year (subject to the first sentence of subparagraph (i), below), Landlord shall
furnish Tenant a statement indicating in reasonable detail the excess or shortfall of (i) Operating Expenses over Base Operating Expenses for such period, (ii) Real Estate Taxes over Base Real Estate Taxes for such period, and the parties shall, within thirty (30) days thereafter, make any payment or allowance necessary to adjust Tenant’s estimated payments to Tenant’s actual share of such excess or shortfall as indicated by such annual statement. Such statement shall constitute an account stated, subject to the provisions of subparagraph 3(i) below. Any payment due Landlord shall be payable by Tenant within thirty (30) days after written demand from Landlord. Any amount due Tenant shall be credited against installments next becoming due under this Paragraph 3(g) or refunded to Tenant, if requested by Tenant. The terms and provisions of the foregoing sentences shall survive the expiration or earlier termination of this Lease.

(h) Tenant shall pay when due, all taxes and assessments (i) levied against any personal property, Alterations, tenant improvements or trade fixtures of Tenant in or about the Premises, (ii) based upon this Lease or any document to which Tenant is a party creating or transferring an interest in this Lease or an estate in all or any portion of the Premises, and (iii) levied for any business, professional, or occupational license fees. If any such taxes or assessments are levied against Landlord or Landlord’s property or if the assessed value of the Land and Building is increased by the inclusion therein of a value placed upon such personal property or trade fixtures, Tenant shall within thirty (30) days after written demand by Landlord reimburse Landlord for the taxes and assessments so levied against Landlord, or such taxes, levies and assessments resulting from such increase in assessed value. To the extent that any such taxes are not separately assessed or billed to Tenant, Tenant shall pay the amount thereof as invoiced to Tenant by Landlord.

(i) Any delay or failure of Landlord in (i) delivering any estimate or statement described in this Paragraph 3, or (ii) computing or billing Tenant’s Proportionate Share of Operating Expenses Excess and/or Taxes Excess shall not constitute a waiver of its right to require an increase in Additional Rent, or in any way impair the continuing obligations of Tenant under this Paragraph 3. In the event of any dispute as to any Additional Rent due under this Paragraph 3, Tenant, an officer of Tenant or Tenant’s certified public accountant (but (a) in no event shall Tenant hire or employ an accounting firm or any other person to audit Landlord as set forth under this Paragraph who is compensated or paid for such audit on a contingency basis and (b) in the event Tenant hires or employs an independent certified public accountant to perform such audit, Tenant shall provide Landlord with a copy of the engagement letter) shall have the right after reasonable notice and at reasonable times to inspect Landlord’s accounting records at Landlord’s accounting office. If, after such inspection, Tenant still disputes such Additional Rent, upon Tenant’s written request therefor, a certification as to the proper amount of Operating Expenses and/or Real Estate Taxes due by Tenant for the period in question; provided, however, such certified public accountant shall not be the accountant who conducted Landlord’s initial calculation of Operating Expenses and/or Real Estate Taxes to which Tenant is now objecting. Such certification shall be final and conclusive as to all parties. The parties shall endeavor to cause such appointed accountant to render its certification within thirty (30) days. If the certification reflects that Tenant has overpaid Tenant’s Proportionate Share of Operating Expenses and/or Real Estate Taxes for the period in question, then Landlord
shall, at Tenant’s option (i) credit such excess to Tenant’s next payment of Operating Expenses and/or Real Estate Taxes or, (ii) promptly refund such excess to Tenant Conversely, if Tenant has underpaid Tenant’s Proportionate Share of Operating Expenses and/or Real Estate Taxes, Tenant shall promptly pay such additional Operating Expenses and/or Real Estate Taxes to Landlord. Tenant agrees to pay the cost of such certification and the investigation with respect thereto unless it is determined that Landlord’s original statement was in error in Landlord’s favor by more than five percent (5%). Tenant waives the right to dispute any matter relating to the calculation of Operating Expenses and/or Real Estate Taxes or Additional Rent under this Paragraph 3 if any claim or dispute with respect thereto is not asserted in writing to Landlord within sixty (60) days after delivery to Tenant of the original billing statement with respect thereto. Subject to the terms herein, such statement shall be considered final, except as to matters which are timely disputed and as to any exceptions arising from such disputes which are not asserted by Tenant within sixty (60) days following Landlord making the appropriate records available for examination as described above. Notwithstanding the foregoing, Tenant shall maintain strict confidentiality of all of Landlord’s accounting records and shall not disclose the same to any other person or entity except for Tenant’s professional advisory representatives (such as Tenant’s employees, accountants, advisors, attorneys and consultants) with a need to know such accounting information, who agree to similarly maintain the confidentiality of such financial information.

(j) Even though the Lease Term has expired and Tenant has vacated the Premises, when the final determination is made of Tenant’s Proportionate Share of Operating Expenses Excess and/or Taxes Excess for the year in which this Lease terminates, Tenant shall pay within thirty (30) days any increase due over the estimated Operating Expenses and/or Real Estate Taxes paid, and conversely, any overpayment made by Tenant shall be promptly refunded to Tenant by Landlord within thirty (30) days after the determination of such overpayment. This Paragraph 3(i) shall survive the expiration or earlier termination of this Lease.

(k) The Base Rent, Additional Rent, late fees, and other amounts required to be paid by Tenant to Landlord hereunder (including the Operating Expenses Excess and Taxes Excess) are sometimes collectively referred to as, and shall constitute, “Rent”.

4. IMPROVEMENTS AND ALTERATIONS

(a) Except as set forth in the Work Letter attached hereto as Exhibit B, Landlord shall deliver the Premises to Tenant, and Tenant agrees to accept the Premises from Landlord in its existing “AS-IS”, “WHERE-IS” and “WITH ALL FAULTS” condition, and Landlord shall have no obligation to refurbish or otherwise improve the Premises throughout the Lease Term. Landlord represents to Tenant that, as of the Commencement Date, (x) all HVAC, mechanical, electrical, plumbing and life safety Building systems that serve the Premises shall be in good working order, condition and repair, and (y) the Premises shall be free of Hazardous Materials. Tenant has informed Landlord that Landlord is purchasing from Juniper Pharmaceuticals, Inc. all of the furniture, fixtures, equipment, wiring and cabling, and other property presently located at the Premises, and Landlord is delivering the Premises to Tenant broom clean with no obligation to remove any furniture, fixtures, equipment, wiring and cabling, and other property from the Premises. Landlord shall use reasonable care in the performance of Landlord’s Work to avoid damaging such items.

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(b) Any alterations, additions, or improvements made by or on behalf of Tenant to the Premises ("Alterations") shall be subject to Landlord’s prior written consent and Alterations may to the extent necessary include installation of equipment and cabling in the Installation Areas. Landlord’s consent shall not be unreasonably withheld, conditioned or delayed with respect to proposed Alterations that (i) comply with all applicable laws, ordinances, rules and regulations; (ii) are compatible with the Building and its mechanical, electrical, HVAC and life safety systems; (iii) will not interfere with the use and occupancy of any other portion of the Building by any other tenant or their invitees; (iv) do not affect the structural portions of the Building; and, (v) do not and will not, whether alone or taken together with other improvements, require the construction of any other improvements or alterations within the Building, (excluding Landlord’s Work). Notwithstanding the foregoing, Alterations which (x) consist solely of decorative or cosmetic work that does not affect or involve the structural elements or Building systems and (y) which do not cost in excess of Sixty Thousand Dollars ($60,000.00) in the aggregate, at any given time (either in a single project or a series of related projects) ("Cosmetic Alterations"), shall not be subject to Landlord’s prior approval provided that Tenant delivers a reasonable description of such Alterations to Landlord at least ten (10) business days prior to commencing such work and subject to the remaining provisions of this Paragraph 4. Tenant shall cause, at its sole cost and expense, all Alterations to comply with insurance requirements and with Laws and shall construct, at its sole cost and expense, any alteration or modification required by Laws as a result of any Alterations. All Alterations shall be constructed at Tenant’s sole cost and expense, in a first class and good and workmanlike manner by contractors reasonably acceptable to Landlord and only good grades of materials shall be used. All plans and specifications for any Alterations shall be submitted to Landlord for its approval. Landlord may monitor construction of the Alterations and Tenant shall reimburse Landlord for any costs incurred by Landlord in monitoring such construction. Without limiting the generality of the foregoing, Tenant shall pay to Landlord, within ten (10) business days after completion of any Alterations, the actual, reasonable costs incurred by Landlord for services rendered by Landlord’s management personnel and engineers to coordinate and/or supervise any of the Alterations to the extent such services are provided in excess of or after the normal on-site hours of such engineers and management personnel. Landlord’s right to review plans and specifications and to monitor construction shall be solely for its own benefit, and Landlord shall have no duty to see that such plans and specifications or construction comply with applicable laws, codes, rules and regulations. Without limiting the other grounds upon which Landlord may refuse to approve any contractor or subcontractor, Landlord may take into account the desirability of maintaining harmonious labor relations at the Building. Landlord may also require that all life safety related work and all mechanical, electrical, plumbing and roof related work be performed by contractors designated by Landlord. Landlord shall have the right, in its sole discretion, to instruct Tenant to remove those improvements or Alterations from the Premises and the Installation Areas which (i) were not approved in advance by Landlord, and (ii) were not built in conformance with the plans and specifications approved by Landlord. In addition, Landlord shall specify during its review of plans and specifications for Alterations those Alterations which Landlord will require Tenant to remove upon the expiration of this Lease. Except as set forth in the preceding sentence, Tenant shall not be obligated to remove such Alterations at the expiration of this Lease. Landlord shall not unreasonably withhold or delay its approval of improvements or Alterations that Landlord requires Tenant to remove at the expiration of the Lease, but may require additional security from Tenant with respect thereto. If upon the termination of this Lease Landlord requires Tenant to remove any or all of such Alterations from
the Premises and the Installation Areas, then Tenant, at Tenant’s sole cost and expense, shall promptly remove such Alterations and improvements and Tenant shall repair and restore the Premises and the Installation Areas to their original condition as of the later of the Commencement Date or the completion of Landlord’s Work, reasonable wear and tear excepted. Any Alterations remaining in the Premises or the Installation Areas following the expiration of the Lease Term or following the surrender of the Premises from Tenant to Landlord, shall become the property of Landlord unless Landlord notifies Tenant otherwise. Tenant shall provide Landlord with the identities and mailing addresses of all persons performing work or supplying materials, prior to beginning such construction, and Landlord may post on and about the Premises notices of non-responsibility pursuant to applicable law. Tenant shall assure payment for the completion of all work free and clear of liens and shall provide certificates of insurance for worker’s compensation and other coverage in amounts and from an insurance company reasonably satisfactory to Landlord protecting Landlord against liability for bodily injury or property damage during construction. Upon completion of any Alterations and upon Landlord’s reasonable request, Tenant shall deliver to Landlord sworn statements setting forth the names of all contractors and subcontractors who did work on the Alterations and final lien waivers from all such contractors and subcontractors. Additionally, upon completion of any Alteration which requires the filing of plans with the designated office of the Commonwealth of Massachusetts or the City of Boston to allow Tenant to lawfully construct such Alterations, Tenant shall provide Landlord, at Tenant’s expense, with a complete set of plans in reproducible form and specifications reflecting the actual conditions of the Alterations, together with a copy of such plans on diskette in the AutoCAD format or such other format as may then be in common use for computer assisted design purposes. Tenant shall pay to Landlord, as additional rent, the reasonable costs of Landlord’s engineers and other consultants (but not Landlord’s on-site management personnel) for review of all plans, specifications and working drawings for the Alterations and for the incorporation of such Alterations in the Landlord’s master Building drawings, within ten (10) business days after Tenant’s receipt of invoices either from Landlord or such consultants together with (in any event) an administrative charge of five percent (5%) of the actual costs of such work (except that in the case of any Cosmetic Alterations there shall be no such administrative charge).

(c) Tenant shall keep the Premises, the Building and the Land free from any and all liens arising out of any Alterations, work performed, materials furnished, or obligations incurred by or for Tenant. In the event that Tenant shall not, within ten (10) business days following written notice from Landlord of the imposition of any such lien, cause the same to be released of record by payment or posting of a bond in a form and issued by a surety reasonably acceptable to Landlord, Landlord shall have the right, but not the obligation, to cause such lien to be released by such means as it shall deem proper (including payment of or defense against the claim giving rise to such lien); in such case, Tenant shall reimburse Landlord for all amounts so paid by Landlord in connection therewith, together with all of Landlord’s reasonable third party out of pocket costs and expenses, with interest thereon at the Default Rate (defined below) and Tenant shall indemnify and defend each and all of the Landlord Indemnitees (defined below) against any damages, losses or costs arising out of any such claim. Tenant’s indemnification of Landlord contained in this Paragraph shall survive the expiration or earlier termination of this Lease. Such rights of Landlord shall be in addition to all other remedies provided herein or by law.
(d) NOTICE IS HEREBY GIVEN THAT LANDLORD SHALL NOT BE LIABLE FOR ANY LABOR, SERVICES OR MATERIALS
FURNISHED OR TO BE FURNISHED TO TENANT, OR TO ANYONE HOLDING THE PREMISES THROUGH OR UNDER TENANT, AND
THAT NO MECHANICS’ OR OTHER LIENS FOR ANY SUCH LABOR, SERVICES OR MATERIALS SHALL ATTACH TO OR AFFECT THE
INTEREST OF LANDLORD IN THE PREMISES.

5. REPAIRS

(a) Landlord’s obligation with respect to repair as part of Basic Services shall be limited to (i) the structural portions of the Building, (ii) the exterior walls of the Building, including, without limitation, glass and glazing, (iii) the roof, (iv) HVAC, mechanical, electrical, plumbing and life safety systems except for any lavatory, shower, toilet, wash basin and kitchen facilities that serve Tenant exclusively and any supplemental heating and air conditioning systems (including all plumbing connected to said facilities or systems up to the point where such plumbing connects with the common plumbing system) and (v) Common Areas. Landlord shall not be deemed to have breached any obligation with respect to the condition of any part of the Land or Building unless Tenant has given to Landlord written notice of any required repair and Landlord has not made such repair within a reasonable time following the receipt by Landlord of such notice. The foregoing notwithstanding: (i) Tenant shall pay for the cost of any repairs as a result of damage to any of the foregoing to the extent caused by the acts or omissions of Tenant or its agents, employees or contractors, except to the extent such repairs are covered by insurance carried or required to be carried by Landlord pursuant to the provisions of Paragraph 8(e) below; (ii) the obligations of Landlord pertaining to damage or destruction by casualty shall be governed by the provisions of Paragraph 9; and (iii) the obligations of Landlord pertaining to damage or destruction by condemnation shall be governed by the provisions of Paragraph 10. Landlord shall have the right but not the obligation to undertake work of repair that Tenant is required to perform under this Lease and that Tenant fails or refuses to perform within applicable periods (including applicable notice and grace periods, if any). All costs reasonably incurred by Landlord (including out of pocket costs and a reasonable allocation of Landlord’s internal costs if employees of Landlord perform such work or repair) in performing any such work or repair for the account of Tenant shall be paid by Tenant to Landlord upon demand, together with an administration fee equal to fifteen percent (15%) of such costs. Except as expressly provided in Paragraph 7(f) and Paragraph 9 of this Lease, there shall be no abatement of Rent and except for the obligation to make repairs necessitated by Landlord’s acts or omissions, no liability of Landlord by reason of any injury to or interference with Tenant’s business arising from the making of any repairs, alterations or improvements in or to any portion of the Premises, the Building or the Land. Tenant waives the right to make repairs at Landlord’s expense under any law, statute or ordinance now or hereafter in effect.

(b) Tenant, at its expense excepting reasonable wear and tear (i) shall keep the Premises and all fixtures contained therein in a safe, clean and neat condition, and (ii) shall bear the cost of maintenance and repair, by contractors reasonably acceptable to the Landlord (such approval not to be unreasonably withheld, conditioned or delayed), of all facilities which are not expressly required to be maintained or repaired by Landlord and which are located in the Premises, including, without limitation, lavatory, shower, toilet, wash basin and kitchen facilities, and supplemental heating and air conditioning systems (including all plumbing connected to said facilities or systems installed by or on behalf of Tenant or existing in the Premises or in the Installation Areas at the time of Landlord’s delivery of the Premises to Tenant and serving the Premises). Tenant shall
make all repairs to the Premises and the Installation Area not required to be made by Landlord under sub-paragraph (a) above with replacements of any materials to be made by use of materials of equal or better quality. Tenant shall be responsible for all decorating, remodeling, alteration and painting, if any, that Tenant requires during the Lease Term. Tenant shall pay for the cost of any repairs to the Premises, the Building or the Land made necessary by any negligence or willful misconduct of Tenant or any of its assignees, subtenants, employees or their respective agents, representatives, contractors, or other persons permitted in or invited to the Premises, the Building or the Land by Tenant, except to the extent such repairs are covered by insurance carried or required to be carried by Landlord or Tenant pursuant to the provisions of Paragraph 8(e) below. If Tenant fails to make such repairs or replacements within fifteen (15) days after written notice from Landlord, Landlord may at its option make such repairs or replacements, and Tenant shall within ten (10) days after written demand pay Landlord the cost thereof reasonably incurred by Landlord (including out of pocket costs and a reasonable allocation of Landlord’s internal costs if employees of Landlord perform such work or repair), together with an administration fee equal to fifteen percent (15%) of such costs.

(c) Upon the expiration or earlier termination of this Lease, Tenant shall surrender the Premises in a safe, clean and neat condition, normal wear and tear and damage by fire or other casualty excepted. Except as otherwise set forth in Paragraph 4(b) of this Lease, Tenant shall remove from the Premises and the Installation Areas all trade fixtures, furnishings and other personal property of Tenant and all computer and phone cabling and wiring installed by or on behalf of Tenant, shall repair all damage caused by such removal and shall restore the Premises to its condition as of the later of the Commencement Date or the completion of Landlord’s Work, reasonable wear and tear excepted. In addition to all other rights Landlord may have, in the event Tenant does not so remove any such fixtures, furnishings or personal property, Tenant shall be deemed to have abandoned the same, in which case Landlord may store or dispose of the same at Tenant’s expense, appropriate the same for itself, and/or sell the same in its discretion.

6. USE OF PREMISES

(a) Tenant shall use the Premises only for general office uses and uses customarily accessory thereto and shall not use the Premises or permit the Premises to be used for any other purpose. Landlord shall have the right to deny its consent to any change in the permitted use of the Premises in its sole and absolute discretion.

(b) Tenant shall not at any time use or occupy the Premises, or permit any act or omission in or about the Premises in violation of any applicable law, statute, ordinance or any governmental rule, regulation or order (collectively, “Law” or “Laws”) and Tenant shall, upon written notice from Landlord, discontinue any use of the Premises which is declared by any governmental authority to be a violation of Law. If any Law shall, by reason of the nature of Tenant’s use or occupancy of the Premises for other than general office use, impose any duty upon Tenant or Landlord with respect to (i) modification or other maintenance of the Premises, the Building or the Land, or (ii) the use, Alteration or occupancy thereof, Tenant shall comply with such Law at Tenant’s sole cost and expense. This Lease shall be subject to all Security Documents (as defined in Paragraph 16(a) below) and all covenants, conditions and restrictions affecting the Premises, the Building or the Land, including, but not limited to, any subordination agreements described in Paragraph 16(a) below, provided that Landlord hereby represents, warrants and covenants that no such Security Documents, covenants, conditions and restrictions adversely affect the use and occupancy of the Premises for general office use, access to the Premises or the exercise of Tenant’s right to use the parking garage.

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(c) Tenant shall not do or permit to be done anything which may invalidate any insurance coverage that is in place affording coverage at the location, or that would increase the risk of loss at the location, or that would cause an increase in the cost of any insurance policy covering the Building, the Land and/or property located therein and Tenant shall comply with all rules, orders, regulations and requirements as set forth in all applicable fire codes and ordinances issued by any federal, state or local governmental body, or by any other organization performing a similar function and issuing codes that pertain to the location. In addition to all other remedies of Landlord, Landlord may require Tenant, promptly upon written demand, to reimburse Landlord for the full amount of any additional premiums charged for such policy or policies by reason of Tenant’s failure to comply with the provisions of this Paragraph 6.

(d) Tenant shall not in any way interfere with the rights or quiet enjoyment of other tenants or occupants of the Building. Tenant shall not use or allow the Premises to be used for any unlawful purpose, nor shall Tenant cause, maintain, or permit any nuisance in, on or about the Premises, the Building or the Land. Tenant shall not place weight upon any portion of the Premises exceeding the structural floor load of 70 pounds per square foot of area or otherwise use any Building system in excess of its capacity or in any other manner which may damage such system or the Building. Tenant shall not create within the Premises a working environment with a density of greater than the lesser of (i) one (1) person per 150 square feet of Rentable Area, or (ii) the maximum density permitted by Law. Business machines and mechanical equipment shall be placed and maintained by Tenant, at Tenant’s expense, in locations and in settings sufficient in Landlord’s reasonable judgment to absorb and prevent vibration, noise and annoyance. Tenant shall not commit or suffer to be committed any waste in, on, upon or about the Premises, the Building or the Land.

(e) Tenant shall take all reasonable steps necessary to adequately secure the Premises from unlawful intrusion, theft, fire and other hazards, and shall keep and maintain any and all security devices in or on the Premises in good working order (reasonable wear and tear excepted), including, but not limited to, exterior door locks for the Premises and smoke detectors and burglar alarms located within the Premises and shall cooperate with Landlord and other tenants in the Building with respect to access control and other safety matters.

(f) As used herein, the term “Hazardous Material” means any (a) oil or any other petroleum-based substance, flammable substances, explosives, radioactive materials, hazardous wastes or substances, toxic wastes or substances or any other wastes, materials or pollutants which (i) pose a hazard to the Building or to persons on or about the Land or (ii) cause the Building or the Land to be in violation of any Laws; (b) asbestos in any form, urea formaldehyde foam insulation, transformers or other equipment that contain dielectric fluid containing levels of polychlorinated biphenyls, or radon gas; (c) chemical, material or substance defined as or included in the definition of “hazardous substances”, “hazardous wastes”, “hazardous materials”, “extremely hazardous waste”, “restricted hazardous waste”, or “toxic substances” or words of similar import under any applicable local, state or federal law or under the regulations adopted or publications promulgated pursuant thereto, including, but not limited to, the Comprehensive...
Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. §9601, et seq.; the Hazardous Materials Transportation Act, as amended, 49 U.S.C. §1801, et seq.; the Federal Water Pollution Control Act, as amended, 33 U.S.C. §1251, et seq.; the Resource Conservation and Recovery Act, as amended, 42 U.S.C. §6901, et seq.; the Safe Drinking Water Act, as amended, 42 U.S.C. §300, et seq.; the Toxic Substances Control Act, as amended, 15 U.S.C. §2601, et seq.; the Federal Hazardous Substances Control Act, as amended, 15 U.S.C. §1261, et seq.; the Occupational Safety and Health Act, as amended, 29 U.S.C. §651, et seq.; and Massachusetts General Laws, Chapters 21C and 21E; (d) other chemical, material or substance, exposure to which is prohibited, limited or regulated by any governmental authority or may or could pose a hazard to the health and safety of the occupants of the Building or the owners and/or occupants of property adjacent to or surrounding the Building, or any other person coming upon the Building or the Land or adjacent property; and (e) other chemicals, materials or substances which may or could pose a hazard to the environment. The term “Permitted Hazardous Materials” shall mean Hazardous Materials which are contained in ordinary office supplies of a type and in quantities typically used in the ordinary course of business within executive offices of similar size in the comparable office buildings, but only if and to the extent that such supplies are transported, stored and used in full compliance with all applicable laws, ordinances, orders, rules and regulations and otherwise in a safe and prudent manner. Hazardous Materials which are contained in ordinary office supplies but which are transported, stored and used in a manner which is not in full compliance with all applicable laws, ordinances, orders, rules and regulations or which is not in any respect safe and prudent shall not be deemed to be “Permitted Hazardous Materials” for the purposes of this Lease.

(i) Tenant, its assignees, subtenants, and their respective agents, servants, employees, representatives and contractors (collectively referred to herein as “Tenant Affiliates”) shall not cause or permit any Hazardous Material to be brought upon, kept or used in or about the Premises by Tenant or by Tenant Affiliates without the prior written consent of Landlord (which may be granted, conditioned or withheld in the sole discretion of Landlord), save and except only for Permitted Hazardous Materials, which Tenant or Tenant Affiliates may bring, store and use in reasonable quantities for their intended use in the Premises, but only in full compliance with all applicable laws, ordinances, orders, rules and regulations. On or before the expiration or earlier termination of this Lease, Tenant shall remove from the Premises all Hazardous Materials (including, without limitation, Permitted Hazardous Materials), regardless of whether such Hazardous Materials are present in concentrations which require removal under applicable laws, except to the extent that such Hazardous Materials were present in the Premises as of the Commencement Date and were not brought onto the Premises by Tenant or Tenant Affiliates.

(ii) Tenant agrees to indemnify, defend and hold Landlord and its Affiliates (defined below) harmless for, from and against any and all claims, actions, administrative proceedings (including informal proceedings), judgments, damages, punitive damages, penalties, fines, costs, liabilities, interest or losses, including reasonable attorneys’ fees and expenses, court costs, consultant fees, and expert fees, together with all other costs and expenses of any kind or nature that arise during or after the Lease Term directly or indirectly from or in connection with the presence or release of any Hazardous Material in or into the air, soil, surface water or groundwater at, on, about, under or within the Premises and/or the Building and/or the Land, or any portion thereof caused by Tenant or Tenant Affiliates.
(iii) In the event any investigation or monitoring of site conditions or any clean-up, containment, restoration, removal or other remedial work (collectively, the “Remedial Work”) is required under any applicable federal, state or local Law, by any judicial order, or by any governmental entity as the result of operations or activities upon, or any use or occupancy of any portion of the Premises by Tenant or Tenant Affiliates, Landlord shall perform or cause to be performed the Remedial Work in compliance with such Law or order at Tenant’s sole cost and expense. All Remedial Work shall be performed by one or more contractors approved by Landlord, and under the supervision of a consulting engineer, selected by Tenant and approved in advance in writing by Landlord (such approval not to be unreasonably withheld, conditioned or delayed). All costs and expenses of such Remedial Work shall be paid by Tenant, including, without limitation, the charges of such contractor(s), the consulting engineer, and Landlord’s reasonable attorneys’ fees and costs incurred in connection with monitoring or review of such Remedial Work.

(iv) Each of the covenants and agreements of Tenant set forth in this Paragraph 6(f) shall survive the expiration or earlier termination of this Lease.

7. UTILITIES AND SERVICES

(a) During the Lease Term, the Building and the Parking Garage will be operated with twenty-four hour, seven day per week access, and Tenant shall be entitled to such access, such access to be controlled (but not prohibited) during non-Business Hours, and Landlord shall furnish, or cause to be furnished to the Premises, the utilities and services described in this Paragraph 7(a) (collectively the “Basic Services”):

(i) Tepid or cold water at those points of supply provided for general use of other tenants in the Building;

(ii) During Business Hours, central heat and air conditioning in season, at such temperatures and in such amounts as are provided by Landlord as standard to other office tenants of the Building or as may be required by applicable laws, ordinances, rules and regulations or by voluntary conservation programs with which Class A office buildings in the downtown financial district of Boston are complying, but Landlord shall not be responsible for (A) inadequate air-conditioning or ventilation to the extent the same occurs because Tenant’s use of power exceeds 6.0 watts per rentable square foot without Tenant providing adequate supplementary air-conditioning and ventilation therefor or (B) if the number of individuals in the Premises exceeds one (1) per one hundred fifty (150) rentable square feet or (C) by reason of any non-standard office use which requires supplemental air-conditioning and/or ventilation;

(iii) Maintenance, repairs, structural and exterior maintenance (including, without limitation, exterior glass and glazing), painting and electric lighting service for all Common Areas comparable to other first class office buildings in the financial district of Boston, subject to the limitation contained in Paragraph 5(a) above;

(iv) Janitorial service on a five (5) day week basis (Monday through Friday);
(v) An electrical system to convey power delivered by public utility providers selected by Landlord in amounts sufficient for normal office operations as provided in similar office buildings, but not to exceed a total allowance of 6.0 watts per square foot of Rentable Area during normal office hours (which includes an allowance for lighting of the Premises at the maximum wattage per square foot of Rentable Area permitted under applicable laws, ordinances, orders, rules and regulations), provided that no single item of electrical equipment requires a voltage other than 120 volts, single phase; and

(vi) Public elevator service and a freight elevator serving the floors on which the Premises are situated, during Business Hours. Subject to Force Majeure, reduced service, consisting of at least two automatic or manually operated elevators accessing the Premises from the lobby area, will be provided at all other times. Freight elevator service shall be available in common with other tenants from 7:00 A.M. to 6:00 P.M. daily (Saturdays, Sundays and Holidays excepted), with a thirty (30) minute time limit for deliveries, and at other times with longer time limits at reasonable charges and only by arrangement in advance with Building management.

Notwithstanding the fact that electrical service is to be provided as described under Paragraph 7(a)(v), electric service shall be separately metered, and Tenant shall pay the amounts charged therefor by the utility provider directly to the utility provider on or before the due dates therefor.

(b) During the Lease Term, Landlord shall provide to Tenant at Tenant’s sole cost and expense (and subject to the limitations hereinafter set forth) the following extra services (collectively the "Extra Services"):

(i) Such extra cleaning and janitorial services requested by Tenant, and agreed to by Landlord, for special improvements or Alterations;

(ii) Subject to Paragraph 7(d) below, additional heating, air conditioning and ventilating capacity in excess of that typically provided by the Building;

(iii) Maintaining and replacing lamps, bulbs, and ballasts;

(iv) If Tenant desires Building standard HVAC service to be provided to the Premises during hours other than Business Hours, Tenant may request such service in accordance with procedures from time to time established by Landlord. Subject to system capacity and the requirements of others in the Building, Landlord will furnish such after-hours HVAC service to the Premises. Where Tenant requests such service, Tenant shall pay its prorated share of the charge of $150.00 per hour per full floor (as such charge shall vary from time to time as generally applied to other office tenants in the Building) for the costs of operating the air handling units on the floor on account of such after-hours HVAC service, but otherwise shall not be required to pay a separate hourly charge for such after-hours HVAC service under this Paragraph 7(b);

(v) If Tenant requires supplemental air-conditioning, in excess of the Building standard HVAC service, for business machines, computer rooms, meeting rooms or other purposes, or because of occupancy or unusual electrical loads, supplemental HVAC equipment may be installed pursuant to Paragraph 4(b) above and shall be operated and maintained by Tenant at its sole cost, but only to the extent that the same is compatible with the Building mechanical systems. In addition to paying costs for operating such supplemental HVAC equipment under Paragraph 7(b)(iv) above, Tenant may use, to the extent available, Building condenser water and shall pay additional rent at the rate of $300.00 per ton, per annum, for the use of such condenser water for such supplemental HVAC equipment (such amount subject to increase from time to time); and

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(vi) Any Basic Service in amounts reasonably determined by Landlord to exceed the amounts required to be provided above, but only if Landlord elects to provide such additional or excess service. Tenant shall pay Landlord the cost of providing such additional services or an amount equal to Landlord’s reasonable estimate of such cost, if the actual cost is not readily ascertainable) together, except as to electrical utility charges, with an administration fee equal to fifteen percent (15%) of such cost, within thirty (30) days following presentation of an invoice therefor by Landlord to Tenant; provided, however, to the extent such additional services are provided directly by Landlord, the administrative fee shall be ten percent (10%) and to the extent such services are provided by third parties, Landlord will at Tenant’s request provide Tenant with a list of acceptable contractors and if Tenant engages such contractor directly to provide such service (otherwise in accordance with this Lease), Landlord shall charge no administrative fee. The cost and fee chargeable to Tenant for all extra services shall constitute Rent.

(c) Tenant agrees to cooperate fully at all times with Landlord and to comply with all nondiscriminatory regulations and requirements which Landlord may from time to time reasonably prescribe for the use of the utilities and Basic Services and Extra Services described herein. Landlord shall not be liable to Tenant for the failure of any other tenant, or its assignees, subtenants, employees, or their respective invitees, licensees, agents or other representatives to comply with such regulations and requirements. The term “Business Hours” shall be deemed to be Monday through Friday from 8:00 A.M. to 6:00 P.M. and Saturday from 8:00 A.M. to 1:00 P.M., excepting Holidays. The term “Holidays” shall mean all federally observed holidays, including New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, and to the extent of utilities or services provided by union members engaged at the Property, such other holidays observed by such unions.

(d) If Tenant requires utilities or services in quantities greater than or at times other than that generally furnished by Landlord as Basic Services as set forth above and Landlord is able to provide the same, Tenant shall pay to Landlord, within fifteen (15) days of receipt of a written statement therefor, Landlord’s charge for such use. In the event that Tenant shall require additional electric current, water or gas for use in the Premises and if, in Landlord’s reasonable judgment, such excess requirements cannot be furnished unless additional risers, conduits, feeders, switchboards and/or appurtenances are installed in the Building and such installation is feasible, subject to the conditions stated below, Landlord shall proceed to install the same at the sole cost of Tenant, payable prior to Landlord’s commencing such work. The installation of such facilities shall be conditioned upon Landlord’s consent (which shall not be unreasonably withheld, conditioned or delayed), and a determination that the installation and use thereof (i) shall be permitted by applicable Law and insurance regulations, (ii) shall not cause permanent damage or injury to the Building or adversely affect the value of the Building or the Land, and (iii) shall not cause or create a dangerous or hazardous condition or interfere with or disturb other tenants in the Building. In the case of any additional utilities or services to be provided hereunder, Landlord may require a switch and metering system to be installed so as to measure the amount of such additional utilities or services. The cost of installation, maintenance and repair thereof shall be paid by Tenant upon demand. Notwithstanding the foregoing, Landlord shall have the right to contract with any utility provider it deems appropriate to provide utilities to the Building.
(e) Landlord shall not be liable for, and Tenant shall not be entitled to, any damages, abatement or reduction of Rent, or other liability by reason of any failure to furnish any services or utilities described herein for any reason, including, without limitation, when caused by accident, breakage, water leakage, flooding, repairs, Alterations or other improvements to the Building or the Land, strikes, lockouts or other labor disturbances or labor disputes of any character, governmental regulation, moratorium or other governmental action, inability to obtain electricity, water or fuel, or any other cause beyond Landlord’s control. Landlord shall be entitled to cooperate with the energy conservation efforts of governmental agencies or utility suppliers and to adjust services or utilities so as to cooperate or comply with such efforts without being liable for any abatement. No such failure, stoppage, adjustment or interruption of any such utility or service shall be construed as an eviction of Tenant, nor shall the same relieve Tenant from any obligation to perform any covenant or agreement under this Lease unless Tenant is not able to perform such covenant or agreement as a result of such failure, stoppage, adjustment or interruption. In the event of any failure, stoppage or interruption thereof, Landlord shall use reasonable efforts to attempt to restore all services promptly. No representation is made by Landlord with respect to the adequacy or fitness of the Building’s ventilating, air conditioning or other systems to maintain temperatures as may be required for the operation of any computer, data processing or other special equipment of Tenant.

(f) Notwithstanding anything contained in this Lease to the contrary, if (i) an interruption or curtailment, suspension or stoppage of an Essential Service (as said term is hereinafter defined) shall occur as a result of the negligence or willful misconduct of Landlord, its agents, contractors, or employees or the failure by Landlord to perform its maintenance and repair obligations hereunder, except any of the same due to any act or neglect of Tenant or Tenant’s agents, contractors or invitees or any person claiming by, through or under Tenant (any such repair, negligence, or willful misconduct, or interruption of an Essential Service being hereinafter referred to as a “Service Interruption”), and (ii) such Service Interruption continues for more than five (5) consecutive business days after Landlord shall have received notice thereof from Tenant, and (iii) as a result of such Service Interruption, the conduct of Tenant’s normal operations in the Premises are materially and adversely affected, then there shall be an abatement of one day’s Base Rent, Operating Expenses Excess and Taxes Excess for each day during which such Service Interruption continues after such five (5) business day period; provided, however, if the entire Premises have not been rendered unusable by the Service Interruption, the amount of abatement shall be equitably prorated. The rights granted to Tenant under this paragraph shall be Tenant’s sole and exclusive remedy resulting from a failure of Landlord to provide Essential Services, and Landlord shall not otherwise be liable for any loss or damage suffered or sustained by Tenant resulting from any failure or cessation of Essential Services. For purposes hereof, the term “Essential Services” shall mean the following services: access to the Premises, water and sewer/septic service and electricity, air conditioning and heating, but only to the extent that Landlord has an obligation to provide same to Tenant under this Lease. Any abatement of Base Rent, Operating Expenses Excess and Taxes Excess under this paragraph shall apply only with respect to Base Rent, Operating Expenses Excess and Taxes Excess allocable to the period after each of the conditions set forth in subsections (i) through (iii) hereof shall have been satisfied and only during such times as each of such conditions shall exist.

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(g) Landlord reserves the right from time to time to make reasonable and nondiscriminatory modifications to the above standards for Basic Services and Extra Services provided that such modifications do not decrease or diminish the amount of electrical, heating or cooling or any other Basic Service or Extra Service below the levels that Landlord is required to provide pursuant to the provisions of this Lease and provided that the HVAC Service shall not be decreased below the Building standard service provided as of the date of this Lease.

8. INSURANCE

(a) Except to the extent caused by Landlord’s negligence or willful misconduct, or as otherwise specifically provided in this Lease, including but not limited to, Paragraph 8(f) below, Landlord shall not be liable for any injury, loss or damage suffered by Tenant or to any person or property occurring or incurred in or about the Premises, the Building or the Land from any cause. Without limiting the foregoing, neither Landlord nor any of its partners, officers, trustees, affiliates, directors, employees, contractors, agents or representatives (collectively, “Affiliates”) shall be liable for and there shall be no abatement of Rent (except in the event of a casualty loss or a condemnation as set forth in Paragraph 9 and Paragraph 10 of this Lease) for (i) any damage to Tenant’s property, (ii) loss of or damage to any property by theft or any other wrongful or illegal act by third parties, or (iii) any injury or damage to persons or property resulting from fire, explosion, falling plaster, steam, gas, electricity, water or rain which may leak from any part of the Building or from the pipes, appliances, appurtenances or plumbing works therein or from the roof, street or sub-surface or from any other place or resulting from dampness or any other cause whatsoever or from the acts or omissions of other tenants, occupants or other visitors to the Building or from any other cause whatsoever (other than Landlord’s sole negligence or willful misconduct), (iv) any diminution or shutting off of light, air or view by any structure which may be erected on lands adjacent to the Building, or (v) any latent or other defect in the Premises or the Building. Tenant shall give prompt notice to Landlord in the event of (i) the occurrence of a fire or accident in the Premises or in the Building, or (ii) the discovery of a defect therein or in the fixtures or equipment thereof.

Landlord agrees to indemnify, protect, defend and hold harmless Tenant and its Affiliates for, from and against any and all liabilities, claims, fines, penalties, costs, damages or injuries to persons, damages to property, losses, liens, causes of action, suits, judgments and expenses (including court costs, attorneys’ fees, expert witness fees and costs of investigation) of any nature, kind or description, arising from injury or death to any person or damage to any property caused by the negligence or willful misconduct of Landlord.

This Paragraph 8(a) shall survive the expiration or earlier termination of this Lease.

(b) Tenant hereby agrees to indemnify, protect, defend and hold harmless Landlord and its designated property management company, and their respective partners, members, affiliates and subsidiaries, and all of their respective officers, trustees, directors, shareholders, employees, servants, partners, representatives, insurers and agents (collectively; “Landlord Indemnitees”) for, from and against all liabilities, claims, fines, penalties, costs, damages or injuries to persons, damages to property, losses, liens, causes of action, suits, judgments and expenses (including court costs, reasonable attorneys’ fees, expert witness fees and costs of investigation) of any nature, kind or description, arising from injury or death to any person or damage to any property caused by the negligence or willful misconduct of Landlord.

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resulting from (in whole or part) (1) Tenant’s construction of, or use, occupancy or enjoyment of, the Premises, (2) any activity, work or other things done, permitted or suffered by Tenant and its agents and employees in or about the Premises, (3) any breach or default in the performance of any of Tenant’s obligations under this Lease, (4) any act, omission, negligence or willful misconduct of Tenant or any of its agents, contractors, employees, business invitees or licensees occurring on or about the Premises, Building, or Land or otherwise arising from the use of the Premises, Building or Land by Tenant or any of its agents, contractors, employees, business invitees or licensees, or (5) any damage to Tenant’s property, or the property of Tenant’s agents, employees, contractors, business invitees or licensees, located in or about the Premises (collectively, “Liabilities”), in all cases except to the extent of the negligence or willful misconduct of Landlord or Landlord’s Indemnitees. This Paragraph 8(b) shall survive the expiration or earlier termination of this Lease.

(c) The respective rights and obligations of Landlord and Tenant under Paragraphs 8(a) and 8(b) shall be subject in all respects to the applicable terms and provisions of Paragraph 8(f) below.

(d) Tenant shall promptly advise Landlord in writing of any action, administrative or legal proceeding or investigation as to which this indemnification may apply of which Tenant has actual knowledge, and Tenant, at Tenant’s expense, shall assume on behalf of each and every Landlord Indemnitee and conduct with due diligence and in good faith the defense thereof with counsel reasonably satisfactory to Landlord; provided, however, that any Landlord Indemnitee shall have the right, at its option, to be represented therein by advisory counsel of its own selection and at its own expense. In the event of failure by Tenant to fully perform in accordance with this Paragraph, Landlord, at its option, and without relieving Tenant of its obligations hereunder, may so perform, but all reasonable costs and expenses so incurred by Landlord in that event shall be reimbursed by Tenant to Landlord, together with interest on the same from the date any such expense was paid by Landlord until reimbursed by Tenant, at the rate of interest provided to be paid on judgments, by the law of the jurisdiction to which the interpretation of this Lease is subject. The indemnification provided in Paragraph 8(b) shall not be limited to damages, compensation or benefits payable under insurance policies, workers’ compensation acts, disability benefit acts or other employees’ benefit acts.

(e) Insurance.

(i) Tenant at all times during the Lease Term shall, at its own expense, keep in full force and effect (A) commercial general liability insurance in or not materially different than the standard current ISO form affording coverage against bodily injury and property damage with a primary limit of at least $1,000,000 per occurrence, which shall include provision for contractual liability coverage insuring this Lease as a covered contract and Excess coverage afforded pursuant to an Umbrella form with a per occurrence limit of at least $5,000,000, (B) worker’s compensation insurance to the statutory limit, if any, and employer’s liability insurance to the limit of $500,000 per occurrence, (C) property coverage written on a Special or other substantially similar ISO form insuring against all risks of direct physical loss or damage to covered property subject only to standard exclusions and limitation, and not excluding coverage for loss resultant from sprinkler leakage (including sprinkler leakage), vandalism, malicious mischief, and wind and/or hurricane and providing for full replacement cost without deduction for depreciation if replaced of all of
Tenant’s personal property, trade fixtures and improvements in the Premises, and (D) business interruption insurance insuring interruption or stoppage of Tenant’s business at the Premises for a period of not less than twelve (12) months. Landlord and its designated property management firm, Landlord’s mortgagees and all other persons designated by Landlord shall be included as an additional insured on each of said liability policies (excluding the worker’s compensation policy and the property policy) and said policies shall be issued by an insurance company or companies authorized to do business in the State and which have policyholder ratings not lower than “A-” and financial ratings not lower than “VII” in Best’s Insurance Guide (latest edition in effect as of the Commencement Date and subsequently in effect as of the date of renewal of the required policies). EACH PROPERTY INSURANCE POLICY SHALL ALSO INCLUDE AN ENDORSEMENT PROVIDING THAT LANDLORD SHALL RECEIVE THIRTY (30) DAYS PRIOR WRITTEN NOTICE OF ANY CANCELLATION OF, OR NONRENEWAL OF SAID POLICIES. Tenant hereby waives its right of recovery against any Landlord Indemnitee of any amounts paid by Tenant or on Tenant’s behalf to satisfy applicable worker’s compensation laws. The policies or duly executed certificates showing the material terms for the same, together with satisfactory evidence of the payment of the premiums therefor, shall be deposited with Landlord not later than the date Tenant first occupies the Premises and upon renewals of such policies prior to the expiration of the term of such coverage. If certificates are supplied rather than the policies themselves, Tenant shall allow Landlord, at all reasonable times, to inspect the policies of insurance required herein.

(ii) It is expressly understood and agreed that the coverages required represent Landlord’s minimum requirements and such are not to be construed to void or limit Tenant’s obligations contained in this Lease, including without limitation Tenant’s indemnity obligations hereunder. Neither shall (A) the insolvency, bankruptcy or failure of any insurance company carrying Tenant, (B) the failure of any insurance company to pay claims occurring nor (C) any exclusion from or insufficiency of coverage be held to affect, negate or waive any of Tenant’s indemnity obligations under this Paragraph 6(f)(ii) or any other provision of this Lease. With respect to insurance coverages, except worker’s compensation, maintained hereunder by Tenant and insurance coverages separately obtained by Landlord, all insurance coverages afforded by policies of insurance maintained by Tenant shall be primary insurance as such coverages apply to Landlord, and such insurance coverages separately maintained by Landlord shall be excess, and Tenant shall have its insurance policies so endorsed. The amount of liability insurance under insurance policies maintained by Tenant shall not be reduced by the existence of insurance coverage under policies separately maintained by Landlord. Tenant shall be solely responsible for any premiums, assessments, penalties, deductible assumptions, retentions, audits, retrospective adjustments or any other kind of payment due under its policies. Tenant shall increase the amounts of insurance or the insurance coverages as Landlord may reasonably request from time to time, but not in excess of the requirements of prudent landlords or lenders for similar tenants occupying similar premises in the Boston financial district.

(iii) Tenant’s occupancy of the Premises without having delivered the required certificates of insurance shall not constitute a waiver of Tenant’s obligations to provide the required coverages. If Tenant provides to Landlord a certificate that does not evidence the coverages required herein, or that is faulty in any respect, Landlord’s acceptance of such certificate shall not constitute a waiver of Tenant’s obligations to provide the proper insurance or the proper certificate evidencing the required coverage.
Throughout the Lease Term, Landlord agrees to maintain (i) fire and extended coverage insurance, and, at Landlord’s option, earthquake damage coverage, terrorism coverage, wind and hurricane coverage, and such additional property insurance coverage as Landlord deems appropriate, on the insurable portions of the Building and the Land, for full replacement costs, subject to reasonable deductibles, (ii) boiler and machinery insurance amounts and with deductibles that would be considered standard for a Class A office building in the Boston financial district, and (iii) commercial general liability insurance. The premiums for any such insurance shall be a part of Operating Expenses.

Mutual Waivers of Recovery. Notwithstanding anything in this Lease to the contrary, Landlord, Tenant, and all parties claiming under them, each mutually release and discharge each other from responsibility for that portion of any loss or damage paid or reimbursed by an insurer of Landlord or Tenant under any fire, extended coverage or other property insurance policy maintained by Tenant with respect to its obligations under this Lease or by Landlord with respect to its obligations under this Lease (or which would have been paid had the insurance required to be maintained by such party under this Lease been in full force and effect), no matter how caused, including negligence, and each waives any right of recovery from the other including, but not limited to, claims for contribution or indemnity, which might otherwise exist on account thereof. Any fire, extended coverage or property insurance policy maintained by Tenant with respect to the Premises, or Landlord with respect to the Building or the Land, shall contain, in the case of Tenant’s policies, a waiver of subrogation provision or endorsement in favor of Landlord, and in the case of Landlord’s policies, a waiver of subrogation provision or endorsement in favor of Tenant. Each party agrees to indemnify, protect, defend and hold harmless the other and each of such party’s Affiliates from and against any claim, suit or cause of action asserted or brought by the indemnifying party’s insurers for, on behalf of, or in the name of the indemnifying party, including, but not limited to, claims for contribution, indemnity or subrogation, brought in contravention of this Paragraph 8(f). The mutual releases, discharges and waivers contained in this provision shall apply EVEN IF THE LOSS OR DAMAGE TO WHICH THIS PROVISION APPLIES IS CAUSED SOLELY OR IN PART BY THE NEGLIGENCE OF LANDLORD OR TENANT.

Business Interruption. Landlord shall not be responsible for, and Tenant releases and discharges Landlord from, and Tenant further waives any right of recovery from Landlord for, any loss for or from business interruption or loss of use of the Premises suffered by Tenant in connection with Tenant’s use or occupancy of the Premises, EVEN IF SUCH LOSS IS CAUSED SOLELY OR IN PART BY THE NEGLIGENCE OF LANDLORD.

Adjustment of Claims. Tenant shall cooperate with Landlord and Landlord’s insurers in the adjustment of any insurance claim pertaining to the Building or the Land or Landlord’s use thereof.

Failure to Maintain Insurance. Any failure of Tenant to obtain and maintain the insurance policies and coverages required hereunder or failure by Tenant to meet any of the insurance requirements of this Lease shall constitute an Event of Default hereunder, and such failure shall entitle Landlord to pursue, exercise or obtain any of the remedies provided for in
Paragraph 12(b), and Tenant shall be solely responsible for any loss suffered by Landlord as a result of such failure. In the event of failure by Tenant to maintain the insurance policies and coverages required by this Lease or to meet any of the insurance requirements of this Lease, Landlord, at its option, and without relieving Tenant of its obligations hereunder, may obtain said insurance policies and coverages or perform any other insurance obligation of Tenant, but all costs and expenses incurred by Landlord in obtaining such insurance or performing Tenant’s insurance obligations shall be reimbursed by Tenant to Landlord, together with interest on same from the date any such cost or expense was paid by Landlord until reimbursed by Tenant, at the Default Rate.

9. FIRE OR CASUALTY

(a) Subject to the provisions of this Paragraph 9, in the event the Premises, or access thereto, is wholly or partially destroyed by fire or other casualty, Landlord shall (to the extent permitted by Law and covenants, conditions and restrictions then applicable to the Building or the Land) rebuild, repair or restore the Premises and access thereto to substantially the same condition as existing immediately prior to such destruction (excluding Tenant’s Alterations, trade fixtures, equipment and personal property, which Tenant shall be required to restore) and this Lease shall continue in full force and effect. Notwithstanding the foregoing, (i) Landlord’s obligation to rebuild, repair or restore the Premises shall not apply to any personal property, above-standard tenant improvements or other items installed or contained in the Premises, and (ii) Landlord shall have no obligation whatsoever to rebuild, repair or restore the Premises with respect to any damage or destruction occurring during the last twelve (12) months of the term of this Lease or any extension of the term.

(b) Landlord may elect to terminate this Lease in any of the following cases of damage or destruction to the Premises or the Building: (i) where the cost of rebuilding, repairing and restoring (collectively, “Restoration”) of the Building, would, regardless of the lack of damage to the Premises or access thereto, in the reasonable opinion of Landlord, exceed twenty percent (20%) of the then replacement cost of the Building; (ii) in the case of any damage or destruction to any portion of the Building or the Premises by uninsured casualty (except in the event the uninsured casualty was required to have been insured by Landlord under Paragraph 8(e)(iv) above); or (iii) if Landlord has not obtained appropriate zoning approvals for reconstruction of the Building or Premises. Notice of any such termination shall be given to Tenant within one hundred twenty (120) days of the date of such damage or destruction and shall be effective thirty (30) days following the date of such notice. If this Lease is not terminated by Landlord and as the result of any damage or destruction, the Premises, or a portion thereof, are rendered untenanted, the Base Rent shall abate reasonably beginning on the date of damage and continuing through the period of Restoration (based upon the extent to which such damage and Restoration materially interfere with Tenant’s business in the Premises). This Lease shall be considered an express agreement governing any case of damage to or destruction of the Premises or the Building. This Lease sets forth the terms and conditions upon which this Lease may terminate in the event of any damage or destruction.
(c) Tenant may elect to terminate this Lease by notice to Landlord as hereinafter set forth (time being of the essence) where substantial completion of Restoration of the Premises or of the access thereto would, in Landlord’s reasonable judgment, take longer than two hundred seventy (270) days from the date of such damage or destruction or if Landlord, having determined that Restoration would occur in such period, is unable to effect substantial completion of Restoration within such period. Landlord shall, within thirty (30) days of any damage or destruction that would give Tenant the right to terminate this Lease if the Restoration is not substantially completed within the said 270-day period, notify Tenant of Landlord’s reasonable estimate of the time necessary to effect substantial completion of Restoration. If the period for substantial completion of Restoration is longer than such 270-day period, Tenant may within thirty (30) days after receipt of Landlord’s notice, terminate this Lease by notice to the Landlord, such termination to take effect on the date of such notice. If Tenant does not so terminate the Lease even though the period for substantial completion of Restoration is longer than 270 days, this Lease shall continue in full force or effect (unless terminated by Landlord pursuant to any right it has to terminate), but if Restoration of the Premises or access thereto is not substantially completed by the end of such 270 day period, Tenant shall have the right within thirty (30) days following the end of such 270 day period to terminate this Lease by notice to the Landlord as of the date of such notice.

(d) If this Lease is not terminated by either Landlord or Tenant and as the result of any damage or destruction, the Premises, or a portion thereof, are rendered untenantable, and in any event during the period the Premises remain subject to this Lease and are untenantable, the Base Rent shall abate reasonably during the period of Restoration (based upon the extent to which such damage and Restoration materially interfere with Tenant’s business in the Premises). This Lease shall be considered an express agreement governing any case of damage to or destruction of the Building. This Lease sets forth the terms and conditions upon which this Lease may terminate in the event of any damage or destruction.

10. EMINENT DOMAIN. In the event the whole of the Premises, the Building or the Land shall be taken under the power of eminent domain, or sold to prevent the exercise thereof (collectively, a “Taking”), this Lease shall automatically terminate as of the date of such Taking. In the event a Taking of a portion of the Land, the Building or the Premises shall, in the reasonable opinion of Landlord, substantially interfere with Landlord’s operation thereof, Landlord may terminate this Lease upon thirty (30) days’ written notice to Tenant given at any time within sixty (60) days following the date of such Taking. In the event that a Taking of a portion of the Premises shall substantially interfere with Tenant’s use and occupancy of the Premises, Tenant may terminate upon thirty (30) days’ written notice to Landlord given at any time within sixty (60) days following the date of such Taking. For purposes of this Lease, the date of Taking shall be the earlier of the date of transfer of title resulting from such Taking or the date of transfer of possession resulting from such Taking. In the event that a portion of the Premises is so taken and this Lease is not terminated, Landlord shall, to the extent of proceeds paid to Landlord as a result of the Taking, with reasonable diligence, use commercially reasonable efforts to proceed to restore (to the extent permitted by Law and covenants, conditions and restrictions then applicable to the Building and/or the Land) the Premises (other than Tenant’s personal property and fixtures, and above-standard tenant improvements) to a complete, functioning unit. In such case, the Base Rent shall be reduced proportionately based on the portion of the Premises so taken. If all or any portion of the Premises is the subject of a temporary Taking, this Lease shall remain in full force and effect and Tenant shall continue to perform each of its obligations under this Lease; in such case, Tenant shall be entitled to receive the entire award allocable to the temporary Taking of the Premises. Except as provided herein, Tenant shall not assert any claim against Landlord or the condemning
authority for, and hereby assigns to Landlord, any compensation in connection with any such Taking, and Landlord shall be entitled to receive the entire amount of any award therefor, without deduction for any estate or interest of Tenant. Nothing contained in this Paragraph 10 shall be deemed to give Landlord any interest in, or prevent Tenant from seeking any award against the condemning authority for the Taking of personal property, fixtures, above standard tenant improvements of Tenant or for relocation or moving expenses recoverable by Tenant from the condemning authority provided that such claim does not reduce award to Landlord.

11. ASSIGNMENT AND SUBLETTING.

(a) Except for a Permitted Transfer (as defined in Paragraph 11(k) below), Tenant shall not directly or indirectly, voluntarily or involuntarily, by operation of law or otherwise, assign, sublet, mortgage or otherwise encumber all or any portion of its interest in this Lease or in the Premises or grant any license for any person other than Tenant or its employees to use or occupy the Premises or any part thereof without obtaining the prior written consent of Landlord, which, if Landlord does not elect to exercise its termination right pursuant to Paragraph 11(c) below, shall not be unreasonably withheld, conditioned, or delayed. Any such attempted assignment, subletting, license, mortgage, other encumbrance or other use or occupancy without the prior written consent of Landlord shall, at Landlord’s option, be null and void and of no effect. Any mortgage, or encumbrance of all or any portion of Tenant’s interest in this Lease or in the Premises and any grant of a license for any person other than Tenant or its employees to use or occupy the Premises or any part thereof shall be deemed to be an “assignment”. In addition, as used in this Paragraph 11, the term “Tenant” shall also mean any entity that has guaranteed Tenant’s obligations under this Lease, and the restrictions applicable to Tenant contained herein shall also be applicable to such guarantor.

(b) No assignment or subletting shall relieve Tenant of its obligation to pay the Rent and to perform all of the other obligations to be performed by Tenant hereunder. The acceptance of Rent by Landlord from any other person shall not be deemed to be a waiver by Landlord of any provision of this Lease or deemed to be consent to any subletting or assignment. Consent by Landlord to one subletting or assignment shall not be deemed to constitute consent to any other or subsequent attempted subletting or assignment. If Tenant desires at any time to assign this Lease or to sublet the Premises or any portion thereof, it shall first notify Landlord of its desire to do so and shall submit in writing to Landlord all pertinent information relating to the proposed assignee or sublessee, all pertinent information relating to the proposed assignment or sublease, and all such financial information as Landlord may reasonably request concerning the Tenant and proposed assignee or subtenant. Without limiting the generality of the foregoing, the notice to Landlord shall include: (a) the proposed effective date (which shall not be less than thirty (30) nor more than one hundred and twenty (120) days after Tenant’s notice), (b) the portion of the Premises to be sublet or subject to the assignment,

(c) the terms of the proposed assignment or sublet and the consideration therefor, the name and address of the proposed transferee, and a copy of all documentation pertaining to the proposed assignment or sublet, (d) current financial statements of the proposed transferee certified by an officer, partner or owner thereof, and any other information reasonably necessary to enable Landlord to determine the financial responsibility, character, and reputation of the proposed transferee, nature of such transferee’s business and proposed use of the space to be sublet or subject
to the assignment. If requested by Tenant for such proposed transforee, Landlord will execute and deliver a commercially reasonable non-disclosure agreement with respect to such financial statements or other confidential information that may be provided to Landlord under this Paragraph 11(b); the form of non-disclosure form attached hereto as Exhibit E shall be deemed to be commercially reasonable.

Any sublease and any assignment shall be in a form and contain conditions reasonably acceptable to Landlord and shall be expressly subject to the terms and conditions of this Lease, except as the Landlord shall otherwise specifically agree in writing. Any assignment or sublet made without complying with this Paragraph 11 shall, at Landlord’s option, be null, void and of no effect, or shall constitute a default under this Lease. Any sublease hereunder shall be subordinate and subject to the provisions of this Lease, and if this Lease shall be terminated during the term of any sublease or an assignment of space other than an assignment of the entire Lease, Landlord shall have the right to: (i) treat such sublease or such assignment as cancelled and repossess the space subject to such sublease or assignment by any lawful means, or (ii) require that such subtenant or assignee to attorn to and recognize Landlord as its landlord under any such sublease or assignment. If Tenant shall be in default of its obligations under this Lease beyond any applicable notice and cure period, such sublessee or assignee is hereby directed to make all payments under or in connection with the sublease or assignment directly to Landlord (which Landlord shall apply towards Tenant’s obligations under this Lease) and such sublessee or assignee may rely upon a statement from Landlord that such payments are to be made to Landlord.

(d) At any time within twenty (20) days after Landlord’s receipt of the information specified in Paragraph 11(b) above, Landlord may by written notice to Tenant elect to terminate this Lease as to the portion of the Premises (or all of the Premises if Tenant proposes to assign this Lease or to sublease all of the Premises) so proposed to be subleased or assigned, with a proportionate abatement, if the termination relates to only a part of the Premises, in the Rent payable hereunder, provided, however, that such termination right shall not apply in the case of a Permitted Transfer. If Landlord so terminates the Lease, then Tenant may, by written notice to Landlord given within five (5) days following the delivery of such termination notice from Landlord, rescind its request for the assignment or sublease and, in such event, Landlord’s termination notice shall be null and void.

(e) Tenant acknowledges that it shall be reasonable for Landlord to withhold its consent to a proposed assignment or sublease in any of the following instances:

(i) The assignee or sublessee (or any affiliate of the assignee or sublessee) is not, in Landlord’s reasonable opinion, sufficiently creditworthy to perform the obligations such assignee or sublessee will have under this Lease;

(ii) The intended use of the Premises by the assignee or sublessee is not for general office use;

(iii) The intended use of the Premises by the assignee or sublessee would materially increase the pedestrian or vehicular traffic to the Premises or the Building;
(iv) Occupancy of the Premises by the assignee or sublessee would, in the good faith judgment of Landlord, violate any agreement binding upon Landlord, the Building or the Land with regard to the identity of tenants, usage in the Building, or similar matters;

(v) The assignee or sublessee (or any affiliate of the assignee or sublessee) is then negotiating with Landlord or has negotiated with Landlord within the previous six (6) months regarding occupancy in the Building, or is a current tenant or subtenant within the Building and Landlord will not have vacant space in the Building of comparable size to the subleased premises for such assignee or sublessee as of the proposed commencement date of such assignment or sublease;

(vi) The identity or business reputation of the assignee or sublessee will, in the good faith judgment of Landlord, tend to damage the goodwill or reputation of the Building; or

(vii) the proposed sublease would result in more than two subleases of portions of the Premises being in effect at any one time during the Lease Term.

The foregoing criteria shall not exclude any other reasonable basis for Landlord to refuse its consent to such assignment or sublease.

(f) Notwithstanding any assignment or subletting, Tenant and any guarantor or surety of Tenant’s obligations under this Lease shall at all times during the initial Term and any subsequent renewals or extensions remain fully responsible and liable for the payment of the Rent and for compliance with all of Tenant’s other obligations under this Lease. In the event that the Rent due and payable by a sublessee or assignee (or a combination of the rental payable under such sublease or assignment, plus any bonus or other consideration therefor or incident thereto) exceeds the Rent payable under this Lease, then Tenant shall be bound and obligated to pay Landlord, as additional rent hereunder, one-half (1/2) of all such excess Rent and other excess consideration within thirty (30) days following receipt thereof by Tenant after first deducting all out-of-pocket costs and expenses reasonably incurred by Tenant in connection with such assignment or subleasing including broker’s fees, attorneys’ fees, free rent, improvement allowances and other reasonable concessions.

(g) If this Lease is assigned or if the Premises is subleased (whether in whole or in part), or in the event of the mortgage or pledge of Tenant’s leasehold interest, or grant of any concession or license within the Premises, or if the Premises are occupied in whole or in part by anyone other than Tenant, then upon a default by Tenant hereunder beyond any applicable notice and cure periods. Landlord may collect the amounts due to the Tenant from the assignee, sublessee, mortgagee, pledgee, concessionee or licensee or other occupant and shall, except to the extent payable to the Landlord as set forth in the preceding sub-paragraph, apply the amount collected to the next Rent payable hereunder; and all such amounts collected by Tenant after such default shall be held in deposit for Landlord and immediately forwarded to Landlord. No such transaction or collection of such amounts or application thereof by Landlord, however, shall be deemed a waiver of these provisions or a release of Tenant from the further performance by Tenant of its covenants, duties, or obligations hereunder.
(h) If Tenant effects an assignment or sublease or requests the consent of Landlord to any proposed assignment or sublease, then Tenant shall, upon demand, pay Landlord an amount equal to Landlord's any reasonable attorneys' and paralegal fees and costs which Landlord may incur in connection with such proposed assignment or sublease or request for consent, not to exceed Two Thousand Five Hundred Dollars ($2,500.00) with respect to a typical assignment or sublease using Landlord's standard form of consent with minor edits. Acceptance of reimbursement of Landlord's attorneys' and paralegal fees shall in no event obligate Landlord to consent to any proposed assignment or sublease or grant a consent hereunder.

(i) Notwithstanding any provision of this Lease to the contrary, in the event this Lease is assigned to any person or entity pursuant to the provisions of the Bankruptcy Code, any and all monies or other consideration payable or otherwise to be delivered in connection with such assignment shall be paid or delivered to Landlord, shall be and remain the exclusive property of Landlord and shall not constitute the property of Tenant or Tenant’s estate within the meaning of the Bankruptcy Code. All such money and other consideration not paid or delivered to Landlord shall be held in trust for the benefit of Landlord and shall be promptly paid or delivered to Landlord.

(j) The joint and several liability of the Tenant named herein and any immediate and remote successor in interest of Tenant (by assignment or otherwise), and the due performance of the obligations of this Lease on Tenant’s part to be performed or observed, shall not in any way be discharged, released or impaired by any (a) agreement that modifies any of the rights or obligations of the parties under this Lease, (b) stipulation that extends the time within which an obligation under this Lease is to be performed, (c) waiver of the performance of an obligation required under this Lease, or (d) failure to enforce any of the obligations set forth in this Lease.

(k) If Tenant is any form of partnership, a withdrawal or change, voluntary, involuntary or by operation of law of any partner, or the dissolution of the partnership, shall be deemed a voluntary assignment. If Tenant consists of more than one (1) person, a purported assignment, voluntary or involuntary or by operation of law from one (1) person to the other shall be deemed a voluntary assignment. If Tenant is a corporation or limited liability entity, any dissolution, merger, consolidation or other reorganization of Tenant, or sale or other transfer of a ownership interest(s) in Tenant that results in a change of voting control of Tenant, or the sale of at least fifty percent (50%) of the value of the assets of Tenant shall be deemed a voluntary assignment.

(l) Notwithstanding anything to the contrary contained in this Paragraph 11, provided that the conditions described below in this sentence have been satisfied prior to or upon such assignment or subleasing, Tenant may, without Landlord’s prior written consent, sublet all or a portion of the Premises or assign this Lease to (i) a subsidiary, affiliate, division, corporation, partnership, limited liability company or joint venture controlling, controlled by or under common control with Tenant, (ii) a successor entity resulting from a merger, consolidation, or nonbankruptcy reorganization by Tenant, or (iii) a purchaser of substantially all of Tenant’s assets (each a “Permitted Transfer”), provided in all cases (i), (ii) and (iii) that the successor entity, assignee, purchaser or subtenant has a net worth equal to or greater than those of Tenant prior to the effective date of this Lease and a liquid net worth sufficient for Tenant to continually perform its obligations under the Lease, and assumes in writing for the benefit of Landlord, this Lease and all of Tenant’s obligations under this Lease. If any assignment or subleasing occurs without such an assumption and/or without Landlord’s consent as provided in this Paragraph 11 above, Tenant shall be deemed for all purposes to be in an Event of Default under this Lease. In all events, Tenant shall remain fully liable under this Lease.

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12. DEFAULT.

(a) Events of Default. The occurrence of any one or more of the following events shall constitute an “Event of Default” under this Lease by Tenant: (i) Tenant shall fail to pay Rent or any other rental or sums payable by Tenant hereunder within five (5) business days after Landlord notifies Tenant in writing of such nonpayment; provided, however, Landlord shall only be obligated to provide such written notice to Tenant one (1) time within any calendar year and in the event Tenant fails to timely pay Rent or any other sums for a second time during any calendar year, then Tenant shall be in immediate default for such late payment and Landlord shall have no obligation or duty to provide notice of such non-payment to Tenant prior to declaring an Event of Default under this Lease; (ii) the failure by Tenant to observe or perform any of the express or implied covenants or provisions of this Lease to be observed or performed by Tenant, other than monetary failures as specified in Paragraph 12(a)(i) above, where such failure shall continue for a period of thirty (30) days after written notice thereof from Landlord to Tenant; provided, however, that if the nature of Tenant’s default is curable and is such that more than thirty (30) days are reasonably required for its cure, then Tenant shall not be deemed to be in default if Tenant shall commence such cure within said thirty (30) day period and thereafter diligently prosecute such cure to completion, which completion shall occur not later than sixty (60) days from the date of such notice from Landlord; (iii) the making by Tenant or any guarantor hereof of any general assignment for the benefit of creditors, (iv) the filing by or against Tenant or any guarantor hereof of a petition to have Tenant or any guarantor hereof adjudged a bankrupt or a petition for reorganization or arrangement under any law relating to bankruptcy (unless, in the case of a petition filed against Tenant or any guarantor hereof, the same is dismissed within sixty (60) days), (v) the appointment of a trustee or receiver to take possession of substantially all of Tenant’s assets located at the Premises or of Tenant’s interest in this Lease or of substantially all of guarantor’s assets, where possession is not restored to Tenant or guarantor within sixty (60) days, (vi) the attachment, execution or other judicial seizure of substantially all of Tenant’s assets located at the Premises or of substantially all of guarantor’s assets or of Tenant’s interest in this Lease where such seizure is not discharged within sixty (60) days; (vii) any material representation or warranty made by Tenant or guarantor in this Lease or any other document delivered in connection with the execution and delivery of this Lease or pursuant to this Lease proves to be incorrect in any material respect provided, however, that an Event of Default shall not be deemed to have occurred if the representation or warranty was made in good faith without the intention to mislead Landlord and the underlying situation to which such representation or warranty relates is capable of being corrected without Landlord’s incurring any loss or damage, then Tenant shall have a reasonable period, not to exceed ten (10) business days, within which to correct the underlying situation and provide Landlord with an accurate representation or warranty with respect thereto; (vii) Tenant or guarantor shall be liquidated or dissolved or shall begin proceedings towards its liquidation or dissolution.
Upon the occurrence of any one or more of such Events of Default, Landlord may, in addition to all other remedies available at law or in equity, at
its sole option without notice (i) at any time after such Event of Default (and following the issuance of any notice to quit if required by Law) and, after
commencing summary process proceedings if required by Law, re-enter the Premises in the name of the whole and repossess the same as of Landlord’s
former estate, and dispossess Tenant and any other persons or entities and their respective property and effects from the Premises, without being deemed
guilty of any manner of trespass and without prejudice to any other rights or remedies, and/or (ii) give to Tenant three (3) days’ notice of cancellation of
this Lease, in which event this Lease and the Lease Term shall terminate (whether or not the Term shall have commenced) with the same force and effect
as if the date set forth in the notice was the Expiration Date stated herein, and Tenant shall then quit and surrender the Premises to Landlord, but Tenant
shall remain liable for damages as provided in this Paragraph 12. Any notice of cancellation of the Lease Term may be given simultaneously with any
notice of default given to Tenant.

(b) Possession/Reletting. If any Event of Default occurs and Landlord reenters the Premises or terminates this Lease as aforesaid.

(i) Surrender of Possession. Tenant shall quit and surrender the Premises to Landlord.

(ii) Disposition of Tenant’s Property. In the event of any such termination, entry or re-entry, Landlord shall have the rights to remove and
store Tenant’s property and that of persons claiming by, through or under Tenant at the sole risk and expense of Tenant and, if Landlord so elects, (x) to
sell such property at public auction or private sale and apply the net proceeds to the payment of all sums due to Landlord from Tenant and pay the
balance, if any, to Tenant, or (y) to dispose of such property in any manner in which Landlord shall elect, Tenant hereby agreeing to the fullest extent
permitted by Law that it shall have no right, title or interest in any property remaining in the Premises after such termination, entry or re-entry.

(iii) Landlord’s Reletting. Landlord, at Landlord’s option, may relet all or any part of the Premises from time to time, either in the name of
Landlord or otherwise, to such tenant or tenants, for any term ending before, on or after the Expiration Date, at such rental and upon such other
conditions (which may include concessions and free rent periods) as Landlord, in its sole discretion, may determine. Landlord shall have no obligation
to and shall not be liable for refusal or failure to relet the Premises or any part thereof, or, in the event of any such reletting, for refusal or failure to
collect any rent due upon any such reletting and Tenant hereby waives, to the extent permitted by applicable Laws, any obligation Landlord may have to
mitigate Tenant’s damages; and no such refusal or failure shall relieve Tenant of, or otherwise affect, any liability under this Lease. Notwithstanding the
foregoing, Landlord will use reasonable efforts to relet the Premises after Tenant vacates the Premises; however, the marketing of the Premises in a
manner similar to the manner in which Landlord markets other premises within Landlord’s control in the Building shall be deemed to have satisfied
Landlord’s obligation to use “reasonable efforts.” In no event shall Landlord be required to (i) solicit or entertain negotiations with any other prospective
tenants for the Premises unless and until Landlord obtains full and complete possession of the Premises, including the final and unappealable legal right
to relet the Premises free of any claim of Tenant, (ii) lease the Premises to a tenant whose proposed use, in Landlord’s reasonable judgment, will be
unacceptable, (iii) relet the Premises prior to leasing any other vacant space in the Building, suitable for the use of the prospective tenant, (iv) lease the
Premises for a rental rate less than the current fair market rent then prevailing for similar space in the Building, or (v) enter

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into a lease with any proposed tenant that does not have, in Landlord’s reasonable opinion, sufficient financial wherewithal and resources to satisfy its financial obligations under the prospective lease. Landlord shall be entitled to take into account in connection with any such reletting of the Premises all relevant factors which would be taken into account by a sophisticated landlord in securing a replacement tenant for the Premises including the first class quality of the Building, matters of tenant mix, and the financial responsibility of any such replacement tenant. Landlord, at Landlord’s option, may make such alterations, decorations and other physical changes in and to the Premises as Landlord, in its sole reasonable discretion, considers advisable or necessary in connection with such reletting or proposed reletting. No reasonable action or inaction by Landlord in connection with such reletting shall relieve Tenant of any liability under this Lease or otherwise affecting any such liability.

(iv) **Remedies Not Exclusive.** The specified remedies to which Landlord may resort hereunder are not intended to be exclusive of any remedies or means of redress to which Landlord may, at any time, be entitled lawfully and Landlord may invoke any remedy (including the remedy of specific performance) allowed at law or in equity as if specific remedies were not herein provided for.

(v) **Summary Process.** Upon any Event of Default of Tenant, or the expiration or termination of this Lease, Landlord shall have the right of summary process under M.G.L.A. Chapter 239, and/or other applicable statues, and such other rights to recover possession as permitted by applicable Laws.

(c) **Tenant’s Waiver.** To the maximum extent permitted by law, after (A) Tenant shall have been dispossessed by judgment or by warrant of any court or judge, (B) any re-entry by Landlord, or (C) any expiration or early termination of the term of this Lease, whether such dispossess, re-entry, expiration or termination shall be by operation of law or pursuant to the provisions of this Lease, Tenant, on its own behalf and on behalf of all persons or entities claiming through or under Tenant, including all creditors, hereby waives all rights which Tenant and all such persons or entities might otherwise have (i) to serve notice of Tenant’s intention to re-enter or notice of Tenant’s intention to institute legal proceedings, or (ii) to redeem, or to re-enter or repossess the Premises, or (iii) to restore the operation of this Lease. The words “re-enter,” “re-entry” and “re-entered” as used in this Lease shall not be deemed to be restricted to their technical legal meanings.

(d) **Tenant’s Breach.** Upon the breach or threatened breach by Tenant, or any persons or entities claiming through or under Tenant, of any term, covenant or condition of this Lease, whether or not such breach or threatened breach constitutes an Event of Default, Landlord shall have the right to enjoin such breach or threatened breach and to invoke any other remedy allowed in equity. The rights to invoke the remedies set forth above shall not preclude Landlord from invoking any other remedy under this Lease or allowed at law or in equity should such breach or threatened breach become an Event of Default.
(e) **Landlord’s Damages.** If this Lease and the Lease Term, or Tenant’s right to possession of the Premises shall terminate, or Landlord shall re-enter the Premises, as provided in this Paragraph 12, then, in any of such events:

(i) Tenant shall pay to Landlord all items of Rent payable under this Lease by Tenant to Landlord prior to the date of termination or repossession;

(ii) Landlord may retain all monies, if any, paid by Tenant to Landlord, whether as prepaid Rent, a security deposit or otherwise, which monies, to the extent not otherwise applied to amounts due and owing to Landlord, shall be credited by Landlord against any damages payable by Tenant to Landlord;

(iii) Tenant shall pay to Landlord, in monthly installments over the balance of the Lease Term, on the days specified in this Lease for payment of installments of Base Rent, any “Deficiency” (as hereinafter defined); it being understood that Landlord shall be entitled to recover the Deficiency installment from Tenant each month as the same shall arise, and no suit to collect the amount of the Deficiency installment for any month, shall prejudice Landlord’s right to collect the Deficiency installment for any subsequent month by a similar proceeding; and

(iv) whether or not Landlord shall have collected any monthly Deficiency installment, Tenant shall pay to Landlord, on demand (the date of such payment is the “Payment Date”), at the election of Landlord, in lieu of any further Deficiency installments and as liquidated and agreed final damages, the Present Value (as hereinafter defined) plus any Deficiency Installments theretofore to have been paid, but which were not paid. Present Value is intended to reflect a discounted value of the amount by which the Rent for the period which otherwise would have constituted the unexpired portion of the Lease Term at the date of termination or repossession (assuming the Operating Expenses Additional Rent and Taxes Additional Rent during such period to be the same as was payable for the year immediately preceding such termination or re-entry, increased in each succeeding year by four percent (4%) (on a compounded basis)) exceeds the then fair and reasonable rental value of the Premises for the same period. To find the Present Value, the difference described in the preceding sentence shall be calculated for each month of the period in question and such difference shall be discounted to the amount which, if invested on the Payment Date at 6% per annum, would yield on the date such monthly payment of Rent would have otherwise been due, in the amount of such difference; and the sum of all such differences so discounted shall be the “Present Value”. If, before presentation of proof of such liquidated damages to any court, commission or tribunal, the Premises, or any part thereof, shall have been relet by Landlord for the period which otherwise would have constituted the unexpired portion of the Lease Term, or any part thereof, the amount of rent reserved upon such reletting shall be deemed prima facie, to be the fair and reasonable rental value for the part or the whole of the Premises so relet during the term of the reletting.

“Deficiency” shall mean the difference between (a) the Base Rent and Additional Rent for the period which otherwise would have constituted the unexpired portion of the Lease Term (assuming the Additional Rent for each year thereof to be the same as was payable for the year immediately preceding such termination or re-entry), and (b) the net amount, if any, of rents or other amounts whether or not characterized as rents) collected under any reletting effected pursuant to the provisions of the Lease for any part of such period (after first deducting from such rents all third party out of pocket expenses incurred by Landlord in connection with the termination of this Lease, Landlord’s re-entry upon the Premises and such reletting, including repossession costs, brokerage commissions, reasonable attorneys’ fees and disbursements, and alteration costs). Deficiency installments shall be calculated on the net rent collectable from third parties with respect to the Premises by reason of reletting with respect to the period for which the Deficiency installment is being paid.

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(f) Reletting. If the Premises, or any part thereof, shall be relet together with other space in the Building, the rents collected or reserved under any such reletting and the expenses of any such reletting shall be equitably apportioned for the purposes of this Paragraph 12. Tenant shall not be entitled to any rents collected or payable under any reletting, whether or not such rents exceed the Base Rent reserved in this Lease. Nothing contained in this Paragraph 12 shall be deemed to limit or preclude the recovery by Landlord from Tenant of the maximum amount allowed to be obtained as damages under this Lease, or of any sums or damages to which Landlord may be entitled in addition to the damages set forth in this Paragraph 12.

(g) Interest. If any payment of Rent is not paid when due, interest shall accrue on such payment, from the date such payment became due until paid at the Default Rate. Tenant acknowledges that late payment by Tenant of Rent will cause Landlord to incur costs not contemplated by this Lease, the exact amount of such costs being extremely difficult and impracticable to fix. Such costs include, without limitation, processing and accounting charges, and late charges that may be imposed on Landlord by the terms of any note secured by a mortgage covering the Building or the Land (or any part thereof). Therefore, in addition to interest, if any amount is not paid when due, a late charge equal to five percent (5%) of such amount shall be assessed, provided, however, that on two (2) occasions during any calendar year of the Term, Landlord shall give Tenant notice of such late payment and Tenant shall have a period of five (5) days thereafter in which to make such payment before any late charge is assessed. Such interest and late charges shall constitute Additional Rent payable by Tenant, and are separate and cumulative and are in addition to and shall not diminish or represent a substitute for any of Landlord’s rights or remedies under any other provision of this Lease or otherwise available at law or in equity. The term “Default Rate” as used in this Lease shall mean the lesser of (A) the rate announced from time to time by Wells Fargo Bank or, if Wells Fargo Bank ceases to exist or ceases to publish such rate, then the rate announced from time to time by the largest (as measured by deposits) chartered bank operating in the State, as its “prime rate” or “reference rate”, plus five percent (5%), or (B) the maximum rate of interest permitted by Law.

(h) Other Rights of Landlord. If Tenant fails to pay any Rent when due, Landlord, in addition to any other right or remedy, shall have the same rights and remedies as in the case of an Event of Default by Tenant in the payment of Base Rent. If Tenant is in arrears in the payment of Rent, Tenant waives Tenant’s right, if any, to designate the items against which any payments made by Tenant are to be credited, and Landlord may apply any payments made by Tenant to any items Landlord sees fit, regardless of any request by Tenant.

(i) Landlord’s Right to Perform. Except as specifically provided otherwise in this Lease, all covenants and agreements by Tenant under this Lease shall be performed by Tenant at Tenant’s sole cost and expense and without any abatement or offset of Rent. If Tenant shall default (after any applicable notice and cure period) in its obligation to pay any sum of money (other than Base Rent) or perform any other act on its part to be paid or performed hereunder, Landlord may, without waiving or releasing Tenant from any of Tenant’s obligations, make such payment or perform such other act on behalf of Tenant. All sums so paid by Landlord and all necessary incidental costs incurred by Landlord in performing such other acts shall be payable by Tenant to Landlord within thirty (30) days after demand therefor as Additional Rent.
(j) Rights and Remedies Cumulative. All rights, options and remedies of Landlord contained in this Paragraph 12 and elsewhere in this Lease shall be construed and held to be cumulative, and no one of them shall be exclusive of the other, and Landlord shall have the right to pursue any one or all of such remedies or any other remedy or relief which may be provided by law or in equity, whether or not stated in this Lease. Nothing in this Paragraph 12 shall be deemed to limit or otherwise affect Tenant’s indemnification of Landlord pursuant to any provision of this Lease.

(k) Costs Upon Event of Default and Litigation. Tenant shall pay to Landlord as Additional Rent all reasonable third party out of pocket expenses incurred by Landlord in the exercise of any remedy by reason of any Event of Default by Tenant hereunder, including reasonable attorneys’ fees and expenses.

13. ACCESS; CONSTRUCTION. Landlord reserves from the leasehold estate hereunder, in addition to all other rights reserved by Landlord under this Lease, the right to use the roof and exterior walls of the Premises and the area beneath, adjacent to and above the Premises, including without limitation the Installation Areas so long as such use does not unreasonably interfere with the right of Tenant to use the Premises for the purposes permitted under this Lease. Landlord also reserves the right to install, use, maintain, repair, replace and relocate equipment, machinery, meters, pipes, ducts, plumbing, conduits and wiring through the Premises, which serve other portions of the Building in a manner and in locations which do not unreasonably interfere with Tenant’s use of the Premises. In addition, Landlord shall have free access to any and all mechanical installations of Landlord or Tenant, including, without limitation, machine rooms, telephone rooms and electrical closets so long as in exercise of such access right. Landlord does not unreasonably interfere with Tenant’s right to use the Premises for the purposes permitted under this Lease. Tenant agrees that there shall be no construction of partitions or other obstructions which materially interfere with or which threaten to materially interfere with Landlord’s free access thereto, or materially interfere with the moving of Landlord’s equipment to or from the enclosures containing said installations. Landlord shall at all reasonable times, during normal business hours and after reasonable written (which includes email) or oral notice, have the right to enter the Premises to inspect the same, to supply janitorial service and any other service to be provided by Landlord to Tenant hereunder, to exhibit the Premises to prospective purchasers, lenders or, during the last twelve (12) months of the Term, tenants, to post notices of non-responsibility, to alter, improve, restore, rebuild or repair the Premises or any other portion of the Building or the Land, or to maintain or repair the Building or the Common Areas in connection with construction or excavation work adjacent to or near the Building, or to do any other act permitted to be done by Landlord hereunder, all without being deemed guilty of an eviction of Tenant and without liability for abatement of Rent or otherwise. For such purposes, Landlord may also erect scaffolding and other necessary structures where reasonably required by the character of the work to be performed, and during such operations may enter upon the Premises and take into and upon or through the Premises, all materials required to make such repairs, maintenance, alterations or improvements, and may close public entry ways, other public areas, restrooms, stairways or corridors. Landlord shall conduct all such inspections and/or improvements, alterations and repairs so as to minimize, to the extent reasonably practical and without material

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additional expense to Landlord, any interruption of or interference with the business of Tenant. Tenant hereby waives any claim for damages for any injury or inconvenience to or interference with Tenant’s business, any loss of occupancy or quiet enjoyment of the Premises, and any other loss occasioned thereby. For each of such purposes, Landlord shall at all times have and retain a key with which to unlock all of the doors in, upon and about the Premises (excluding Tenant’s vaults and safes, access to which shall be provided by Tenant upon Landlord’s reasonable request). Landlord shall have the right to use any and all means which Landlord may deem proper in an emergency in order to obtain entry to the Premises or any portion thereof, and Landlord shall have the right, at any time during the Lease Term, to provide whatever access control measures it deems reasonably necessary to the Building, without any interruption or abatement in the payment of Rent by Tenant. Any entry into the Premises obtained by Landlord by any of such means shall not under any circumstances be construed to be a forcible or unlawful entry into, or a detainer of, the Premises, or any eviction of Tenant from the Premises or any portion thereof. No provision of this Lease shall be construed as obligating Landlord to perform any repairs, Alterations or decorations to the Premises or the Building or the Land except as otherwise expressly agreed to be performed by Landlord pursuant to the provisions of this Lease.

14. BANKRUPTCY.

(a) If at any time on or before the Commencement Date there shall be filed by or against Tenant in any court, tribunal, administrative agency or any other forum having jurisdiction, pursuant to any applicable law, either of the United States or of any state, a petition in bankruptcy or insolvency or for reorganization or for the appointment of a receiver, trustee or conservator of all or a portion of Tenant’s property, or if Tenant makes an assignment for the benefit of creditors, this Lease shall ipso facto be canceled and terminated and in such event neither Tenant nor any person claiming through or under Tenant or by virtue of any applicable law or by an order of any court, tribunal, administrative agency or any other forum having jurisdiction, shall be entitled to possession of the Premises and Landlord, in addition to the other rights and remedies given by Paragraph 12 hereof or by virtue of any other provision contained in this Lease or by virtue of any applicable law, may retain as damages any Rent, Security Deposit or moneys received by it from Tenant or others on behalf of Tenant.

(b) If, after the Commencement Date, or if at any time during the term of this Lease, there shall be filed against Tenant in any court, tribunal, administrative agency or any other forum having jurisdiction, pursuant to any applicable law, either of the United States or of any state, a petition in bankruptcy or insolvency or for reorganization or for the appointment of a receiver, trustee or conservator of all or a portion of Tenant’s property, and the same is not dismissed after sixty (60) calendar days, or if Tenant makes an assignment for the benefit of creditors, this Lease, at the option of Landlord exercised within a reasonable time after notice of the happening of any one or more of such events, may be canceled and terminated and in such event neither Tenant nor any person claiming through or under Tenant or by virtue of any statute or of an order of any court shall be entitled to possession or to remain in possession of the Premises, but shall forthwith quit and surrender the Premises, and Landlord, in addition to the other rights and remedies granted by Paragraph 12 hereof or by virtue of any other provision contained in this Lease or by virtue of any applicable law, may retain as damages any Rent, Security Deposit or moneys received by it from Tenant or others on behalf of Tenant.
15. **SUBSTITUTION OF PREMISES.** Subject to the conditions specified in this Paragraph 15, Landlord reserves the right without Tenant’s consent, on ninety (90) days’ prior written notice to Tenant, to substitute other premises within the Building for the Premises, provided, however, that such right shall not be exercised prior to the expiration of Lease Year 2, and may only be exercised one (1) time during the Term. In each such case, the substituted premises shall (a) contain at least substantially the same Rentable Area as the Premises and no lower in the Building than the original Premises, (b) contain comparable tenant improvements using new materials and finishes and substantially the same layout and amount of interior glass as the original Premises, and (c) be made available to Tenant at the then current annual Rent for such space, which in no event, shall exceed the per square foot annual Rent for the Premises in effect under this Lease for the Premises at the time of such substitution. Landlord shall pay all reasonable moving expenses of Tenant incidental to such substitution of premises, the reasonable cost of new stationery and reasonable costs and expenses incurred by Tenant for telecommunications cabling and wiring. Any physical relocation of Tenant under this Paragraph 15 shall be undertaken only non a weekend or legal holiday and shall in no event cause any material disruption to Tenant’s business operations.

16. **SUBORDINATION; ATTORNMENT; ESTOPPEL CERTIFICATES.**

(a) Tenant agrees that this Lease and the rights of Tenant hereunder shall be subject and subordinate to any and all mortgages, deeds of trust, master leases, ground leases or other security documents and any and all modifications, renewals, extensions, consolidations and replacements thereof (collectively, “Security Documents”) which now or hereafter constitute a lien upon or encumber the Land, the Building or the Premises. Such subordination shall be effective without the necessity of the execution by Tenant of any additional document for the purpose of evidencing or effecting such subordination. In addition, the holder of any such Security Documents (e.g., mortgagee, trustee, master lessor or the like), may effect, by providing notice thereof to Tenant to subordinate or cause to be subordinated any such Security Documents to this Lease and in such case, in the event of the termination or transfer of Landlord’s estate or interest in the Land or the Building by reason of any termination or foreclosure of any such Security Documents, Tenant shall, notwithstanding such subordination, attorn to and become the Tenant of the successor-in-interest to Landlord. Furthermore, Tenant shall within fifteen (15) days of demand therefor execute any instruments or other documents which may be required by Landlord or the holder of any Security Document and specifically shall execute, acknowledge and deliver within fifteen (15) days of demand therefor a subordination of this lease in the form required by the holder of the Security Document requesting the document; the failure to do so by Tenant within such time period shall be a material default hereunder.

(b) If as a result of a proceeding brought for default under any ground or master lease to which this Lease is subject, the interest of the Landlord is transferred or in the event of such transfer by reason of foreclosure or the exercise of the power of sale under any mortgage, deed of trust or other Security Document made by Landlord covering the Premises, Tenant shall attorn to and recognize such transferee as Landlord under this Lease, provided such transferee expressly agrees in writing to be bound to all future obligations by the terms of this Lease, provided, however, it shall be a condition of the obligation of the transferee to be so bound that, if so requested by the transferee, Tenant shall enter into a new lease with that transferee or any successor to such transferee on the same terms and conditions as are contained in this Lease (for the unexpired term of this Lease then remaining). Tenant hereby waives its rights under any current or future law which gives or purports to give Tenant any right to terminate or otherwise adversely affect this Lease and the obligations of Tenant hereunder in the event of any such foreclosure proceeding or sale.
(c) Tenant shall, upon not less than ten (10) days’ prior notice by Landlord, execute, acknowledge and deliver to Landlord a statement in writing certifying to those facts for which certification has been requested by Landlord or any current or prospective purchaser, holder of any Security Document, ground lessor or master lessor, or stating any limitations on any certification, including, but without limitation, that (i) this Lease is unmodified and in full force and effect (or if there have been modifications, that the same is in full force and effect as modified and stating the modifications), (ii) the dates to which the Base Rent, Additional Rent and other charges hereunder have been paid, if any, and (iii) whether or not to the best knowledge of Tenant, Landlord is in default in the performance of any covenant, agreement or condition contained in this Lease and, if so, specifying each such default of which Tenant may have knowledge. The form of the statement attached hereto as Exhibit D is hereby approved by Tenant for use pursuant to this sub-paragraph (c); however, at Landlord’s option, Landlord shall have the right to use other forms for such purpose. Tenant’s failure to execute and deliver such statement within such time shall, at the option of Landlord, constitute an Event of Default under this Lease and, in any event, shall be conclusive upon Tenant that this Lease is in full force and effect without modification except as may be represented by Landlord in any such certificate prepared by Landlord and delivered to Tenant for execution. Any statement delivered pursuant to this Paragraph 16 may be relied upon by any prospective purchaser of the fee or of the Building or any mortgagee, ground lessor or other like encumbrances thereof or any assignee of any such encumbrance upon the Building or the Land.

17. SALE BY LANDLORD; TENANT’S REMEDIES; NONRECOERCSE LIABILITY.

(a) In the event of a sale or conveyance by Landlord of the Building or the Land, Landlord shall be released from any and all liability under this Lease. If the Security Deposit has been deposited by Tenant to Landlord prior to such sale or conveyance, Landlord shall transfer the Security Deposit to the purchaser, and upon delivery to Tenant of notice thereof, Landlord shall be discharged from any further liability in reference thereto.

(b) Landlord shall not be in default of any obligation of Landlord hereunder unless Landlord fails to perform any of its obligations under this Lease within thirty (30) days after receipt of written notice of such failure from Tenant; provided, however, that if the nature of Landlord’s obligation is such that more than thirty (30) days are required for its performance, Landlord shall not be in default if Landlord commences to cure such default within the thirty (30) day period and thereafter diligently prosecutes the same to completion. All obligations of Landlord under this Lease will be binding upon Landlord only during the period of its ownership of the Building and not thereafter. All obligations of Landlord hereunder shall be construed as covenants, not conditions; and, except as may be otherwise expressly provided in this Lease, Tenant may not terminate this Lease for breach of Landlord’s obligations hereunder.
(c) Notwithstanding anything contained in this Lease to the contrary, the obligations of Landlord under this Lease (including any actual or alleged breach or default by Landlord) do not constitute personal obligations of the individual partners, directors, officers, trustees, members or shareholders of Landlord or Landlord’s members or partners, and Tenant shall not seek recourse against the individual partners, directors, officers, trustees, members or shareholders of Landlord or against Landlord’s members or partners or against any other persons or entities having any interest in Landlord, or against any of their personal assets for satisfaction of any liability with respect to this Lease. Any liability of Landlord for a default by Landlord under this Lease, or a breach by Landlord of any of its obligations under the Lease, shall be limited solely to its interest in the Land and Building, and in no event shall any personal liability be asserted against Landlord in connection with this Lease nor shall any recourse be had to any other property or assets of Landlord, its partners, directors, officers, trustees, members, shareholders or any other persons or entities having any interest in Landlord. Tenant’s sole and exclusive remedy for a default or breach of this Lease by Landlord shall be either (i) an action for damages, or (ii) an action for injunctive relief; Tenant hereby waiving and agreeing that Tenant shall have no offset rights or right to terminate this Lease on account of any breach or default by Landlord under this Lease. Under no circumstances whatsoever shall Landlord ever be liable for punitive, consequential or special damages under this Lease and Tenant waives any rights it may have to such damages under this Lease in the event of a breach or default by Landlord under this Lease.

(d) Notwithstanding anything contained in this Lease to the contrary, the obligations of Tenant under this Lease (including any actual or alleged breach or default by Tenant) do not constitute personal obligations of the individual partners, directors, officers, trustees, members or shareholders of Tenant or Tenant’s members or partners, and Landlord shall not seek recourse against the individual partners, directors, officers, trustees, members or shareholders of Tenant for a breach or default by Tenant in its obligations under this Lease. With the exception of (i) a holdover by Tenant of the Lease Term, and (ii) a breach or default or of Tenant’s obligations under this Lease with regard to Hazardous Materials (and without limiting any indemnification obligations of Tenant with regard to Hazardous Materials), Tenant shall never be liable for punitive, consequential or special damages under this Lease and subject to the foregoing exceptions, Landlord waives any rights it may have to such damages under this Lease in the event of a breach or default by Tenant under this Lease.

(e) As a condition to the effectiveness of any notice of default given by Tenant to Landlord, Tenant shall also concurrently give such notice under the provisions of Paragraph 17(b) to each beneficiary under a Security Document encumbering the Land or the Building of whom Tenant has received written notice (such notice to specify the address of the beneficiary). In the event Landlord shall fail to cure any breach or default within the time period specified in sub-paragraph (b), then prior to the pursuit of any remedy therefor by Tenant, each such beneficiary shall have an additional thirty (30) days within which to cure such default, or if such default cannot reasonably be cured within such period, then each such beneficiary shall have such additional time as shall be necessary to cure such default, provided that within such thirty (30) day period, such beneficiary has commenced and is diligently pursuing the remedies available to it which are necessary to cure such default (including, without limitation, as appropriate, commencement of foreclosure proceedings).
18. PARKING: COMMON AREAS.

(a) The parking garage associated with the Building (the “Parking Garage”) is leased to and operated by a third party (the “Parking Garage Operator”), pursuant to which Landlord has certain rights to designate a certain number of parking spaces for use by tenants in the Building.

Commencing on the Commencement Date, Landlord shall designate for Tenant’s use parking passes for up to the number of parking spaces in the Parking Garage specified in Item 14 of Basic Lease Provisions, which shall be on an unreserved, non-exclusive basis. Monthly parking charges shall be paid directly to the Parking Garage Operator either by Tenant, to the extent that Tenant designates itself, as an entity, as the holder of certain passes, or by the individual designated by Tenant as the holder of designated parking passes, in any case at prevailing rates of the Parking Garage Operator from time to time. A default by Tenant, its officers or employees beyond any applicable notice and cure periods in the agreement with such operator shall relieve Landlord from any liability to provide parking spaces under this Lease. Notwithstanding anything to the contrary set forth in this Lease, Tenant shall have the right to arrange directly with the Parking Garage Operator to rent additional parking spaces in the Parking Garage on a month-to-month basis.

(b) Subject to sub-paragraph (c) below and the remaining provisions of this Lease, Tenant shall have, as appurtenant to the Premises, the nonexclusive right, in common with others, to the use of such entrances, lobbies, fire vestibules, restrooms (excluding restrooms on any full floors leased by a tenant), mechanical areas, ground floor corridors, elevators and elevator foyers, electrical and janitorial closets, telephone and equipment rooms, loading and unloading areas, the plaza areas surrounding the Building and located on the Land, ramps, drives, stairs, and similar access ways and service ways and other common areas and facilities in and adjacent to the Building and located on the Land as are designated from time to time by Landlord for the general nonexclusive use and enjoyment of Landlord, Tenant and the other tenants of the Building and their respective employees, agents, representatives, licensees and invitees (“Common Areas”). The use of such Common Areas shall be subject to the Rules and Regulations (as defined in Paragraph 19(f)) and the provisions of any covenants, conditions and restrictions affecting the Building or the Land. Tenant shall keep all of the Common Areas free and clear of any obstructions created or permitted by Tenant or resulting from Tenant’s operations, and shall use the Common Areas only for normal activities and ingress and egress by Tenant and its employees, agents, representatives, licensees and invitees to and from the Premises, the Building or the Land. If, in the reasonable opinion of Landlord, unauthorized persons are using the Common Areas by reason of the presence of Tenant in the Premises, Tenant, upon demand of Landlord, shall correct such situation by appropriate action or proceedings against all such unauthorized persons. Nothing herein shall affect the rights of Landlord at any time to remove any such unauthorized persons from said areas or to prevent the use of any of said areas by unauthorized persons. Landlord reserves the right to make such changes, alterations, additions, deletions, improvements, repairs or replacements in or to the Building (excluding the Premises) and the Common Areas as Landlord may reasonably deem necessary or desirable, including, without limitation, adding floors and making changes in the location, size, shape and number of entrances, loading areas, landscaped areas and walkways, changes and reductions in corridors and lobbies and the installation of kiosks, planters, sculptures, displays, escalators, mezzanines, and other structures, facilities, amenities and features therein, and changes for the purpose of connection with or entrance into or use of the Property in conjunction with any adjoining or adjacent building or buildings, now existing or hereafter constructed; provided, however, that (i) there shall be no unreasonable permanent
obstruction of access to or use of the Premises resulting therefrom, and (ii) Landlord shall use commercially reasonable efforts to minimize any
interruption with Tenant’s use and occupancy of and access to the Premises. Notwithstanding any provision of this Lease to the contrary, the Common
Areas shall not in any event be deemed to be a portion of or included within the Premises leased to Tenant and the Premises shall not be deemed to be a
portion of the Common Areas. This Lease is granted subject to the terms hereof, the rights and interests of third parties under existing liens, ground
leases, easements and encumbrances affecting such property, all zoning regulations, rules, ordinances, building restrictions and other laws and
regulations now in effect or hereafter adopted by any governmental authority having jurisdiction over the Land or Building or any part thereof.

(c) Notwithstanding any provision of this Lease to the contrary, Landlord specifically reserves the right to redefine the term “Building” for
purposes of equitably allocating and calculating Operating Expenses and Real Estate Taxes so as to include or exclude areas as Landlord shall from time
to time reasonably determine or specify (and any such determination or specification shall be without prejudice to Landlord’s right to revise thereafter
such determination or specification). In addition, Landlord shall have the right to contract or otherwise arrange for amenities, services or utilities that are
included within the definition of Operating Expenses under this Lease to be provided on a common or shared basis to both the Building (i.e., the area
defined in the Basic Lease Provisions as the “Building”) and adjacent areas not included within the Building (the “Additional Area”), so long as the cost
of such amenities, services or utilities is allocated to the Building and such Additional Area on a reasonable and equitable basis and not for the purpose
of shifting to the Building a greater share of Operating Expenses or Real Estate Taxes. In the case where the definition of the Building is revised for
purposes of the allocation or determination of Operating Expenses and Real Estate Taxes to include both the Building and the Additional Area, Tenant’s
Proportionate Share shall be appropriately revised to equal the percentage share represented by the Premises of the Rentable Area contained within the
Building and the Additional Area in the aggregate, and Base Operating Expenses and Base Real Estate Taxes shall be adjusted appropriately to reflect
the amount that would have been reasonably included therein had Operating Expenses and Taxes been determined on the same basis during the
respective Base Years in order to maintain an equitable allocation of increases in Operating Expenses and Real Estate Taxes over that associated with the
respective Base Years notwithstanding such adjustments. Landlord shall have the sole right to determine which portions of the Building and other areas,
if any, shall be served by common management, operation, maintenance and repair. Landlord shall have the exclusive rights to the airspace above and
around, and the subsurface below, the Premises and other portions of the Building and Land.

19. MISCELLANEOUS.

(a) Attorneys’ Fees. In the event of any legal action or proceeding brought by either party against the other arising out of this Lease, the prevailing
party shall be entitled to recover reasonable attorneys’ fees and costs (including, without limitation, court costs and expert witness fees) incurred in such
action. Such amounts shall be included in any judgment rendered in any such action or proceeding and the parties shall request that the trier of fact
determine which is the prevailing party.
Waiver. No waiver by Landlord of any provision of this Lease or of any breach by Tenant hereunder shall be deemed to be a waiver of any other provision hereof, or of any subsequent breach by Tenant. Landlord’s consent to or approval of any act by Tenant requiring Landlord’s consent or approval under this Lease shall not be deemed to render unnecessary the obtaining of Landlord’s consent to or approval of any subsequent act of Tenant. No act or thing done by Landlord or Landlord’s agents during the term of this Lease shall be deemed an acceptance of a surrender of the Premises, unless in writing signed by Landlord. The delivery of the keys to any employee or agent of Landlord shall not operate as a termination of the Lease or a surrender of the Premises. The acceptance of any Rent by Landlord following a breach of this Lease by Tenant shall not constitute a waiver by Landlord of such breach or any other breach unless such waiver is expressly stated in a writing signed by Landlord.

(c) Notices. Any notice, demand, request, consent, approval, disapproval or certificate (“Notice”) required or desired to be given under this Lease shall be in writing and given by certified mail, return receipt requested, by personal delivery or by a nationally recognized overnight delivery service (such as Federal Express or UPS) providing a receipt for delivery. Notices may not be given by facsimile. The date of giving any Notice shall be deemed to be the date upon which delivery is actually made by one of the methods described in this Paragraph 19(c) (or attempted if said delivery is refused or rejected). If a Notice is received on a Saturday, Sunday or legal holiday, it shall be deemed received on the next business day. All notices, demands, requests, consents, approvals, disapprovals, or certificates shall be addressed at the respective addresses specified in Item 15 of the Basic Lease Provisions or to such other addresses as may be specified by written notice from Landlord to Tenant or Tenant to Landlord. Either party may change its address by giving reasonable advance written Notice of its new address in accordance with the methods described in this Paragraph; provided, however, no notice of either party’s change of address shall be effective until fifteen (15) days after the addressee’s actual receipt thereof. For the purpose of this Lease, each party’s counsel may provide Notices to the other on behalf of their respective clients and such notices shall be binding on the receiving party as if such notices have been provided directly by the notifying party.

(d) Access Control. Landlord shall be the sole determinant of the type and amount of any access control or courtesy guard services to be provided to the Building, if any. IN ALL EVENTS, LANDLORD SHALL NOT BE LIABLE TO TENANT, AND TENANT HEREBY WAIVES ANY CLAIM AGAINST LANDLORD, FOR (I) ANY TRESPASS OR CRIMINAL ENTRY OF THIRD PARTIES INTO THE PREMISES OR THE BUILDING, (II) ANY DAMAGE TO PERSONS, OR (III) ANY LOSS OF PROPERTY IN AND ABOUT THE PREMISES, THE BUILDING OR THE LAND, BY OR FROM ANY TRESPASS OR CRIMINAL ACTS OF THIRD PARTIES, REGARDLESS OF ANY ACTION, INACTION, FAILURE, BREAKDOWN, MALFUNCTION AND/OR INSUFFICIENCY OF THE ACCESS CONTROL OR COURTESY GUARD SERVICES PROVIDED BY LANDLORD, IF ANY. Tenant shall provide such supplemental security services and shall install within the Premises such supplemental security equipment, systems and procedures as may reasonably be required for the protection of its employees and invitees, provided that Tenant shall coordinate such services and equipment with any security provided by Landlord. The determination of the extent to which such supplemental security equipment, systems and procedures are reasonably required shall be made in the sole judgment, and shall be the sole responsibility, of Tenant. Tenant acknowledges that it has neither received nor relied upon any representation or warranty made by or on behalf of
Landlord with respect to the safety or security of the Premises or the Building or any part thereof or the extent or effectiveness of any security measures or procedures now or hereafter provided by Landlord, and further acknowledges that Tenant has made its own independent determinations with respect to all such matters. Without limiting the generality of the foregoing, Landlord shall have the right to limit or prevent access to the Property, shut down elevator service, activate elevator emergency controls, or otherwise take such action or preventative measures deemed necessary by Landlord for the safety of tenants or other occupants of the Property or the protection of the Property and other property located thereon or therein, in case of fire, invasion, insurrection, riot, civil disorder, public excitement or other dangerous condition, or threat thereof.

(e) **Storage.** Any storage space at any time leased to Tenant hereunder shall be used exclusively for storage. Notwithstanding any other provision of this Lease to the contrary, (i) Landlord shall have no obligation to provide heating, cleaning, water or air conditioning therefor, and (ii) Landlord shall be obligated to provide to such storage space only such electricity as will, in Landlord's judgment, be adequate to light said space as storage space.

(f) **Holding Over.** If Tenant retains possession of the Premises after the termination or expiration of the Lease Term, then Tenant shall, at Landlord's election become a tenant at sufferance (and not a tenant at will), such possession shall be subject to immediate termination by Landlord at any time, and all of the other terms and provisions of this Lease (excluding any expansion or renewal option or other similar right or option) shall be applicable during such holdover period, except that Tenant shall pay Landlord from time to time, upon demand, as Base Rent for the holdover period, an amount equal to one hundred fifty percent (150%) of the Base Rent in effect on the termination date for the first thirty (30) days of any holdover and two hundred percent (200%) of the Base Rent in effect on the termination date thereafter, computed on a monthly basis for each month or part thereof during such holding over. All other payments (including payment of Additional Rent) shall continue under the terms of this Lease. In addition, if Tenant holds over for thirty (30) or more days following the termination date, Tenant shall be liable for all damages incurred by Landlord as a result of such holding over. No holding over by Tenant, whether with or without consent of Landlord, shall operate to extend this Lease except as otherwise expressly provided, and this Paragraph shall not be construed as consent for Tenant to retain possession of the Premises.

(g) **Condition of Premises.** EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS LEASE, LANDLORD HEREBY DISCLAIMS ANY EXPRESS OR IMPLIED REPRESENTATION OR WARRANTY THAT THE PREMISES ARE SUITABLE FOR TENANT'S INTENDED PURPOSE OR USE, WHICH DISCLAIMER IS HEREBY ACKNOWLEDGED BY TENANT. EXCEPT AS OTHERWISE PROVIDED IN THIS LEASE THE TAKING OF POSSESSION BY TENANT SHALL BE CONCLUSIVE EVIDENCE THAT TENANT:

(i) **ACCEPTS THE PREMISES, THE BUILDING AND LEASEHOLD IMPROVEMENTS AS SUITABLE FOR THE PURPOSES FOR WHICH THE PREMISES WERE LEASED;**

(ii) **ACCEPTS THE PREMISES AND BUILDING AS BEING IN GOOD AND SATISFACTORY CONDITION;**
(iii) WAIVES ANY DEFECTS IN THE PREMISES AND ITS APPURTEINANCES EXISTING NOW OR IN THE FUTURE, EXCEPT THAT TENANT’S TAKING OF POSSESSION SHALL NOT BE DEEMED TO WAIVE LANDLORD’S COMPLETION OF MINOR FINISH WORK ITEMS THAT DO NOT INTERFERE WITH TENANT’S OCCUPANCY OF THE PREMISES OR LANDLORD’S ONGOING MAINTENANCE AND REPAIR OBLIGATIONS UNDER OTHER PROVISIONS OF THIS LEASE; AND

(iv) WAIVES ALL CLAIMS BASED ON ANY IMPLIED WARRANTY OF SUITABILITY OR HABITABILITY.

(h) **Quiet Possession.** Provided Tenant pays the Rent reserved hereunder when due or within any applicable period of notice and grace and Tenant and observing and performing all of the covenants, conditions and provisions on Tenant’s part to be observed and performed hereunder within applicable periods of notice and grace, Tenant shall have quiet possession of the Premises for the term hereof without hindrance or ejection by any person lawfully claiming under Landlord, subject to the provisions of this Lease and to the provisions of any (i) covenants, conditions and restrictions, (ii) master lease, or (iii) Security Documents to which this Lease is subordinate or may be subordinated. Notwithstanding the foregoing, Landlord shall have the right to grant to any person or entity the right to conduct any business or render any service at the Property, whether or not it is the same or similar to the use made of the Premises by the Tenant; and shall have access to any mail chutes located on the Premises according to the rules of the United States Postal Service.

(i) **Matters of Record.** Except as otherwise provided herein, this Lease and Tenant’s rights hereunder are subject and subordinate to all matters affecting Landlord’s title to the Land and Building recorded in the Real Property Records of the County in which the Building is located, prior to and subsequent to the date hereof, including, without limitation, all covenants, conditions and restrictions. Tenant agrees for itself and all persons in possession or holding under it that it will comply with and not violate any such covenants, conditions and restrictions or other matters of record to the extent such covenants, conditions and restrictions or other matters of record do not conflict with Tenant’s rights and obligations under this Lease. Landlord reserves the right, from time to time, to grant such easements, rights and dedications as Landlord deems necessary or desirable, and to cause the recordation of parcel maps and covenants, conditions and restrictions affecting the Premises, the Building or the Land, as long as such easements, rights, dedications, maps, and covenants, conditions and restrictions do not materially interfere with the use of the Premises by Tenant. At Landlord’s request, Tenant shall join in the execution of any of the aforementioned documents.

(j) **Successors and Assigns.** Except as otherwise provided in this Lease, all of the covenants, conditions and provisions of this Lease shall be binding upon and shall inure to the benefit of the parties hereto and their respective heirs, personal representatives, successors and assigns. Tenant shall attorn to each purchaser, successor or assignee of Landlord.

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(k) Brokers. Each party warrants to the other that it has had no dealings with any real estate broker or agent in connection with the negotiation of this Lease, excepting only the Landlord’s broker named in Item 13 of the Basic Lease Provisions and that it knows of no other real estate broker or agent who is or might be entitled to a commission in connection with this Lease. Landlord shall be responsible for all brokerage commissions or similar payments due to such broker named in Item 13 of the Basic Lease Provisions. Tenant hereby agrees to indemnify, defend and hold Landlord harmless for, from and against all claims for any brokerage commissions, finders’ fees or similar payments by any persons acting on behalf of Tenant, and all costs, expenses and liabilities incurred in connection with such claims, including reasonable attorneys’ fees and costs. Landlord hereby agrees to indemnify, defend and hold Tenant harmless for, from and against all claims for any brokerage commissions, finders’ fees or similar payments by any persons acting on behalf of Landlord, and all costs, expenses and liabilities incurred in connection with such claims, including reasonable attorneys’ fees and costs.

(l) Building Name and Signage. Landlord shall have the right at any time to install, affix and maintain any and all signs on the exterior and on the interior of the Building as Landlord may, in Landlord’s sole discretion, desire. Tenant shall not use the name of the Building or use pictures or illustrations of the Building in advertising or other publicity or for any purpose other than as the address of the business to be conducted by Tenant in the Premises, without the prior written consent of Landlord. Additionally, Landlord shall have the exclusive right at all times during the Lease Term to change, modify, add to or otherwise alter the name, number, or designation of the Building, and Landlord shall not be liable for claims or damages of any kind which may be attributed thereto or result therefrom. Notwithstanding the foregoing, Landlord hereby consents to Tenant placing signage on the exterior of the Premises at Tenant’s entrance doors, at Tenant’s sole cost and expense, in accordance with Landlord’s reasonable rules with respect thereto and Tenant may, at its option have signage on the electronic Building directory provided for tenants in the lobby of the Building, standard elevator lobby signage in the applicable floor, and an additional directional sign on the 31st floor at a location and of a size as shall be mutually agreed by Landlord and Tenant.

(m) Examination of Lease. Submission of this instrument for examination or signature by Tenant does not constitute a reservation of or option for lease, and it is not effective as a lease or otherwise until execution by and delivery to both Landlord and Tenant.

(n) Time. Time is of the essence of this Lease and each and all of those provisions of the Lease that are time dependent.

(o) Interpretation; Defined Terms and Marginal Headings. The words “Landlord” and “Tenant” as used herein shall include the plural as well as the singular and for purposes of Articles 5, 7, 13 and 18, the term Landlord shall include Landlord, its employees, contractors and agents. The marginal headings and titles to the articles of this Lease are not a part of this Lease and shall have no effect upon the construction or interpretation of any part hereof. Wherever this Lease requires Landlord to provide a customary service or to act in a reasonable manner (whether in incurring an expense, establishing a rule or regulation, providing an approval or consent, or performing any other act), this Lease shall be deemed also to provide that whether such service is customary or such conduct is reasonable shall be determined by reference to the practices of owners of buildings that (i) are comparable to the Building in size, age, class, quality and location, and (ii) at Landlord’s option, have been, or are being prepared to be, certified under the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) rating system or a similar rating system.
(p) Conflict of Laws; Prior Agreements; Separability. This Lease shall be governed by and construed pursuant to the laws of the Commonwealth of Massachusetts. This Lease contains all of the agreements of the parties hereto with respect to any matter covered or mentioned in this Lease. No prior agreement, understanding or representation pertaining to any such matter shall be effective for any purpose. No provision of this Lease may be amended or added to except by an agreement in writing signed by the parties hereto or their respective successors in interest. The illegality, invalidity or unenforceability of any provision of this Lease shall in no way impair or invalidate any other provision of this Lease, and such remaining provisions shall remain in full force and effect.

(q) Authority. If Tenant is a corporation or limited liability company, Tenant and each individual executing this Lease on behalf of Tenant hereby covenants and warrants that Tenant is a duly authorized and existing corporation or limited liability company, that Tenant has and is qualified to do business in the State, that the corporation or limited liability company has full right and authority to enter into this Lease, and that each person signing on behalf of the corporation is authorized to do so. If Tenant is a partnership or trust, each individual executing this Lease on behalf of Tenant hereby covenants and warrants that he is duly authorized to execute and deliver this Lease on behalf of Tenant in accordance with the terms of such entity’s partnership or trust agreement. Tenant shall provide Landlord on demand with such evidence of such authority as Landlord shall reasonably request, including, without limitation, resolutions, certificates and opinions of counsel. This Lease shall not be construed to create a partnership, joint venture or similar relationship or arrangement between Landlord and Tenant hereunder.

(r) Joint and Several Liability. If two or more individuals, corporations, partnerships or other business associations (or any combination of two or more thereof) shall sign this Lease as Tenant, the liability of each such individual, corporation, partnership or other business association to pay Rent and perform all other obligations hereunder shall be deemed to be joint and several, and all notices, payments and agreements given or made by, with or to any one of such individuals, corporations, partnerships or other business associations shall be deemed to have been given or made by, with or to all of them. In like manner, if Tenant shall be a partnership or other business association, the members of which are, by virtue of statute or federal law, subject to personal liability, then the liability of each such member shall be joint and several.

(s) Rental Allocation. For purposes of Section 467 of the Internal Revenue Code of 1986, as amended from time to time, Landlord and Tenant hereby agree to allocate all Rent to the period in which payment is due, or if later, the period in which Rent is paid.

(t) Rules and Regulations. Tenant agrees to comply with all non-discriminatory rules and regulations of general applicability to tenants and other users of the Building from time to time made by Landlord (the “Rules and Regulations”), as the same may be amended or supplemented from time to time upon reasonable notice to Tenant. Landlord shall not be liable to Tenant for the failure of any other tenant or any of its assignees, subtenants, or their respective agents, employees, representatives, invitees or licensees to conform to the Rules and Regulations.
(u) **Joint Product.** This Agreement is the result of arms-length negotiations between Landlord and Tenant and their respective attorneys experienced in lease transactions of office space in the Commonwealth of Massachusetts. Accordingly, neither party shall be deemed to be the author of this Lease and this Lease shall not be construed against either party. Furthermore, each of the provisions was negotiated in view of the entire transaction including the type and location of the property, the rental, the term and the respective rights, obligations and remedies of the Landlord and Tenant. As a result, the rights, obligations and remedies agreed to herein are, as negotiated, a part of the transaction as a whole. Neither party intends that the absence of a termination remedy being specified herein for a particular action or lack of action by the other party implies that the parties intended any such remedy to be inferred. Without limiting the generality of the foregoing, in no event shall Tenant have the right to terminate or cancel this lease as a result of any default by Landlord or breach by Landlord of its covenants or any warranties or promises hereunder, except in the case of a wrongful eviction of Tenant from the demised premises (constructive or actual) by Landlord or as expressly provided in this Lease.

(v) **Financial Statements.** Upon Landlord’s written request, Tenant shall promptly furnish Landlord, from time to time, with the most current audited annual financial statements prepared in accordance with generally accepted accounting principles, certified by Tenant and an independent auditor to be true and correct, reflecting Tenant’s then current financial condition. Landlord and its affiliates and investors shall keep such financial statements confidential, provided that Landlord shall be permitted to deliver such financial statements to a lender, purchaser or lessor or a prospective lender, purchaser or lessor, subject to such recipient’s execution of a commercially reasonable confidentiality agreement. Landlord and Tenant agree that the form attached hereto as Exhibit E is a commercially reasonable form of confidentiality agreement.

(w) **Force Majeure.** Any prevention, delay or stoppage due to strikes, lockouts, labor disputes, acts of God, acts of war, terrorism, terrorist activities, inability to obtain services, labor, or materials or reasonable substitutes therefore, governmental actions, civil commotions, fire, flood, earthquake or other casualty, and other causes beyond the reasonable control of the party obligated to perform, except with respect to the obligations imposed with regard to Rent and other charges to be paid by Tenant pursuant to this Lease and except as to Tenant’s obligations under Article 6 and Article 8 of this Lease and Paragraph 19(f) of this Lease (collectively, a “Force Majeure”), notwithstanding anything to the contrary contained in this Lease, shall excuse the performance of such party for a period equal to any such prevention, delay or stoppage and, therefore, if this Lease specifies a time period for performance of an obligation of either party, that time period shall be extended by the period of any delay in such party’s performance caused by a Force Majeure.

(x) **Counterparts.** This Lease may be executed in several counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

(y) **Waiver of Right to Jury Trial.** LANDLORD AND TENANT WAIVE THEIR RESPECTIVE RIGHTS TO TRIAL BY JURY OF ANY CONTRACT OR TORT CLAIM, COUNTERCLAIM, CROSS-COMPLAINT, OR CAUSE OF ACTION IN ANY ACTION, PROCEEDING, OR HEARING BROUGHT BY EITHER PARTY AGAINST THE OTHER ON ANY MATTER ARISING OUT OF OR IN ANY WAY CONNECTED WITH THIS LEASE, THE RELATIONSHIP OF LANDLORD AND TENANT, OR TENANT’S USE OR OCCUPANCY OF THE LEASED PREMISES, INCLUDING WITHOUT LIMITATION ANY CLAIM OF INJURY OR DAMAGE OR THE ENFORCEMENT OF ANY REMEDY UNDER ANY CURRENT OR FUTURE LAW, STATUTE, REGULATION, CODE, OR ORDNANCE.
Office and Communications Services. Landlord has advised Tenant that certain office and communications services may be offered to tenants of the Building by a concessionaire under contract to Landlord ("Provider"). Tenant shall be permitted to contract with Provider for the provision of any or all of such services on such terms and conditions as Tenant and Provider may agree. Tenant acknowledges and agrees that: (i) Landlord has made no warranty or representation to Tenant with respect to the availability of any such services, or the quality, reliability or suitability thereof; (ii) the Provider is not acting as the agent or representative of Landlord in the provision of such services, and Landlord shall have no liability or responsibility for any failure or inadequacy of such services, or any equipment or facilities used in the furnishing thereof, or any act or omission of Provider, or its agents, employees, representatives, officers or contractors; (iii) Landlord shall have no responsibility or liability for the installation, alteration, repair, maintenance, furnishing, operation, adjustment or removal of any such services, equipment or facilities; and (iv) any contract or other agreement between Tenant and Provider shall be independent of this Lease, the obligations of Tenant hereunder, and the rights of Landlord hereunder, and, without limiting the foregoing, no default or failure of Provider with respect to any such services, equipment or facilities, or under any contract or agreement relating thereto, shall have any effect on this Lease or give to Tenant any offset or defense to the full and timely performance of its obligations hereunder, or entitle Tenant to any abatement of rent or additional rent or any other payment required to be made by Tenant hereunder, or constitute any accrual or constructive eviction of Tenant, or otherwise give rise to any other claim of any nature against Landlord.

OFAC Compliance.

(i) Certification. Tenant certifies, represents, warrants and covenants that:

(i) It is not acting and will not act, directly or indirectly, for or on behalf of any person, group, entity, or nation named by any Executive Order or the United States Treasury Department as a terrorist, "Specially Designated National and Blocked Person", or other banned or blocked person, entity, nation or transaction pursuant to any law, order, rule, or regulation that is enforced or administered by the Office of Foreign Assets Control; and

(ii) It is not engaged in this transaction, directly or indirectly on behalf of, or instigating or facilitating this transaction, directly or indirectly on behalf of, any such person, group, entity or nation.

(ii) Indemnity. Tenant hereby agrees to defend (with counsel reasonably acceptable to Landlord), indemnify and hold harmless Landlord and the Landlord Indemnitees from and against any and all Claims arising from or related to any such breach of the foregoing certifications, representations, warranties and covenants.
(bb) **OFAC Compliance.**

(i) Certification. Landlord certifies, represents, warrants and covenants that:

(i) It is not acting and will not act, directly or indirectly, for or on behalf of any person, group, entity, or nation named by any Executive Order or the United States Treasury Department as a terrorist, “Specially Designated National and Blocked Person”, or other banned or blocked person, entity, nation or transaction pursuant to any law, order, rule, or regulation that is enforced or administered by the Office of Foreign Assets Control; and

(ii) It is not engaged in this transaction, directly or indirectly on behalf of, or instigating or facilitating this transaction, directly or indirectly on behalf of, any such person, group, entity or nation.

(iii) Indemnity. Landlord hereby agrees to defend (with counsel reasonably acceptable to Tenant), indemnify and hold harmless Tenant and the Tenant Affiliates from and against any and all Claims arising from or related to any such breach of the foregoing certifications, representations, warranties and covenants.

(cc) **No Easement For Light, Air And View.** This Lease conveys to Tenant no rights for any light, air or view. No diminution of light, air or view, or any impairment of the visibility of the Premises from inside or outside the Building, by any structure or other object that may hereafter be erected (whether or not by Landlord) shall entitle Tenant to any reduction of Rent under this Lease, constitute an actual or constructive eviction of Tenant, result in any liability of Landlord to Tenant, or in any other way affect this Lease or Tenant’s obligations hereunder.

(dd) **Nondisclosure of Lease Terms.** Tenant agrees that the terms of this Lease are confidential and constitute proprietary information of Landlord, and that disclosure of the terms hereof could adversely affect the ability of Landlord to negotiate with other tenants. Tenant hereby agrees that Tenant and its partners, officers, directors, employees, agents, real estate brokers and sales persons and attorneys shall not disclose the terms of this Lease to any other person without Landlord’s prior written consent, except to any accountants of Tenant in connection with the preparation of Tenant’s financial statements or tax returns, to an assignee of this Lease or subtenant of the Premises, or to an entity or person to whom disclosure is required by applicable law or in connection with any action brought to enforce this Lease.

(ee) **ERISA.** Tenant is not an “employee benefit plan” as defined in Section 3(3) of the Employee Retirement Income Security Act of 1974 (“ERISA”), which is subject to Title I of ERISA, or a “plan” as defined in Section 4975(e)(1) of the Internal Revenue Code of 1986, which is subject to Section 4975 of the Internal Revenue Code of 1986; and (b) the assets of Tenant do not constitute “plan assets” of one or more such plans for purposes of Title I of ERISA or Section 4975 of the Internal Revenue Code of 1986; and (c) Tenant is not a “governmental plan” within the meaning of Section 3(32) of ERISA, and assets of Tenant do not constitute plan assets of one or more such plans; or (d) transactions by or with Tenant are not in violation of state statutes applicable to Tenant regulating investments of and fiduciary obligations with respect to governmental plans.

[SIGNATURE PAGES TO FOLLOW]
IN WITNESS WHEREOF, the parties have executed this Lease to be effective as of the Date of this Lease.

LANDLORD:

T-C 33 ARCH STREET LLC,
a Delaware limited liability company

By: Teachers Insurance and Annuity Association of America, Managing Investor

By: /s/ William K. Arkamowitz
Name: William K. Arkamowitz
Title: Authorized Signatory
Date of Execution: 

[Signature Page]
SIGNATURE PAGE TO OFFICE LEASE
BY AND BETWEEN T-C 33 ARCH STREET LLC, AS LANDLORD,
AND KARUNA PHARMACEUTICALS, INC., AS TENANT

TENANT:

KARUNA PHARMACEUTICALS, INC.,
a Delaware corporation

By: /s/ Andrew Miller
its: COO
hereunto duly authorized

[Signature Page]
BUSINESS SERVICES, PERSONNEL AND INFORMATION MANAGEMENT AGREEMENT

This Business Services, Personnel and Information Management Agreement ("Agreement") is entered into to be effective as of the Effective Date (as defined below) by and between Karuna Pharmaceuticals, Inc., a Delaware Corporation (the "Operating Company"), PureTech Management, Inc., a Delaware corporation (the "PTM"), PureTech Health LLC, a Delaware limited liability company (fka PureTech Ventures, LLC) ("PureTech") and PureTech Health pic, a UK public limited company ("PTH pic").

WHEREAS, the parties hereto are parties to that certain Business Services and Personnel Agreement dated on or about July 24, 2009 (the "Effective Date") (the "Original Agreement");

WHEREAS, PureTech is in the business of creating companies and providing, among other things, management expertise, strategic advice, accounting and administrative support, computer and telecommunications services and office infrastructure to certain of its operating companies;

WHEREAS, PTM is in the business of providing personnel services to PureTech and certain of PureTech’s operating companies;

WHEREAS, the Operating Company desires to (i) engage PureTech to provide (or continue to provide), among other things, management expertise, strategic advice, accounting and administrative support, computer and telecommunications services and office infrastructure (collectively, the "Business Services") and (ii) engage PTM to provide personnel services (the "Personnel Services");

WHEREAS, from time to time, PureTech and PTH pic may share certain information with the Operating Company, and the Operating Company may wish to, or may be required to, make certain information public, and the parties have agreed to enter into this Agreement to, among other things, set out the means by which the sharing of such information is to be controlled and (where relevant) restricted by the Operating Company and/or PTH pic.

NOW, THEREFORE, in consideration of the foregoing and the mutual covenants set forth herein, the sufficiency of which consideration is acknowledged to be sufficient, the parties agree that the Original Agreement is hereby amended, restated and superseded in its entirety as set forth below.

Section 1. Term

This Agreement shall commence as of the Effective Date and shall continue in full force and effect until terminated by either party giving at least thirty (30) calendar days written notice to the other except in respect of Sections 5, 6, 7 and 8 which shall survive any termination of this Agreement.
Section 2. Business Services.

PureTech shall provide Business Services to the Operating Company at such times and in such forms as reasonably requested by Operating Company and agreed to by PureTech.

Section 3. Personnel Services.

(a) Provision of Personnel. PTM shall provide such Personnel Services to the Operating Company as are requested by the Operating Company from time to time to carry on the operations of the Operating Company and agreed by PureTech.

(b) Payments for PTM Personnel Services. PTM shall be liable and responsible for all payments in connection with the Personnel Services owed to employees, governments and other third parties including, without limitation, salaries, wages and other compensation, and shall pay any and all contributions, employer taxes, and assessments which may be required to be paid in respect of unemployment insurance, workers’ compensation, social security, Medicare, tax withholding, and other obligations; provided such payments have been made in advance to PTM in accordance with Section 6 hereof.

(c) Benefits for PTM Personnel. PTM shall also be responsible for providing, and shall pay the cost of, the benefit plans and prerequisites offered to all similarly situated personnel covered by the Personnel Services, in each case to the extent and in accordance with each applicable employee’s employment or services agreement; provided that the payments for such costs have been made in advance to PTM in accordance with Section 6 hereof.

(d) Records. PTM shall have sole responsibility for keeping all records pertaining to the Personnel Services provided by it to the Operating Company. PTM shall, upon request by the Operating Company, provide to the Operating Company or its designated agent(s) access to such records and shall provide to the Operating Company or its designated agent(s) copies of such records upon request.

Section 4. Compliance with Laws.

At all times, PTM shall comply with all laws, regulations, ordinances, and other legal requirements applicable to it including, without limitation, the obtaining of workers’ compensation insurance as such may be required by law.

Section 5. Information Management.

(a) Definitions. For purposes of this Section 5, the following definitions shall apply:

(i) “Act” means the Companies Act 2006.

(ii) “Accounts” means, in respect of any financial year or other period in respect of which accounts are prepared in accordance with the relevant provisions of the Companies Act 2006, the audited or unaudited accounts of any party to this Agreement;
(iii) “Business Day” means a day (which for this purpose shall be from 9.00am to 5.30pm Eastern Standard Time) on which banks are open for commercial business in the United States of America other than a Saturday or a Sunday;

(iv) “Disclose” or “Disclosure” means the disclosure of Information to a person other than a party to this Agreement;

(v) “Company Disclosure Requirements” means any relevant disclosure obligations imposed on a company by the United States Securities and Exchange Commission, the Food and Drug Administration Agency, the Act, or any other such relevant, equivalent or successor body from time to time;

(vi) “Information” means, to the extent not otherwise Public Information:

   (1) in the case of information provided by or relating to PureTech and/or PTH pic, any information whatsoever concerning PureTech and/or PTH pic that is not Public Information; and

   (2) in the case of information relating to the Operating Company, any information, publication, e-mail, text message or announcement relating to the Operating Company’s products, research, clinical studies, strategy, business, customer relationships or supplier relationships, whether actual, potential, or otherwise, its Accounts, any information pertaining to or is reasonably likely to cause any actual or prospective material change in its financial position, prospects or business, and any other material matter concerning or relating to the Operating Company.

(vii) “Public Information” means information that (1) is or becomes generally available to the public other than as a result of its Disclosure by the Operating Company in breach of this Agreement; or (2) pursuant to a written statement by PureTech and/or PTH pic, is not to be construed as “Information”;

(viii) “Required Disclosure” means any Disclosure made pursuant to the Company Disclosure Requirements.

(b) Operating Company Obligations. The Operating Company hereby agrees that (i) it shall introduce and maintain appropriate control systems to protect the Information; and (ii) subject to Section 5(c), it shall not Disclose Information other than as permitted in accordance with this Agreement.
(c) **Required Disclosures by Operating Company.**

(i) Nothing in this Agreement shall prevent the Operating Company from making a Required Disclosure, provided that the Operating Company complies with the provisions of Section 5(c)(ii).

(ii) To the extent that the Operating Company is required to make a Required Disclosure, the Operating Company shall not make such Required Disclosure until PureTech has approved the Draft Required Disclosure (as defined below) and the Operating Company has at its own cost: (1) prepared and delivered to PureTech and PTH pic, not less than 5 Business Days prior to the date of the Required Disclosure, written notice of the Required Disclosure, including a copy of the proposed form of Required Disclosure (the “Draft Required Disclosure”), the reason for the proposed Required Disclosure, and any other information or documentation as would be necessary for PureTech to identify the nature, content and extent of the proposed Required Disclosure; (2) provided PureTech and PTH pic with such information and access to the officers, employees and premises of the Operating Company as PureTech and/or PureTech pic may reasonably required in connection with evaluating such Required Disclosure; and (3) directed the Operating Company’s auditors to provide to PureTech and/or PTH pic such information as PureTech may reasonably request in connection with evaluating such Required Disclosure.

(iii) The Operating Company shall not disclose Information to third parties unless such third party has executed a non-disclosure agreement subjecting such disclosure to customary confidentiality and non-use obligations. In addition, each of the Operating Company’s its directors, officers and employees shall execute non-disclosure agreements containing customary confidentiality and non-use obligations upon their engagement by the Operating Company.

(d) **Financial Statements.** The Operating Company shall provide to PureTech and PTH PLC such financial and other information as reasonably determined by PureTech or PTH pic to be necessary or appropriate in the preparation of PTH pic’s Accounts. Such information shall be provided in a manner and at such times as PureTech or PTH PLC shall require in their sole and absolute discretion.

(e) **Announcements.** No announcement concerning this Agreement or any matter referred to herein shall be made by the Operating Company without the prior written approval of PureTech and/or PTH pic, except for such announcements as may be required by the Company Disclosure Requirements.

(f) **Termination.** This Section 5 shall terminate upon the date on which PureTech holds less than ten percent (10%) of then outstanding voting power of the Operating Company.
Section 6. Payments.

(a) Business Services. PureTech shall periodically invoice the Operating Company for the Business Services provided by PureTech to the Operating Company and out-of-pocket expenses reasonably incurred by PureTech in connection with the provision of such Business Services. Such invoices shall be paid to PureTech via check or wire transfer; provided, however, that if PureTech so elects, in its sole and absolute discretion, such invoices may be paid in the form of a convertible promissory note issued by the Operating Company, or conversion of such outstanding indebtedness into equity of the Operating Company, on such terms as may be agreed by the Operating Company and PureTech.

(b) Personnel Services. The Operating Company shall pay PTM an amount equal to:

(i) the direct costs (including, without limitation, the cost of all wages, salaries, compensation, benefits, contributions (including 401(k) contributions) and taxes) and assessments of the PTM Personnel provided to the Operating Company calculated on a pro rata basis for the time actually spent by PTM Personnel in service for the Operating Company, plus

(ii) any amounts in respect of severance, notice or similar payments paid or owed by PTM to any PTM Personnel.

All amounts due pursuant to this Section 6(b) shall be paid to PTM via check or wire transfer sufficiently prior to the date on which PTM is required to make such payments to PTM Personnel. Upon any termination of this Agreement, the Operating Company shall be obligated to pay all amounts that accrued pursuant to this Section 6(b) prior to the effective date of any such termination and (ii) all amounts in respect of severance, notice or similar payments paid or owed by PTM to any PTM Personnel. The payment obligations contained herein shall survive any termination of this Agreement.

Section 7. Liability.

(a) Indemnification of PTM and PureTech. The Operating Company shall indemnify and hold PTM, PureTech and PTH pic, and each of their respective directors, officers, employees, trustees, contractors, subcontractors, and agents (collectively, the “Indemnitees”) harmless against any and all claims (including any employment related claims against any such Indemnitees) for loss, damage, or injuries (“Losses”) to the extent such Losses arise out of or relate to the Business Services or the Personnel Services or any breaches of this Agreement; provided that the Operating Company shall not be liable for any Losses arising out of the gross negligence or bad faith of PTM, PureTech or PTH pic. Such indemnity shall include all costs and expenses incurred by the Indemnitees in connection with such cause of action, including reasonable attorney’s fees and any costs of settlement. The rights and obligations of this section shall survive termination or expiration of the Agreement.

(b) Interruption of Service. PTM shall not be liable to the Operating Company for any loss of business or other damage caused to the Operating Company by any personnel provided in connection with any Personnel Services or arising out of any interruption of service due to a labor strike or other reason beyond the control of PTM.
Section 8. **Miscellaneous Provisions.**

(a) **Governing Law.** This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts. Any dispute arising hereunder which cannot be settled by the parties shall first be referred to a mediator and, if such mediation proves unsuccessful, shall be referred to a court located in Boston, Massachusetts.

(b) **Assignment.** This Agreement and the rights and obligations set forth herein may not be delegated, assigned, or subcontracted by the Operating Company to any person or entity which is not a party without first obtaining the written consent of PTM, PureTech and PTH to this Agreement.

(c) **Independent Contractor.** The parties agree that the relationship of each of PureTech and PTM, on the one hand, to the Operating Company, on the other hand, is that of an independent contractor. Neither PureTech nor PTM shall act as the agent of the Operating Company or execute any instrument purporting to bind the Operating Company. The Operating Company shall not act as the agent of PureTech or PTM and shall not execute any instrument purporting to bind PureTech or PTM. Notwithstanding the foregoing, PTM Personnel to the Operating Company may enter into contracts, agreements, and other instruments binding on the Operating Company if authorized to do so as part of their customary responsibilities for the Operating Company and if approved by the Operating Company.
IN WITNESS WHEREOF, this Agreement is effective as of the Effective Date set forth above.

KARUNA PHARMACEUTICALS, INC

By: /s/ Eric Elenko
Name: Eric Elenko
Title: Acting CEO

PURETECH MANAGEMENT, INC.

By: /s/ Stephen Muniz
Name: Stephen Muniz
Title: SVP

PURETECH HEALTH LLC
(fka PureTech Ventures, LLC)

By: /s/ Stephen Muniz
Name: Stephen Muniz
Title: SVP

PURETECH HEALTH PLC

By: /s/ Stephen Muniz
Name: Stephen Muniz
Title: SVP

[Signature Page to Business Services, Personnel and Information Management Agreement]
Exhibit 10.14

AMENDED AND RESTATED EMPLOYMENT AGREEMENT

This Amended and Restated Employment Agreement (“Agreement”) is made between Karuna Therapeutics, Inc., a Delaware corporation (the “Company”), and Steven Paul, M.D. (the “Executive”) and is made effective as of the closing of the Company’s first underwritten public offering of its equity securities pursuant to an effective registration statement under the Securities Act of 1933, as amended (the “Effective Date”).

WHEREAS, the Company (formerly, Karuna Pharmaceuticals, Inc.) and the Executive are parties to an employment agreement, dated August 1, 2018, as amended (the “Prior Agreement”), which the Company and the Executive intend to amend and restate in its entirety; and

WHEREAS, the Company desires to continue to employ the Executive and the Executive desires to continue to be employed by the Company on the new terms and conditions contained herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree to amend and restate the Prior Agreement in its entirety as follows:

1. Employment.

(a) Term. The term of this Agreement shall commence on the Effective Date and continue until terminated in accordance with the provisions hereof (the “Term”). The Executive’s employment with the Company shall be “at will,” meaning that the Executive’s employment may be terminated by the Company or the Executive at any time and for any reason, subject to the terms of this Agreement.

(b) Position and Duties. During the Term, the Executive shall serve as the President and Chief Executive Officer of the Company (“CEO”) and Chairman of the Board and shall have such powers and duties as may from time to time be prescribed by the Board of Directors (the “Board”). In addition, the Executive shall serve on the Board as long as the Executive remains the Chief Executive Officer of the Company, provided the Executive shall resign from the Board and from any related positions upon ceasing to serve as CEO for any reason. The Executive shall devote his full time efforts to the business and affairs of the Company; provided that he shall regularly work in the Company’s offices, currently located in Boston, Massachusetts, at least two days per week; provided further that he will be required to travel as necessary for business-related purposes. Notwithstanding the foregoing, the Executive may serve on other boards of directors, with the approval of the Board, or engage in religious, charitable or other community activities or other business activities as long as such services and activities are disclosed to the Board and do not interfere with the Executive’s performance of his duties to the Company, provided the Executive shall not perform an operational or fundraising role for another for-profit entity while serving as CEO. The Company specifically acknowledges and agrees to the Executive’s existing and continued service on the Board of Directors of Alnylam Pharmaceuticals, Inc., Sage Therapeutics, Inc., and Voyager Therapeutics, Inc.
2. Compensation and Related Matters.

(a) **Base Salary.** During the Term, the Executive’s initial base salary shall be paid at the rate of $500,000 per year. The Executive’s base salary shall be reviewed annually by the Board or the Compensation Committee of the Board (the “Compensation Committee”). The base salary in effect at any given time is referred to herein as “Base Salary.” The Base Salary shall be payable in a manner that is consistent with the Company’s usual payroll practices for executive officers.

(b) **Incentive Compensation.** During the Term, the Executive shall be eligible to receive cash incentive compensation as determined by the Board or the Compensation Committee from time to time. The Executive’s initial target annual incentive compensation shall be 50 percent of his Base Salary (the “Target Bonus”) and be based on predetermined metrics as determined by the Board or the Compensation Committee after consultation with the Executive. Except as otherwise provided herein, to earn incentive compensation, the Executive must be employed by the Company on the day such incentive compensation is paid.

(c) **Expenses.** The Executive shall be entitled to receive prompt reimbursement for all reasonable expenses incurred by him during the Term in performing services hereunder, in accordance with the policies and procedures then in effect and established by the Company for its executive officers.

(d) **Other Benefits.** During the Term, the Executive shall be eligible to participate in or receive benefits under the Company’s employee benefit plans in effect from time to time, subject to the terms of such plans.

(e) **Vacations.** During the Term, the Executive shall be entitled to take paid time off in accordance with the Company’s applicable paid time off policy for executives as may be in effect from time to time. The Executive shall also be entitled to all paid holidays given by the Company to its executive officers.

(f) **Equity.** The equity awards held by the Executive shall continue to be governed by the terms and conditions of the Company’s applicable equity incentive plan(s) and the applicable award agreement(s) governing the terms of such equity awards held by the Executive (collectively, the “Equity Documents”); provided, however, and notwithstanding anything to the contrary in the Equity Documents, (i) Section 5(b)(iii) of this Agreement shall apply in the event of a termination by the Company without Cause or by the Executive for Good Reason that does not occur within the Change in Control Period (as such terms are defined below) and (ii) Section 6(a)(ii) of this Agreement shall apply in the event of a termination by the Company without Cause or by the Executive for Good Reason in either event within the Change in Control Period.
3. **Termination.** During the Term, the Executive’s employment hereunder may be terminated without any breach of this Agreement under the following circumstances:

(a) **Death.** The Executive’s employment hereunder shall terminate upon his death.

(b) **Disability.** The Company may terminate the Executive’s employment if he is disabled and unable to perform the essential functions of the Executive’s then existing position or positions under this Agreement with or without reasonable accommodation for a period of 180 days (which need not be consecutive) in any 12-month period. If any question shall arise as to whether during any period the Executive is disabled so as to be unable to perform the essential functions of the Executive’s then existing position or positions with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive’s guardian has no reasonable objection as to whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company’s determination of such issue shall be binding on the Executive. Nothing in this Section 3(b) shall be construed to waive the Executive’s rights, if any, under existing law including, without limitation, the Family and Medical Leave Act of 1993, 29 U.S.C. §2601 et seq. and the Americans with Disabilities Act, 42 U.S.C. §12101 et seq.

(c) **Termination by Company for Cause.** The Company may terminate the Executive’s employment hereunder for Cause. For purposes of this Agreement, “Cause” shall mean: (i) conduct by the Executive constituting a material act of misconduct in connection with the performance of his duties, including, without limitation, willful failure or refusal to perform material responsibilities that have been requested by the Board, misappropriation of funds or property of the Company or any of its subsidiaries or affiliates other than the occasional, customary and de minimis use of Company property for personal purposes, or dishonesty to the Board with respect to any material matter; (ii) the commission by the Executive of any acts satisfying the elements of felony or a misdemeanor involving moral turpitude, deceit, dishonesty or fraud, or any conduct by the Executive that would reasonably be expected to result in material injury or reputational harm to the Company or any of its subsidiaries or affiliates if he were retained in his position; (iii) continued non-performance by the Executive of his duties hereunder (other than by reason of the Executive’s physical or mental illness, incapacity or disability) which has continued for more than 30 days following written notice of such non-performance from the Board; (iv) a breach by the Executive of any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements; (v) a material violation by the Executive of the Company’s written employment policies; or (vi) failure to cooperate with a bona fide internal investigation or an investigation by regulatory or law enforcement authorities, after being instructed by the Company to cooperate, or the willful destruction or failure to preserve documents or other materials known to be relevant to such investigation or the inducement of others to fail to cooperate or to produce documents or other materials in connection with such investigation.

(d) **Termination without Cause.** The Company may terminate the Executive’s employment hereunder at any time without Cause. Any termination by the Company of the Executive’s employment under this Agreement which does not constitute a termination for Cause under Section 3(c) and does not result from the death or disability of the Executive under Section 3(a) or (b) shall be deemed a termination without Cause.
Termination by the Executive. The Executive may terminate his employment hereunder at any time for any reason, including but not limited to Good Reason. For purposes of this Agreement, “Good Reason” shall mean that the Executive has complied with the “Good Reason Process” (hereinafter defined) following the occurrence of any of the following events: (i) a material diminution in the Executive’s responsibilities, authority or duties; (ii) a material diminution in the Executive’s Base Salary except for across-the-board salary reductions based on the Company’s financial performance similarly affecting all or substantially all senior management employees of the Company; (iii) a material change in the geographic location at which the Executive provides services to the Company; or (iv) the material breach of this Agreement by the Company. “Good Reason Process” shall mean that (i) the Executive reasonably determines in good faith that a “Good Reason” condition has occurred; (ii) the Executive notifies the Company in writing of the first occurrence of the Good Reason condition within 60 days of the first occurrence of such condition; (iii) the Executive cooperates in good faith with the Company’s efforts, for a period not less than 30 days following such notice (the “Cure Period”), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) the Executive terminates his employment within 60 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

4. Notice and Date of Termination.

(a) Notice of Termination. Except for termination as specified in Section 3(a), any termination of the Executive’s employment by the Company or any such termination by the Executive shall be communicated by written Notice of Termination to the other party hereto. For purposes of this Agreement, a “Notice of Termination” shall mean a notice which shall indicate the specific termination provision in this Agreement relied upon.

(b) Date of Termination. “Date of Termination” shall mean: (i) if the Executive’s employment is terminated by his death, the date of his death; (ii) if the Executive’s employment is terminated on account of disability under Section 3(b) or by the Company for Cause under Section 3(c), the date on which Notice of Termination is given; (iii) if the Executive’s employment is terminated by the Company under Section 3(d), the date on which a Notice of Termination is given or another date as specified in the Notice of Termination; (iv) if the Executive’s employment is terminated by the Executive under Section 3(e) without Good Reason, 30 days after the date on which a Notice of Termination is given, and (v) if the Executive’s employment is terminated by the Executive under Section 3(e) for Good Reason, the date on which a Notice of Termination is given after the end of the Cure Period. Notwithstanding the foregoing, in the event that the Executive gives a Notice of Termination to the Company, the Company may unilaterally accelerate the Date of Termination and such acceleration shall not result in a termination by the Company for purposes of this Agreement.
5. Compensation Upon Termination.

(a) Termination Generally. If the Executive’s employment with the Company is terminated for any reason, the Company shall pay or provide to the Executive (or to his authorized representative or estate) (i) any Base Salary earned through the Date of Termination, unpaid expense reimbursements (subject to, and in accordance with, Section 2(c) of this Agreement) and unused vacation that accrued through the Date of Termination on or before the time required by law but in no event more than 30 days after the Executive’s Date of Termination; and (ii) any vested benefits the Executive may have under any employee benefit plan of the Company through the Date of Termination, which vested benefits shall be paid and/or provided in accordance with the terms of such employee benefit plans (collectively, the “Accrued Benefit”).

(b) Termination by the Company without Cause or by the Executive with Good Reason. During the Term, if the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d), or the Executive terminates his employment for Good Reason as provided in Section 3(e), then the Company shall pay the Executive his Accrued Benefit. In addition, subject to (i) the Executive signing a separation agreement in a form and manner satisfactory to the Company, which shall contain, among other provisions, a general release of claims in favor of the Company and related persons and entities, confidentiality, return of property and non-disparagement and a reaffirmation of all of the Executive’s Continuing Obligations (as defined below), (the “Separation Agreement and Release”) and (ii) the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period:

(i) the Company shall pay the Executive an amount equal to twelve (12) months of the Executive’s then-current Base Salary; and

(ii) the Company shall pay the Executive a pro-rata amount of the Executive’s Target Bonus based on the performance of the Company and consistent with bonuses paid to other Company executives, both as determined by the Board in its reasonable good faith discretion; and

(iii) notwithstanding anything to the contrary in any applicable option agreement or other equity award agreement, all outstanding equity grants subject to time-based vesting held by the Executive that would have vested in the twelve (12) month period following the Date of Termination shall immediately accelerate and become fully exercisable or nonforfeitable as of the Date of Termination; and

(iv) subject to the Executive’s copayment of premium amounts at the applicable active employees’ rate and the Executive’s proper election to receive benefits under the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended (“COBRA”), the Company shall pay to the group health plan provider, the COBRA provider or the Executive a monthly payment equal to the monthly employer contribution that the Company would have made to the provide health insurance to the Executive if the Executive had remained employed by the Company until the earliest of (A) the 12-
month anniversary of the Date of Termination; (B) the Executive’s eligibility for group medical plan benefits under any other employer’s group medical plan; or (C) the cessation of the Executive’s continuation rights under COBRA; provided, however, if the Company determines that it cannot pay such amounts to the group health plan provider or the COBRA provider (if applicable) without potentially violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then the Company shall convert such payments to payroll payments directly to the Executive for the time period specified above. Such payments shall be subject to tax-related deductions and withholdings and paid on the Company’s regular payroll dates. For the avoidance of doubt, the taxable payments described above may be used for any purpose, including, but not limited to, continuation coverage under COBRA; and

The amounts payable under Sections 4(b)(i) and (iv), to the extent taxable, shall be paid out in substantially equal installments in accordance with the Company’s payroll practice over twelve (12) months commencing within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the “Code”), shall begin to be paid in the second calendar year by the last day of such 60-day period; provided, further, that the initial payment shall include a catch-up payment to cover amounts retroactive to the day immediately following the Date of Termination. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The amount payable under Section 4(b)(ii) shall be paid on the date bonuses are paid to the Company’s other executives but no later than March 15 following the year in which the Date of Termination occurs.

Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements (as defined below), all payments under this Sections 5(b) shall immediately cease.

6. **Change in Control Payment.** The provisions of this Section 6 set forth certain terms of an agreement reached between the Executive and the Company regarding the Executive’s rights and obligations upon the occurrence of a Change in Control of the Company. These provisions are intended to assure and encourage in advance the Executive’s continued attention and dedication to his assigned duties and his objectivity during the pendency and after the occurrence of any such event. These provisions shall apply in lieu of, and expressly supersede, the provisions of Section 5(b) regarding severance pay and benefits upon a termination of employment, if such termination of employment occurs within twelve (12) months after the occurrence of the first event constituting a Change in Control (the “Change in Control Period”). These provisions shall terminate and be of no further force or effect beginning after the Change in Control Period.

   (a) **Change in Control.** During the Term, if during the Change in Control Period, the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d) or the Executive terminates his employment for Good Reason as provided in Section 3(e), then, subject to the Executive signing a Separation Agreement and Release that conforms with the requirements of Section 5(b)(i) and the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period
(i) the Company shall pay the Executive a lump sum in cash in an amount equal to 1.5 times the sum of (A) the Executive’s then-current Base Salary (or the Executive’s Base Salary in effect immediately prior to the Change in Control, if higher) plus (B) the Executive’s Target Bonus for the then current year; and

(ii) notwithstanding anything to the contrary in any applicable option agreement or other equity award agreement, all outstanding equity grants subject to time-based vesting held by the Executive shall immediately accelerate and become fully exercisable or nonforfeitable as of the Date of Termination; and

(iii) subject to the Executive’s copayment of premium amounts at the applicable active employees’ rate and the Executive’s proper election to receive benefits under the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended (“COBRA”), the Company shall pay to the group health plan provider, the COBRA provider or the Executive a monthly payment equal to the monthly employer contribution that the Company would have made to the provide health insurance to the Executive if the Executive had remained employed by the Company until the earliest of (A) the 18-month anniversary of the Date of Termination; (B) the Executive’s eligibility for group medical plan benefits under any other employer’s group medical plan; or (C) the cessation of the Executive’s continuation rights under COBRA; provided, however, if the Company determines that it cannot pay such amounts to the group health plan provider or the COBRA provider (if applicable) without potentially violating applicable law (including, without limitation, Section 2716 of the Public Health Service Act), then the Company shall convert such payments to payroll payments directly to the Executive for the time period specified above. Such payments shall be subject to tax-related deductions and withholdings and paid on the Company’s regular payroll dates. For the avoidance of doubt, the taxable payments described above may be used for any purpose, including, but not limited to, continuation coverage under COBRA; and

The amounts payable under Sections 6(a)(i) and (iii), to the extent taxable, shall be paid or commence to be paid within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Code, shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period. Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement, all payments under this Section 6(a) shall immediately cease.
(b) Additional Limitation.

(i) Anything in this Agreement to the contrary notwithstanding, in the event that the amount of any compensation, payment or distribution by the Company to or for the benefit of the Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise, calculated in a manner consistent with Section 280G of the Code and the applicable regulations thereunder (the “Aggregate Payments”), would be subject to the excise tax imposed by Section 4999 of the Code, then the Aggregate Payments shall be reduced (but not below zero) so that the sum of all of the Aggregate Payments shall be $1.00 less than the amount at which the Executive becomes subject to the excise tax imposed by Section 4999 of the Code; provided that such reduction shall only occur if it would result in the Executive receiving a higher After Tax Amount (as defined below) than the Executive would receive if the Aggregate Payments were not subject to such reduction. In such event, the Aggregate Payments shall be reduced in the following order, in each case, in reverse chronological order beginning with the Aggregate Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits; provided that in the case of all the foregoing Aggregate Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c).

(ii) For purposes of this Section 6(b), the “After Tax Amount” means the amount of the Aggregate Payments less all federal, state, and local income, excise and employment taxes imposed on the Executive as a result of the Executive’s receipt of the Aggregate Payments. For purposes of determining the After Tax Amount, the Executive shall be deemed to pay federal income taxes at the highest marginal rate of federal income taxation applicable to individuals for the calendar year in which the determination is to be made, and state and local income taxes at the highest marginal rates of individual taxation in each applicable state and locality, net of the maximum reduction in federal income taxes which could be obtained from deduction of such state and local taxes.

(iii) The determination as to whether a reduction in the Aggregate Payments shall be made pursuant to Section 6(b)(i) shall be made by a nationally recognized accounting firm selected by the Company (the “Accounting Firm”), which shall provide detailed supporting calculations both to the Company and the Executive within 15 business days of the Date of Termination, if applicable, or at such earlier time as is reasonably requested by the Company or the Executive. Any determination by the Accounting Firm shall be binding upon the Company and the Executive.

(c) Definitions. For purposes of this Section 6, the following terms shall have the following meanings:

“Change in Control” shall mean any of the following:

(i) any “person,” as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the “Act”) (other than the Company, any of its subsidiaries, or any trustee, fiduciary or other person or entity holding securities under any employee benefit plan or trust of the Company or any of its subsidiaries), together with all “affiliates” and “associates” (as such terms are defined in Rule 12b-2
under the Act) of such person, shall become the “beneficial owner” (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, of
securities of the Company representing 50 percent or more of the combined voting power of the Company’s then outstanding securities having the right
to vote in an election of the Board (“Voting Securities”) (in such case other than as a result of an acquisition of securities directly from the Company); or

(ii) the date a majority of the members of the Board is replaced during any 12-month period by directors whose appointment or election is
not endorsed by a majority of the members of the Board before the date of the appointment or election; or

(iii) the consummation of (A) any consolidation or merger of the Company where the stockholders of the Company, immediately prior to the
consolidation or merger, would not, immediately after the consolidation or merger, beneficially own (as such term is defined in Rule 13d-3 under the
Act), directly or indirectly, shares representing in the aggregate more than 50 percent of the voting shares of the Company issuing cash or securities in
the consolidation or merger (or of its ultimate parent corporation, if any), or (B) any sale or other transfer (in one transaction or a series of transactions
contemplated or arranged by any party as a single plan) of all or substantially all of the assets of the Company.

Notwithstanding the foregoing, a “Change in Control” shall not be deemed to have occurred for purposes of the foregoing clause (i) solely as the
result of an acquisition of securities by the Company which, by reducing the number of shares of Voting Securities outstanding, increases the
proportionate number of Voting Securities beneficially owned by any person to 50 percent or more of the combined voting power of all of the then
outstanding Voting Securities; provided, however, that if any person referred to in this sentence shall thereafter become the beneficial owner of any
additional shares of Voting Securities (other than pursuant to a stock split, stock dividend, or similar transaction or as a result of an acquisition of
securities directly from the Company) and immediately thereafter beneficially owns 50 percent or more of the combined voting power of all of the then
outstanding Voting Securities, then a “Change in Control” shall be deemed to have occurred for purposes of the foregoing clause (i).

7. **Section 409A.**

(a) Anything in this Agreement to the contrary notwithstanding, if at the time of the Executive’s separation from service within the meaning
of Section 409A of the Code, the Company determines that the Executive is a “specified employee” within the meaning of Section 409A(a)(2)(B)(i) of
the Code, then to the extent any payment or benefit that the Executive becomes entitled to under this Agreement on account of the Executive’s
separation from service would be considered deferred compensation otherwise subject to the 20 percent additional tax imposed pursuant to
Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, such payment shall not be payable and such benefit
shall not be provided until the date that is the earlier of (A) six months and one day after the Executive’s separation from service, or (B) the Executive’s
death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering
amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments
shall be payable in accordance with their original schedule.
(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes “non-qualified deferred compensation” under Section 409A of the Code, and to the extent that such payment or benefit is payable upon the Executive’s termination of employment, then such payments or benefits shall be payable only upon the Executive’s “separation from service.” The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A-1(h).

(d) The parties intend that this Agreement will be administered in accordance with Section 409A of the Code. To the extent that any provision of this Agreement is ambiguous as to its compliance with Section 409A of the Code, the provision shall be read in such a manner so that all payments hereunder comply with Section 409A of the Code. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Section 409A of the Code and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A of the Code but do not satisfy an exemption from, or the conditions of, such Section.

8. Continuing Obligations

(a) Restrictive Covenants Agreement. The Executive has previously entered into the Employee Invention and Non-Disclosure Agreement dated August 1, 2018, attached hereto as Exhibit A, and the Non-Competition and Non-Solicitation Agreement dated August 1, 2018, attached hereto as Exhibit B (together, the “Restrictive Covenants Agreements”). The terms of the Restrictive Covenants Agreements continue to remain in full force and effect. For purposes of this Agreement, the obligations in this Section 8 and those that arise in the Restrictive Covenants Agreements and any other agreement relating to confidentiality, assignment of inventions, or other restrictive covenants shall collectively be referred to as the “Continuing Obligations.”
(b) Protected Disclosures and Other Protected Action. Nothing in this Agreement shall be interpreted or applied to prohibit the Executive from making any good faith report to any governmental agency or other governmental entity (a “Government Agency”) concerning any act or omission that the Executive reasonably believes constitutes a possible violation of federal or state law or making other disclosures that are protected under the anti-retaliation or whistleblower provisions of applicable federal or state law or regulation. In addition, nothing contained in this Agreement limits the Executive’s ability to communicate with any Government Agency or otherwise participate in any investigation or proceeding that may be conducted by any Government Agency, including the Executive’s ability to provide documents or other information, without notice to the Company. In addition, for the avoidance of doubt, pursuant to the federal Defend Trade Secrets Act of 2016, the Executive shall not be held criminally or civilly liable under any federal or state trade secret law or under this Agreement or the Restrictive Covenants Agreements for the disclosure of a trade secret that (a) is made (i) in confidence to a federal, state, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (b) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal.

9. Consent to Jurisdiction. The parties hereby consent to the jurisdiction of the state and federal courts of the Commonwealth of Massachusetts. Accordingly, with respect to any such court action, the Executive (a) submits to the personal jurisdiction of such courts; (b) consents to service of process; and (c) waives any other requirement (whether imposed by statute, rule of court, or otherwise) with respect to personal jurisdiction or service of process.

10. Integration. This Agreement, along with the Restrictive Covenants Agreements, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements between the parties concerning such subject matter, including the Prior Agreement, provided that the Restrictive Covenants Agreement and the Equity Documents remain in full force and effect.

11. Withholding; Tax Effect. All payments made by the Company to the Executive under this Agreement shall be net of any tax or other amounts required to be withheld by the Company under applicable law. Nothing in this Agreement shall be construed to require the Company to make any payments to compensate the Executive for any adverse tax effect associated with any payments or benefits or for any deduction or withholding from any payment or benefit.

12. Successor to the Executive. This Agreement shall inure to the benefit of and be enforceable by the Executive’s personal representatives, executors, administrators, heirs, distributees, devisees and legatees. In the event of the Executive’s death after his termination of employment but prior to the completion by the Company of all payments due him under this Agreement, the Company shall continue such payments to the Executive’s beneficiary designated in writing to the Company prior to his death (or to his estate, if the Executive fails to make such designation).
13. **Enforceability.** If any portion or provision of this Agreement (including, without limitation, any portion or provision of any section of this Agreement) shall to any extent be declared illegal or unenforceable by a court of competent jurisdiction, then the remainder of this Agreement, or the application of such portion or provision in circumstances other than those as to which it is so declared illegal or unenforceable, shall not be affected thereby, and each portion and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

14. **Survival.** The provisions of this Agreement shall survive the termination of this Agreement and/or the termination of the Executive’s employment to the extent necessary to effectuate the terms contained herein.

15. **Waiver.** No waiver of any provision hereof shall be effective unless made in writing and signed by the waiving party. The failure of any party to require the performance of any term or obligation of this Agreement, or the waiver by any party of any breach of this Agreement, shall not prevent any subsequent enforcement of such term or obligation or be deemed a waiver of any subsequent breach.

16. **Notices.** Any notices, requests, demands and other communications provided for by this Agreement shall be sufficient if in writing and delivered in person or sent by a nationally recognized overnight courier service or by registered or certified mail, postage prepaid, return receipt requested, to the Executive at the last address the Executive has filed in writing with the Company or, in the case of the Company, at its main offices, attention of the Board.

17. **Amendment.** This Agreement may be amended or modified only by a written instrument signed by the Executive and by a duly authorized representative of the Company.

18. **Effect on Other Plans and Agreements.** An election by the Executive to resign for Good Reason under the provisions of this Agreement shall not be deemed a voluntary termination of employment by the Executive for the purpose of interpreting the provisions of any of the Company’s benefit plans, programs or policies. Nothing in this Agreement shall be construed to limit the rights of the Executive under the Company’s benefit plans, programs or policies except as otherwise provided in Section 8 hereof, and except that the Executive shall have no rights to any severance benefits under any Company severance pay plan, offer letter or otherwise. In the event that the Executive is party to an agreement with the Company providing for payments or benefits under such agreement and this Agreement, the terms of this Agreement shall govern and the Executive may receive payment under this Agreement only and not both. Further, Section 5 and Section 6 of this Agreement are mutually exclusive and in no event shall the Executive be entitled to payments or benefits pursuant to Section 5 and Section 6 of this Agreement.

19. **Governing Law.** This is a Massachusetts contract and shall be construed under and be governed in all respects by the laws of the Commonwealth of Massachusetts, without giving effect to the conflict of laws principles thereof. With respect to any disputes concerning federal law, such disputes shall be determined in accordance with the law as it would be interpreted and applied by the United States Court of Appeals for the First Circuit.
20. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be taken to be an original; but such counterparts shall together constitute one and the same document.

21. **Successor to Company.** The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company expressly to assume and agree to perform this Agreement to the same extent that the Company would be required to perform it if no succession had taken place. Failure of the Company to obtain an assumption of this Agreement at or prior to the effectiveness of any succession shall be a material breach of this Agreement.

22. **Gender Neutral.** Wherever used herein, a pronoun in the masculine gender shall be considered as including the feminine gender unless the context clearly indicates otherwise.

[Signature page follows.]
IN WITNESS WHEREOF, the parties have executed this Agreement effective on the date and year first above written.

KARUNA THERAPEUTICS, INC.

By: 
Its: 

EXECUTIVE

Steven Paul, M.D.
This Amended and Restated Employment Agreement ("Agreement") is made between Karuna Therapeutics, Inc., a Delaware corporation (the "Company"), and Andrew Miller, Ph.D. (the "Executive") and is made effective as of the closing of the Company’s first underwritten public offering of its equity securities pursuant to an effective registration statement under the Securities Act of 1933, as amended (the "Effective Date").

WHEREAS, the Company (formerly, Karuna Pharmaceuticals, Inc.) and the Executive are parties to an employment offer letter, dated August 1, 2018 (the "Prior Agreement"), which the Company and the Executive intend to amend and restate in its entirety; and

WHEREAS, the Company desires to continue to employ the Executive and the Executive desires to continue to be employed by the Company on the new terms and conditions contained herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree to amend and restate the Prior Agreement in its entirety as follows:

1. Employment.

(a) Term. The term of this Agreement shall commence on the Effective Date and continue until terminated in accordance with the provisions hereof (the “Term”). The Executive’s employment with the Company shall be “at will,” meaning that the Executive’s employment may be terminated by the Company or the Executive at any time and for any reason, subject to the terms of this Agreement.

(b) Position and Duties. During the Term, the Executive shall serve as the Chief Operating Officer of the Company ("COO") and shall have such powers and duties as may from time to time be prescribed by the Board of Directors (the “Board”) or the Chief Executive Officer of the Company (the “CEO”). The Executive shall devote his full time efforts to the business and affairs of the Company; provided that he will be required to travel as necessary for business-related purposes. Notwithstanding the foregoing, the Executive may serve on other boards of directors, with the approval of the Board, or engage in religious, charitable or other community activities or other business activities as long as such services and activities are disclosed to the Board and do not interfere with the Executive’s performance of his duties to the Company, provided the Executive shall not perform an operational or fundraising role for another for-profit entity.

2. Compensation and Related Matters.

(a) Base Salary. During the Term, the Executive’s initial base salary shall be paid at the rate of $400,000 per year. The Executive’s base salary shall be reviewed annually by the Board or the Compensation Committee of the Board (the “Compensation Committee”). The base salary in effect at any given time is referred to herein as “Base Salary.” The Base Salary shall be payable in a manner that is consistent with the Company’s usual payroll practices for executive officers.
(b) Incentive Compensation. During the Term, the Executive shall be eligible to receive cash incentive compensation as determined by the Board or the Compensation Committee from time to time. The Executive’s initial target annual incentive compensation shall be 40 percent of his Base Salary (the “Target Bonus”) and be based on predetermined metrics as determined by the Board or the Compensation Committee. Except as otherwise provided herein, to earn incentive compensation, the Executive must be employed by the Company on the day such incentive compensation is paid.

(c) Expenses. The Executive shall be entitled to receive prompt reimbursement for all reasonable expenses incurred by him during the Term in performing services hereunder, in accordance with the policies and procedures then in effect and established by the Company for its executive officers.

(d) Other Benefits. During the Term, the Executive shall be eligible to participate in or receive benefits under the Company’s employee benefit plans in effect from time to time, subject to the terms of such plans.

(e) Vacations. During the Term, the Executive shall be entitled to take paid time off in accordance with the Company’s applicable paid time off policy for executives as may be in effect from time to time. The Executive shall also be entitled to all paid holidays given by the Company to its executive officers.

(f) Equity. The equity awards held by the Executive shall continue to be governed by the terms and conditions of the Company’s applicable equity incentive plan(s) and the applicable award agreement(s) governing the terms of such equity awards held by the Executive (collectively, the “Equity Documents”); provided, however, and notwithstanding anything to the contrary in the Equity Documents, Section 6(a)(ii) of this Agreement shall apply in the event of a termination by the Company without Cause or by the Executive for Good Reason in either event within the Change in Control Period (as such terms are defined below).

3. Termination. During the Term, the Executive’s employment hereunder may be terminated without any breach of this Agreement under the following circumstances:

(a) Death. The Executive’s employment hereunder shall terminate upon his death.

(b) Disability. The Company may terminate the Executive’s employment if he is disabled and unable to perform the essential functions of the Executive’s then existing position or positions under this Agreement with or without reasonable accommodation for a period of 180 days (which need not be consecutive) in any 12-month period. If any question shall arise as to whether during any period the Executive is disabled so as to be unable to perform the essential functions of the Executive’s then existing position or positions with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive’s guardian has no reasonable objection as to
whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company’s determination of such issue shall be binding on the Executive. Nothing in this Section 3(b) shall be construed to waive the Executive’s rights, if any, under existing law including, without limitation, the Family and Medical Leave Act of 1993, 29 U.S.C. §2601 et seq. and the Americans with Disabilities Act, 42 U.S.C. §12101 et seq.

(c) **Termination by Company for Cause.** The Company may terminate the Executive’s employment hereunder for Cause. For purposes of this Agreement, “Cause” shall mean: (i) conduct by the Executive constituting a material act of misconduct in connection with the performance of his duties, including, without limitation, willful failure or refusal to perform material responsibilities that have been requested by the Board, misappropriation of funds or property of the Company or any of its subsidiaries or affiliates other than the occasional, customary and de minimis use of Company property for personal purposes, or dishonesty to the Board with respect to any material matter; (ii) the commission by the Executive of any acts satisfying the elements of felony or a misdemeanor involving moral turpitude, deceit, dishonesty or fraud, or any conduct by the Executive that would reasonably be expected to result in material injury or reputational harm to the Company or any of its subsidiaries or affiliates if he were retained in his position; (iii) continued non-performance by the Executive of his duties hereunder (other than by reason of the Executive’s physical or mental illness, incapacity or disability) which has continued for more than 30 days following written notice of such non-performance from the CEO; (iv) a breach by the Executive of any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements; (v) a material violation by the Executive of the Company’s written employment policies; or (vi) failure to cooperate with a bona fide internal investigation or an investigation by regulatory or law enforcement authorities, after being instructed by the Company to cooperate, or the willful destruction or failure to preserve documents or other materials known to be relevant to such investigation or the inducement of others to fail to cooperate or to produce documents or other materials in connection with such investigation.

(d) **Termination without Cause.** The Company may terminate the Executive’s employment hereunder at any time without Cause. Any termination by the Company of the Executive’s employment under this Agreement which does not constitute a termination for Cause under Section 3(c) and does not result from the death or disability of the Executive under Section 3(a) or (b) shall be deemed a termination without Cause.

(e) **Termination by the Executive.** The Executive may terminate his employment hereunder at any time for any reason, including but not limited to Good Reason. For purposes of this Agreement, “Good Reason” shall mean that the Executive has complied with the “Good Reason Process” (hereinafter defined) following the occurrence of any of the following events: (i) a material diminution in the Executive’s responsibilities, authority or duties; (ii) a material diminution in the Executive’s Base Salary except for across-the-board salary reductions based on the Company’s financial performance similarly affecting all or substantially all senior management employees of the Company; (iii) a material change in the geographic location at which the Executive provides services to the Company; or (iv) the
material breach of this Agreement by the Company. “Good Reason Process” shall mean that (i) the Executive reasonably determines in good faith that a “Good Reason” condition has occurred; (ii) the Executive notifies the Company in writing of the first occurrence of the Good Reason condition within 60 days of the first occurrence of such condition; (iii) the Executive cooperates in good faith with the Company’s efforts, for a period not less than 30 days following such notice (the “Cure Period”), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) the Executive terminates his employment within 60 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

4. Notice and Date of Termination.
   
   (a) Notice of Termination. Except for termination as specified in Section 3(a), any termination of the Executive’s employment by the Company or any such termination by the Executive shall be communicated by written Notice of Termination to the other party hereto. For purposes of this Agreement, a “Notice of Termination” shall mean a notice which shall indicate the specific termination provision in this Agreement relied upon.

   (b) Date of Termination. “Date of Termination” shall mean: (i) if the Executive’s employment is terminated by his death, the date of his death; (ii) if the Executive’s employment is terminated on account of disability under Section 3(b) or by the Company for Cause under Section 3(c), the date on which Notice of Termination is given; (iii) if the Executive’s employment is terminated by the Company under Section 3(d), the date on which a Notice of Termination is given or another date as specified in the Notice of Termination; (iv) if the Executive’s employment is terminated by the Executive under Section 3(e) without Good Reason, 30 days after the date on which a Notice of Termination is given, and (v) if the Executive’s employment is terminated by the Executive under Section 3(e) for Good Reason, the date on which a Notice of Termination is given after the end of the Cure Period. Notwithstanding the foregoing, in the event that the Executive gives a Notice of Termination to the Company, the Company may unilaterally accelerate the Date of Termination and such acceleration shall not result in a termination by the Company for purposes of this Agreement.

5. Compensation Upon Termination.
   
   (a) Termination Generally. If the Executive’s employment with the Company is terminated for any reason, the Company shall pay or provide to the Executive (or to his authorized representative or estate) (i) any Base Salary earned through the Date of Termination, unpaid expense reimbursements (subject to, and in accordance with, Section 2(c) of this Agreement) and unused vacation that accrued through the Date of Termination on or before the time required by law but in no event more than 30 days after the Executive’s Date of Termination; and (ii) any vested benefits the Executive may have under any employee benefit plan of the Company through the Date of Termination, which vested benefits shall be paid and/or provided in accordance with the terms of such employee benefit plans (collectively, the “Accrued Benefit”).
(b) Termination by the Company without Cause or by the Executive with Good Reason. During the Term, if the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d), or the Executive terminates his employment for Good Reason as provided in Section 3(e), then the Company shall pay the Executive his Accrued Benefit. In addition, subject to (i) the Executive signing a separation agreement in a form and manner satisfactory to the Company, which shall contain, among other provisions, a general release of claims in favor of the Company and related persons and entities, confidentiality, return of property and non-disparagement and a reaffirmation of all of the Executive’s Continuing Obligations (as defined below) (the “Separation Agreement and Release”) and (ii) the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period:

(i) the Company shall pay the Executive an amount equal to nine (9) months of the Executive’s then current Base Salary; and

(ii) the Company shall pay the Executive a pro-rata amount of the Executive’s Target Bonus based on the performance of the Company and consistent with bonuses paid to other Company executives, both as determined by the Board in its reasonable good faith discretion; and

(iii) if the Executive was participating in the Company’s group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for nine (9) months or the Executive’s COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company; and

The amounts payable under Sections 5(b)(i) and (iii) shall be paid out in substantially equal installments in accordance with the Company’s payroll practice over nine (9) months commencing within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the “Code”), shall begin to be paid in the second calendar year by the last day of such 60-day period; provided, further, that the initial payment shall include a catch-up payment to cover amounts retroactive to the day immediately following the Date of Termination. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The amount payable under Section 4(b)(ii) shall be paid on the date bonuses are paid to the Company’s other executives but no later than March 15 following the year in which the Date of Termination occurs.

Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements (as defined below), all payments under this Sections 5(b) shall immediately cease.
6. **Change in Control Payment.** The provisions of this Section 6 set forth certain terms of an agreement reached between the Executive and the Company regarding the Executive’s rights and obligations upon the occurrence of a Change in Control of the Company. These provisions are intended to assure and encourage in advance the Executive’s continued attention and dedication to his assigned duties and his objectivity during the pendency and after the occurrence of any such event. These provisions shall apply in lieu of, and expressly supersede, the provisions of Section 5(b) regarding severance pay and benefits upon a termination of employment, if such termination of employment occurs within twelve (12) months after the occurrence of the first event constituting a Change in Control (the “Change in Control Period”). These provisions shall terminate and be of no further force or effect beginning after the Change in Control Period.

(a) **Change in Control.** During the Term, if during the Change in Control Period, the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d) or the Executive terminates his employment for Good Reason as provided in Section 3(e), then, subject to the Executive signing a Separation Agreement and Release that conforms with the requirements of Section 5(b)(i) and the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period:

   (i) the Company shall pay the Executive a lump sum in cash in an amount equal to one times the sum of (A) the Executive’s then current Base Salary (or the Executive’s Base Salary in effect immediately prior to the Change in Control, if higher) plus (B) the Executive’s Target Bonus for the then current year; and

   (ii) notwithstanding anything to the contrary in any applicable option agreement or other equity award agreement, all outstanding equity grants subject to time-based vesting held by the Executive shall immediately accelerate and become fully exercisable or nonforfeitable as of the Date of Termination; and

   (iii) if the Executive was participating in the Company’s group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for twelve (12) months or the Executive’s COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company; and

The amounts payable under Sections 6(a)(i) and (iii) shall be paid or commence to be paid within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Code, shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period. Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement, all payments under this Section 6(a) shall immediately cease.
(b) Additional Limitation.

(i) Anything in this Agreement to the contrary notwithstanding, in the event that the amount of any compensation, payment or distribution by the Company to or for the benefit of the Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise, calculated in a manner consistent with Section 280G of the Code and the applicable regulations thereunder (the “Aggregate Payments”), would be subject to the excise tax imposed by Section 4999 of the Code, then the Aggregate Payments shall be reduced (but not below zero) so that the sum of all of the Aggregate Payments shall be $1.00 less than the amount at which the Executive becomes subject to the excise tax imposed by Section 4999 of the Code; provided that such reduction shall only occur if it would result in the Executive receiving a higher After Tax Amount (as defined below) than the Executive would receive if the Aggregate Payments were not subject to such reduction. In such event, the Aggregate Payments shall be reduced in the following order, in each case, in reverse chronological order beginning with the Aggregate Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits; provided that in the case of all the foregoing Aggregate Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c).

(ii) For purposes of this Section 6(b), the “After Tax Amount” means the amount of the Aggregate Payments less all federal, state, and local income, excise and employment taxes imposed on the Executive as a result of the Executive’s receipt of the Aggregate Payments. For purposes of determining the After Tax Amount, the Executive shall be deemed to pay federal income taxes at the highest marginal rate of federal income taxation applicable to individuals for the calendar year in which the determination is to be made, and state and local income taxes at the highest marginal rates of individual taxation in each applicable state and locality, net of the maximum reduction in federal income taxes which could be obtained from deduction of such state and local taxes.

(iii) The determination as to whether a reduction in the Aggregate Payments shall be made pursuant to Section 6(b)(i) shall be made by a nationally recognized accounting firm selected by the Company (the “Accounting Firm”), which shall provide detailed supporting calculations both to the Company and the Executive within 15 business days of the Date of Termination, if applicable, or at such earlier time as is reasonably requested by the Company or the Executive. Any determination by the Accounting Firm shall be binding upon the Company and the Executive.
Definitions. For purposes of this Section 5, the following terms shall have the following meanings:

“Change in Control” shall mean any of the following:

(i) any “person,” as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the “Act”) (other than the Company, any of its subsidiaries, or any trustee, fiduciary or other person or entity holding securities under any employee benefit plan or trust of the Company or any of its subsidiaries), together with all “affiliates” and “associates” (as such terms are defined in Rule 12b-2 under the Act) of such person, shall become the “beneficial owner” (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, of securities of the Company representing 50 percent or more of the combined voting power of the Company’s then outstanding securities having the right to vote in an election of the Board (“Voting Securities”) (in such case other than as a result of an acquisition of securities directly from the Company); or

(ii) the date a majority of the members of the Board is replaced during any 12-month period by directors whose appointment or election is not endorsed by a majority of the members of the Board before the date of the appointment or election; or

(iii) the consummation of (A) any consolidation or merger of the Company where the stockholders of the Company, immediately prior to the consolidation or merger, would not, immediately after the consolidation or merger, beneficially own (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, shares representing in the aggregate more than 50 percent of the voting shares of the Company issuing cash or securities in the consolidation or merger (or of its ultimate parent corporation, if any), or (B) any sale or other transfer (in one transaction or a series of transactions contemplated or arranged by any party as a single plan) of all or substantially all of the assets of the Company.

Notwithstanding the foregoing, a “Change in Control” shall not be deemed to have occurred for purposes of the foregoing clause (i) solely as the result of an acquisition of securities by the Company which, by reducing the number of shares of Voting Securities outstanding, increases the proportionate number of Voting Securities beneficially owned by any person to 50 percent or more of the combined voting power of all of the then outstanding Voting Securities; provided, however, that if any person referred to in this sentence shall thereafter become the beneficial owner of any additional shares of Voting Securities (other than pursuant to a stock split, stock dividend, or similar transaction or as a result of an acquisition of securities directly from the Company) and immediately thereafter beneficially owns 50 percent or more of the combined voting power of all of the then outstanding Voting Securities, then a “Change in Control” shall be deemed to have occurred for purposes of the foregoing clause (i).

7. Section 409A.

(a) Anything in this Agreement to the contrary notwithstanding, if at the time of the Executive’s separation from service within the meaning of Section 409A of the Code, the Company determines that the Executive is a “specified employee” within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that the Executive becomes entitled to under this Agreement on account of the Executive’s separation from service
would be considered deferred compensation otherwise subject to the 20 percent additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after the Executive’s separation from service, or (B) the Executive’s death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule.

(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes “non-qualified deferred compensation” under Section 409A of the Code, and to the extent that such payment or benefit is payable upon the Executive’s termination of employment, then such payments or benefits shall be payable only upon the Executive’s “separation from service.” The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A-1(h).

(d) The parties intend that this Agreement will be administered in accordance with Section 409A of the Code. To the extent that any provision of this Agreement is ambiguous as to its compliance with Section 409A of the Code, the provision shall be read in such a manner so that all payments hereunder comply with Section 409A of the Code. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Section 409A of the Code and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A of the Code but do not satisfy an exemption from, or the conditions of, such Section.
8. **Continuing Obligations.**

   (a) **Restrictive Covenants Agreement.** The Executive has previously entered into the Employee Invention and Non-Disclosure Agreement dated August 15, 2018, attached hereto as Exhibit A and the Non-Competition and Non-Solicitation Agreement dated August 15, 2018, attached hereto as Exhibit B (together, the “Restrictive Covenants Agreements”). The terms of the Restrictive Covenants Agreements continue to remain in full force and effect. For purposes of this Agreement, the obligations in this Section 8 and those that arise in the Restrictive Covenants Agreements and any other agreement relating to confidentiality, assignment of inventions, or other restrictive covenants shall collectively be referred to as the “Continuing Obligations.”

   (b) **Protected Disclosures and Other Protected Action.** Nothing in this Agreement shall be interpreted or applied to prohibit the Executive from making any good faith report to any governmental agency or other governmental entity (a “Government Agency”) concerning any act or omission that the Executive reasonably believes constitutes a possible violation of federal or state law or making other disclosures that are protected under the anti-retaliation or whistleblower provisions of applicable federal or state law or regulation. In addition, nothing contained in this Agreement limits the Executive’s ability to communicate with any Government Agency or otherwise participate in any investigation or proceeding that may be conducted by any Government Agency, including the Executive’s ability to provide documents or other information, without notice to the Company. In addition, for the avoidance of doubt, pursuant to the federal Defend Trade Secrets Act of 2016, the Executive shall not be held criminally or civilly liable under any federal or state trade secret law or under this Agreement or the Restrictive Covenants Agreements for the disclosure of a trade secret that (a) is made (i) in confidence to a federal, state, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (b) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal.

9. **Consent to Jurisdiction.** The parties hereby consent to the jurisdiction of the state and federal courts of the Commonwealth of Massachusetts. Accordingly, with respect to any such court action, the Executive (a) submits to the personal jurisdiction of such courts; (b) consents to service of process; and (c) waives any other requirement (whether imposed by statute, rule of court, or otherwise) with respect to personal jurisdiction or service of process.

10. **Integration.** This Agreement, along with the Restrictive Covenants Agreements, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements between the parties concerning such subject matter, including the Prior Agreement, provided that the Restrictive Covenants Agreement and the Equity Documents remain in full force and effect.

11. **Withholding; Tax Effect.** All payments made by the Company to the Executive under this Agreement shall be net of any tax or other amounts required to be withheld by the Company under applicable law. Nothing in this Agreement shall be construed to require the Company to make any payments to compensate the Executive for any adverse tax effect associated with any payments or benefits or for any deduction or withholding from any payment or benefit.
12. **Successor to the Executive.** This Agreement shall inure to the benefit of and be enforceable by the Executive’s personal representatives, executors, administrators, heirs, distributees, devisees and legatees. In the event of the Executive’s death after his termination of employment but prior to the completion by the Company of all payments due him under this Agreement, the Company shall continue such payments to the Executive’s beneficiary designated in writing to the Company prior to his death (or to his estate, if the Executive fails to make such designation).

13. **Enforceability.** If any portion or provision of this Agreement (including, without limitation, any portion or provision of any section of this Agreement) shall to any extent be declared illegal or unenforceable by a court of competent jurisdiction, then the remainder of this Agreement, or the application of such portion or provision in circumstances other than those as to which it is so declared illegal or unenforceable, shall not be affected thereby, and each portion and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

14. **Survival.** The provisions of this Agreement shall survive the termination of this Agreement and/or the termination of the Executive’s employment to the extent necessary to effectuate the terms contained herein.

15. **Waiver.** No waiver of any provision hereof shall be effective unless made in writing and signed by the waiving party. The failure of any party to require the performance of any term or obligation of this Agreement, or the waiver by any party of any breach of this Agreement, shall not prevent any subsequent enforcement of such term or obligation or be deemed a waiver of any subsequent breach.

16. **Notices.** Any notices, requests, demands and other communications provided for by this Agreement shall be sufficient if in writing and delivered in person or sent by a nationally recognized overnight courier service or by registered or certified mail, postage prepaid, return receipt requested, to the Executive at the last address the Executive has filed in writing with the Company or, in the case of the Company, at its main offices, attention of the Board.

17. **Amendment.** This Agreement may be amended or modified only by a written instrument signed by the Executive and by a duly authorized representative of the Company.

18. **Effect on Other Plans and Agreements.** An election by the Executive to resign for Good Reason under the provisions of this Agreement shall not be deemed a voluntary termination of employment by the Executive for the purpose of interpreting the provisions of any of the Company’s benefit plans, programs or policies. Nothing in this Agreement shall be construed to limit the rights of the Executive under the Company’s benefit plans, programs or policies except as otherwise provided in Section 8 hereof, and except that the Executive shall have no rights to any severance benefits under any Company severance pay plan, offer letter or otherwise. In the event that the Executive is party to an agreement with the Company providing for payments or benefits under such agreement and this Agreement, the terms of this Agreement shall govern and the Executive may receive payment under this Agreement only and not both. Further, Section 5 and Section 6 of this Agreement are mutually exclusive and in no event shall the Executive be entitled to payments or benefits pursuant to Section 5 and Section 6 of this Agreement.
19. Governing Law. This is a Massachusetts contract and shall be construed under and be governed in all respects by the laws of the Commonwealth of Massachusetts, without giving effect to the conflict of laws principles thereof. With respect to any disputes concerning federal law, such disputes shall be determined in accordance with the law as it would be interpreted and applied by the United States Court of Appeals for the First Circuit.

20. Counterparts. This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be taken to be an original; but such counterparts shall together constitute one and the same document.

21. Successor to Company. The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company expressly to assume and agree to perform this Agreement to the same extent that the Company would be required to perform it if no succession had taken place. Failure of the Company to obtain an assumption of this Agreement at or prior to the effectiveness of any succession shall be a material breach of this Agreement.

22. Gender Neutral. Wherever used herein, a pronoun in the masculine gender shall be considered as including the feminine gender unless the context clearly indicates otherwise.

IN WITNESS WHEREOF, the parties have executed this Agreement effective on the date and year first above written.

KARUNA THERAPEUTICS, INC.

By: __________________________________________
Its:  __________________________________________

EXECUTIVE

Andrew Miller, Ph.D.
This Amended and Restated Employment Agreement ("Agreement") is made between Karuna Therapeutics, Inc., a Delaware corporation (the "Company"), and Stephen Brannan, M.D. (the "Executive") and is made effective as of the closing of the Company’s first underwritten public offering of its equity securities pursuant to an effective registration statement under the Securities Act of 1933, as amended (the “Effective Date”).

WHEREAS, the Company (formerly, Karuna Pharmaceuticals, Inc.) and the Executive are parties to an employment offer letter, dated February 15, 2017 (the “Prior Agreement”), which the Company and the Executive intend to amend and restate in its entirety; and

WHEREAS, the Company desires to continue to employ the Executive and the Executive desires to continue to be employed by the Company on the new terms and conditions contained herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree to amend and restate the Prior Agreement in its entirety as follows:

1. Employment.
   (a) **Term.** The term of this Agreement shall commence on the Effective Date and continue until terminated in accordance with the provisions hereof (the “Term”). The Executive’s employment with the Company shall be “at will,” meaning that the Executive’s employment may be terminated by the Company or the Executive at any time and for any reason, subject to the terms of this Agreement.
   (b) **Position and Duties.** During the Term, the Executive shall serve as the Chief Medical Officer of the Company (“CMO”) and shall have such powers and duties as may from time to time be prescribed by the Board of Directors (the “Board”) or the Chief Executive Officer of the Company (the “CEO”). The Executive shall devote his full time efforts to the business and affairs of the Company; provided that he will be required to travel as necessary for business-related purposes. Notwithstanding the foregoing, the Executive may serve on other boards of directors, with the approval of the Board, or engage in religious, charitable or other community activities or other business activities as long as such services and activities are disclosed to the Board and do not interfere with the Executive’s performance of his duties to the Company, provided the Executive shall not perform an operational or fundraising role for another for-profit entity.

2. Compensation and Related Matters.
   (a) **Base Salary.** During the Term, the Executive’s initial base salary shall be paid at the rate of $400,000 per year. The Executive’s base salary shall be reviewed annually by the Board or the Compensation Committee of the Board (the “Compensation Committee”). The base salary in effect at any given time is referred to herein as “Base Salary.” The Base Salary shall be payable in a manner that is consistent with the Company’s usual payroll practices for executive officers.
Incentive Compensation. During the Term, the Executive shall be eligible to receive cash incentive compensation as determined by the Board or the Compensation Committee from time to time. The Executive’s initial target annual incentive compensation shall be 35 percent of his Base Salary (the “Target Bonus”) and be based on predetermined metrics as determined by the Board or the Compensation Committee. Except as otherwise provided herein, to earn incentive compensation, the Executive must be employed by the Company on the day such incentive compensation is paid.

Expenses. The Executive shall be entitled to receive prompt reimbursement for all reasonable expenses incurred by him during the Term in performing services hereunder, in accordance with the policies and procedures then in effect and established by the Company for its executive officers.

Other Benefits. During the Term, the Executive shall be eligible to participate in or receive benefits under the Company’s employee benefit plans in effect from time to time, subject to the terms of such plans.

Vacations. During the Term, the Executive shall be entitled to take paid time off in accordance with the Company’s applicable paid time off policy for executives as may be in effect from time to time. The Executive shall also be entitled to all paid holidays given by the Company to its executive officers.

Equity. The equity awards held by the Executive shall continue to be governed by the terms and conditions of the Company’s applicable equity incentive plan(s) and the applicable award agreement(s) governing the terms of such equity awards held by the Executive (collectively, the “Equity Documents”); provided, however, and notwithstanding anything to the contrary in the Equity Documents, Section 6(a)(ii) of this Agreement shall apply in the event of a termination by the Company without Cause or by the Executive for Good Reason in either event within the Change in Control Period (as such terms are defined below).

3. Termination. During the Term, the Executive’s employment hereunder may be terminated without any breach of this Agreement under the following circumstances:

(a) Death. The Executive’s employment hereunder shall terminate upon his death.

(b) Disability. The Company may terminate the Executive’s employment if he is disabled and unable to perform the essential functions of the Executive’s then existing position or positions under this Agreement with or without reasonable accommodation for a period of 180 days (which need not be consecutive) in any 12-month period. If any question shall arise as to whether during any period the Executive is disabled so as to be unable to perform the essential functions of the Executive’s then existing position or positions with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive’s guardian has no reasonable objection as to
whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company’s determination of such issue shall be binding on the Executive. Nothing in this Section 3(b) shall be construed to waive the Executive’s rights, if any, under existing law including, without limitation, the Family and Medical Leave Act of 1993, 29 U.S.C. §2601 et seq. and the Americans with Disabilities Act, 42 U.S.C. §12101 et seq.

(c) Termination by Company for Cause. The Company may terminate the Executive’s employment hereunder for Cause. For purposes of this Agreement, “Cause” shall mean: (i) conduct by the Executive constituting a material act of misconduct in connection with the performance of his duties, including, without limitation, willful failure or refusal to perform material responsibilities that have been requested by the Board, misappropriation of funds or property of the Company or any of its subsidiaries or affiliates other than the occasional, customary and de minimis use of Company property for personal purposes, or dishonesty to the Board with respect to any material matter; (ii) the commission by the Executive of any acts satisfying the elements of felony or a misdemeanor involving moral turpitude, deceit, dishonesty or fraud, or any conduct by the Executive that would reasonably be expected to result in material injury or reputational harm to the Company or any of its subsidiaries or affiliates if he were retained in his position; (iii) continued non-performance by the Executive of his duties hereunder (other than by reason of the Executive’s physical or mental illness, incapacity or disability) which has continued for more than 30 days following written notice of such non-performance from the CEO; (iv) a breach by the Executive of any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements; (v) a material violation by the Executive of the Company’s written employment policies; or (vi) failure to cooperate with a bona fide internal investigation or an investigation by regulatory or law enforcement authorities, after being instructed by the Company to cooperate, or the willful destruction or failure to preserve documents or other materials known to be relevant to such investigation or the inducement of others to fail to cooperate or to produce documents or other materials in connection with such investigation.

(d) Termination without Cause. The Company may terminate the Executive’s employment hereunder at any time without Cause. Any termination by the Company of the Executive’s employment under this Agreement which does not constitute a termination for Cause under Section 3(c) and does not result from the death or disability of the Executive under Section 3(a) or (b) shall be deemed a termination without Cause.

(e) Termination by the Executive. The Executive may terminate his employment hereunder at any time for any reason, including but not limited to Good Reason. For purposes of this Agreement, “Good Reason” shall mean that the Executive has complied with the “Good Reason Process” (hereinafter defined) following the occurrence of any of the following events: (i) a material diminution in the Executive’s responsibilities, authority or duties; (ii) a material diminution in the Executive’s Base Salary except for across-the-board salary reductions based on the Company’s financial performance similarly affecting all or substantially all senior management employees of the Company; (iii) a material change in the geographic location at which the Executive provides services to the Company; or (iv) the
material breach of this Agreement by the Company. “Good Reason Process” shall mean that (i) the Executive reasonably determines in good faith that a “Good Reason” condition has occurred; (ii) the Executive notifies the Company in writing of the first occurrence of the Good Reason condition within 60 days of the first occurrence of such condition; (iii) the Executive cooperates in good faith with the Company's efforts, for a period not less than 30 days following such notice (the “Cure Period”), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) the Executive terminates his employment within 60 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

4. Notice and Date of Termination.

(a) Notice of Termination. Except for termination as specified in Section 3(a), any termination of the Executive's employment by the Company or any such termination by the Executive shall be communicated by written Notice of Termination to the other party hereto. For purposes of this Agreement, a “Notice of Termination” shall mean a notice which shall indicate the specific termination provision in this Agreement relied upon.

(b) Date of Termination. “Date of Termination” shall mean: (i) if the Executive's employment is terminated by his death, the date of his death; (ii) if the Executive's employment is terminated on account of disability under Section 3(b) or by the Company for Cause under Section 3(c), the date on which Notice of Termination is given; (iii) if the Executive's employment is terminated by the Company under Section 3(d), the date on which a Notice of Termination is given or another date as specified in the Notice of Termination; (iv) if the Executive’s employment is terminated by the Executive under Section 3(e) without Good Reason, 30 days after the date on which a Notice of Termination is given, and (v) if the Executive’s employment is terminated by the Executive under Section 3(e) for Good Reason, the date on which a Notice of Termination is given after the end of the Cure Period. Notwithstanding the foregoing, in the event that the Executive gives a Notice of Termination to the Company, the Company may unilaterally accelerate the Date of Termination and such acceleration shall not result in a termination by the Company for purposes of this Agreement.

5. Compensation Upon Termination.

(a) Termination Generally. If the Executive's employment with the Company is terminated for any reason, the Company shall pay or provide to the Executive (or to his authorized representative or estate) (i) any Base Salary earned through the Date of Termination, unpaid expense reimbursements (subject to, and in accordance with, Section 2(c) of this Agreement) and unused vacation that accrued through the Date of Termination and on or before the time required by law but in no event more than 30 days after the Executive's Date of Termination; and (ii) any vested benefits the Executive may have under any employee benefit plan of the Company through the Date of Termination, which vested benefits shall be paid and/or provided in accordance with the terms of such employee benefit plans (collectively, the “Accrued Benefit”).
(b) Termination by the Company without Cause or by the Executive with Good Reason. During the Term, if the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d), or the Executive terminates his employment for Good Reason as provided in Section 3(e), then the Company shall pay the Executive his Accrued Benefit. In addition, subject to (i) the Executive signing a separation agreement in a form and manner satisfactory to the Company, which shall contain, among other provisions, a general release of claims in favor of the Company and related persons and entities, confidentiality, return of property and non-disparagement and a reaffirmation of all of the Executive’s Continuing Obligations (as defined below) (the “Separation Agreement and Release”) and (ii) the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period:

(i) the Company shall pay the Executive an amount equal to nine (9) months of the Executive’s then current Base Salary; and

(ii) the Company shall pay the Executive a pro-rata amount of the Executive’s Target Bonus based on the performance of the Company and consistent with bonuses paid to other Company executives, both as determined by the Board in its reasonable good faith discretion; and

(iii) if the Executive was participating in the Company’s group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for nine (9) months or the Executive’s COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company; and

The amounts payable under Sections 5(b)(i) and (iii) shall be paid out in substantially equal installments in accordance with the Company’s payroll practice over nine (9) months commencing within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the “Code”), shall begin to be paid in the second calendar year by the last day of such 60-day period; provided, further, that the initial payment shall include a catch-up payment to cover amounts retroactive to the day immediately following the Date of Termination. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The amount payable under Section 4(b)(ii) shall be paid on the date bonuses are paid to the Company’s other executives but no later than March 15 following the year in which the Date of Termination occurs.

Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement or the Restrictive Covenants Agreements (as defined below), all payments under this Sections 5(b) shall immediately cease.
6. Change in Control Payment. The provisions of this Section 6 set forth certain terms of an agreement reached between the Executive and the Company regarding the Executive’s rights and obligations upon the occurrence of a Change in Control of the Company. These provisions are intended to assure and encourage in advance the Executive’s continued attention and dedication to his assigned duties and his objectivity during the pendency and after the occurrence of any such event. These provisions shall apply in lieu of, and expressly supersede, the provisions of Section 5(b) regarding severance pay and benefits upon a termination of employment, if such termination of employment occurs within twelve (12) months after the occurrence of the first event constituting a Change in Control (the “Change in Control Period”). These provisions shall terminate and be of no further force or effect beginning after the Change in Control Period.

(a) Change in Control. During the Term, if during the Change in Control Period, the Executive’s employment is terminated by the Company without Cause as provided in Section 3(d) or the Executive terminates his employment for Good Reason as provided in Section 3(e), then, subject to the Executive signing a Separation Agreement and Release that conforms with the requirements of Section 5(b)(i) and the Separation Agreement and Release becoming fully irrevocable, all within 60 days after the Date of Termination (or such shorter period as set forth in the Separation Agreement and Release), which shall include a seven (7) business day revocation period:

(i) the Company shall pay the Executive a lump sum in cash in an amount equal to one times the sum of (A) the Executive’s then current Base Salary (or the Executive’s Base Salary in effect immediately prior to the Change in Control, if higher) plus (B) the Executive’s Target Bonus for the then current year; and

(ii) notwithstanding anything to the contrary in any applicable option agreement or other equity award agreement, all outstanding equity grants subject to time-based vesting held by the Executive shall immediately accelerate and become fully exercisable or nonforfeitable as of the Date of Termination; and

(iii) if the Executive was participating in the Company’s group health plan immediately prior to the Date of Termination and elects COBRA health continuation, then the Company shall pay to the Executive a monthly cash payment for twelve (12) months or the Executive’s COBRA health continuation period, whichever ends earlier, in an amount equal to the monthly employer contribution that the Company would have made to provide health insurance to the Executive if the Executive had remained employed by the Company; and

The amounts payable under Sections 6(a)(i) and (iii) shall be paid or commence to be paid within 60 days after the Date of Termination; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments, to the extent they qualify as “non-qualified deferred compensation” within the meaning of Section 409A of the Code, shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period. Notwithstanding the foregoing, if the Executive breaches any of the provisions contained in Section 8 of this Agreement, all payments under this Section 6(a) shall immediately cease.
(b) **Additional Limitation.**

(i) Anything in this Agreement to the contrary notwithstanding, in the event that the amount of any compensation, payment or distribution by the Company to or for the benefit of the Executive, whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise, calculated in a manner consistent with Section 280G of the Code and the applicable regulations thereunder (the “Aggregate Payments”), would be subject to the excise tax imposed by Section 4999 of the Code, then the Aggregate Payments shall be reduced (but not below zero) so that the sum of all of the Aggregate Payments shall be $1.00 less than the amount at which the Executive becomes subject to the excise tax imposed by Section 4999 of the Code; provided that such reduction shall only occur if it would result in the Executive receiving a higher After Tax Amount (as defined below) than the Executive would receive if the Aggregate Payments were not subject to such reduction. In such event, the Aggregate Payments shall be reduced in the following order, in each case, in reverse chronological order beginning with the Aggregate Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits; provided that in the case of all the foregoing Aggregate Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c).

(ii) For purposes of this Section 6(b), the “After Tax Amount” means the amount of the Aggregate Payments less all federal, state, and local income, excise and employment taxes imposed on the Executive as a result of the Executive’s receipt of the Aggregate Payments. For purposes of determining the After Tax Amount, the Executive shall be deemed to pay federal income taxes at the highest marginal rate of federal income taxation applicable to individuals for the calendar year in which the determination is to be made, and state and local income taxes at the highest marginal rates of individual taxation in each applicable state and locality, net of the maximum reduction in federal income taxes which could be obtained from deduction of such state and local taxes.

(iii) The determination as to whether a reduction in the Aggregate Payments shall be made pursuant to Section 6(b)(i) shall be made by a nationally recognized accounting firm selected by the Company (the “Accounting Firm”), which shall provide detailed supporting calculations both to the Company and the Executive within 15 business days of the Date of Termination, if applicable, or at such earlier time as is reasonably requested by the Company or the Executive. Any determination by the Accounting Firm shall be binding upon the Company and the Executive.

(c) **Definitions.** For purposes of this Section 5, the following terms shall have the following meanings:

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“Change in Control” shall mean any of the following:

(i) any “person,” as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the “Act”) (other than the Company, any of its subsidiaries, or any trustee, fiduciary or other person or entity holding securities under any employee benefit plan or trust of the Company or any of its subsidiaries), together with all “affiliates” and “associates” (as such terms are defined in Rule 12b-2 under the Act) of such person, shall become the “beneficial owner” (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, of securities of the Company representing 50 percent or more of the combined voting power of the Company’s then outstanding securities having the right to vote in an election of the Board (“Voting Securities”) (in such case other than as a result of an acquisition of securities directly from the Company); or

(ii) the date a majority of the members of the Board is replaced during any 12-month period by directors whose appointment or election is not endorsed by a majority of the members of the Board before the date of the appointment or election; or

(iii) the consummation of (A) any consolidation or merger of the Company where the stockholders of the Company, immediately prior to the consolidation or merger, would not, immediately after the consolidation or merger, beneficially own (as such term is defined in Rule 13d-3 under the Act), directly or indirectly, shares representing in the aggregate more than 50 percent of the voting shares of the Company issuing cash or securities in the consolidation or merger (or of its ultimate parent corporation, if any), or (B) any sale or other transfer (in one transaction or a series of transactions contemplated or arranged by any party as a single plan) of all or substantially all of the assets of the Company.

Notwithstanding the foregoing, a “Change in Control” shall not be deemed to have occurred for purposes of the foregoing clause (i) solely as the result of an acquisition of securities by the Company which, by reducing the number of shares of Voting Securities outstanding, increases the proportionate number of Voting Securities beneficially owned by any person to 50 percent or more of the combined voting power of all of the then outstanding Voting Securities; provided, however, that if any person referred to in this sentence shall thereafter become the beneficial owner of any additional shares of Voting Securities directly from the Company and immediately thereafter beneficially owns 50 percent or more of the combined voting power of all of the then outstanding Voting Securities, then a “Change in Control” shall be deemed to have occurred for purposes of the foregoing clause (i).

7. Section 409A

(a) Anything in this Agreement to the contrary notwithstanding, if at the time of the Executive’s separation from service within the meaning of Section 409A of the Code, the Company determines that the Executive is a “specified employee” within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that the Executive becomes entitled to under this Agreement on account of the Executive’s separation from service
would be considered deferred compensation otherwise subject to the 20 percent additional tax imposed pursuant to Section 409A(a) of the Code as a result of the application of Section 409A(a)(2)(B)(i) of the Code, such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after the Executive’s separation from service, or (B) the Executive’s death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule.

(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes “non-qualified deferred compensation” under Section 409A of the Code, and to the extent that such payment or benefit is payable upon the Executive’s termination of employment, then such payments or benefits shall be payable only upon the Executive’s “separation from service.” The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A-1(h).

(d) The parties intend that this Agreement will be administered in accordance with Section 409A of the Code. To the extent that any provision of this Agreement is ambiguous as to its compliance with Section 409A of the Code, the provision shall be read in such a manner so that all payments hereunder comply with Section 409A of the Code. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A-2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Section 409A of the Code and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Section 409A of the Code but do not satisfy an exemption from, or the conditions of, such Section.
8. Continuing Obligations.

(a) Restrictive Covenants Agreement. The Executive has previously entered into the Employee Invention and Non-Disclosure Agreement dated February 15, 2017, attached hereto as Exhibit A and the Non-Competition and Non-Solicitation Agreement dated February 15, 2017, attached hereto as Exhibit B (together, the “Restrictive Covenants Agreements”). The terms of the Restrictive Covenants Agreements continue to remain in full force and effect. For purposes of this Agreement, the obligations in this Section 8 and those that arise in the Restrictive Covenants Agreements and any other agreement relating to confidentiality, assignment of inventions, or other restrictive covenants shall collectively be referred to as the “Continuing Obligations.”

(b) Protected Disclosures and Other Protected Action. Nothing in this Agreement shall be interpreted or applied to prohibit the Executive from making any good faith report to any governmental agency or other governmental entity (a “Government Agency”) concerning any act or omission that the Executive reasonably believes constitutes a possible violation of federal or state law or making other disclosures that are protected under the anti-retaliation or whistleblower provisions of applicable federal or state law or regulation. In addition, nothing contained in this Agreement limits the Executive’s ability to communicate with any Government Agency or otherwise participate in any investigation or proceeding that may be conducted by any Government Agency, including the Executive’s ability to provide documents or other information, without notice to the Company. In addition, for the avoidance of doubt, pursuant to the federal Defend Trade Secrets Act of 2016, the Executive shall not be held criminally or civilly liable under any federal or state trade secret law or under this Agreement or the Restrictive Covenants Agreements for the disclosure of a trade secret that (a) is made (i) in confidence to a federal, state, or local government official, either directly or indirectly, or to an attorney; and (ii) solely for the purpose of reporting or investigating a suspected violation of law; or (b) is made in a complaint or other document filed in a lawsuit or other proceeding, if such filing is made under seal.

9. Consent to Jurisdiction. The parties hereby consent to the jurisdiction of the state and federal courts of the Commonwealth of Massachusetts. Accordingly, with respect to any such court action, the Executive (a) submits to the personal jurisdiction of such courts; (b) consents to service of process; and (c) waives any other requirement (whether imposed by statute, rule of court, or otherwise) with respect to personal jurisdiction or service of process.

10. Integration. This Agreement, along with the Restrictive Covenants Agreements, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements between the parties concerning such subject matter, including the Prior Agreement, provided that the Restrictive Covenants Agreement and the Equity Documents remain in full force and effect.

11. Withholding; Tax Effect. All payments made by the Company to the Executive under this Agreement shall be net of any tax or other amounts required to be withheld by the Company under applicable law. Nothing in this Agreement shall be construed to require the Company to make any payments to compensate the Executive for any adverse tax effect associated with any payments or benefits or for any deduction or withholding from any payment or benefit.
12. Successor to the Executive. This Agreement shall inure to the benefit of and be enforceable by the Executive’s personal representatives, executors, administrators, heirs, distributees, devisees and legatees. In the event of the Executive’s death after his termination of employment but prior to the completion by the Company of all payments due him under this Agreement, the Company shall continue such payments to the Executive’s beneficiary designated in writing to the Company prior to his death (or to his estate, if the Executive fails to make such designation).

13. Enforceability. If any portion or provision of this Agreement (including, without limitation, any portion or provision of any section of this Agreement) shall to any extent be declared illegal or unenforceable by a court of competent jurisdiction, then the remainder of this Agreement, or the application of such portion or provision in circumstances other than those as to which it is so declared illegal or unenforceable, shall not be affected thereby, and each portion and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

14. Survival. The provisions of this Agreement shall survive the termination of this Agreement and/or the termination of the Executive’s employment to the extent necessary to effectuate the terms contained herein.

15. Waiver. No waiver of any provision hereof shall be effective unless made in writing and signed by the waiving party. The failure of any party to require the performance of any term or obligation of this Agreement, or the waiver by any party of any breach of this Agreement, shall not prevent any subsequent enforcement of such term or obligation or be deemed a waiver of any subsequent breach.

16. Notices. Any notices, requests, demands and other communications provided for by this Agreement shall be sufficient if in writing and delivered in person or sent by a nationally recognized overnight courier service or by registered or certified mail, postage prepaid, return receipt requested, to the Executive at the last address the Executive has filed in writing with the Company or, in the case of the Company, at its main offices, attention of the Board.

17. Amendment. This Agreement may be amended or modified only by a written instrument signed by the Executive and by a duly authorized representative of the Company.

18. Effect on Other Plans and Agreements. An election by the Executive to resign for Good Reason under the provisions of this Agreement shall not be deemed a voluntary termination of employment by the Executive for the purpose of interpreting the provisions of any of the Company’s benefit plans, programs or policies. Nothing in this Agreement shall be construed to limit the rights of the Executive under the Company’s benefit plans, programs or policies except as otherwise provided in Section 8 hereof, and except that the Executive shall have no rights to any severance benefits under any Company severance pay plan, offer letter or otherwise. In the event that the Executive is party to an agreement with the Company providing for payments or benefits under such agreement and this Agreement, the terms of this Agreement shall govern and the Executive may receive payment under this Agreement only and not both. Further, Section 5 and Section 6 of this Agreement are mutually exclusive and in no event shall the Executive be entitled to payments or benefits pursuant to Section 5 and Section 6 of this Agreement.
19. **Governing Law.** This is a Massachusetts contract and shall be construed under and be governed in all respects by the laws of the Commonwealth of Massachusetts, without giving effect to the conflict of laws principles thereof. With respect to any disputes concerning federal law, such disputes shall be determined in accordance with the law as it would be interpreted and applied by the United States Court of Appeals for the First Circuit.

20. **Counterparts.** This Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall be taken to be an original; but such counterparts shall together constitute one and the same document.

21. **Successor to Company.** The Company shall require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company expressly to assume and agree to perform this Agreement to the same extent that the Company would be required to perform it if no succession had taken place. Failure of the Company to obtain an assumption of this Agreement at or prior to the effectiveness of any succession shall be a material breach of this Agreement.

22. **Gender Neutral.** Wherever used herein, a pronoun in the masculine gender shall be considered as including the feminine gender unless the context clearly indicates otherwise.

IN WITNESS WHEREOF, the parties have executed this Agreement effective on the date and year first above written.

KARUNA THERAPEUTICS, INC.

By: 
Its: _______________________________

EXECUTIVE

_________________________________
Stephen Brannan, M.D.
KARUNA THERAPEUTICS, INC.

[FORM OF] DIRECTOR INDEMNIFICATION AGREEMENT

This Indemnification Agreement ("Agreement") is made as of [_______] by and between Karuna Therapeutics, Inc., a Delaware corporation (the "Company"), and [Director] ("Indemnitee").

RECITALS

WHEREAS, the Company desires to attract and retain the services of highly qualified individuals, such as Indemnitee, to serve the Company;

WHEREAS, in order to induce Indemnitee to provide or continue to provide services to the Company, the Company wishes to provide for the indemnification of, and advancement of expenses to, Indemnitee to the maximum extent permitted by law;

WHEREAS, the Amended and Restated Certificate of Incorporation (as amended and in effect from time to time, the "Charter") and the Amended and Restated Bylaws (as amended and in effect from time to time, the "Bylaws") of the Company require indemnification of the officers and directors of the Company, and Indemnitee may also be entitled to indemnification pursuant to the General Corporation Law of the State of Delaware (the "DGCL");

WHEREAS, the Charter, the Bylaws and the DGCL expressly provide that the indemnification provisions set forth therein are not exclusive, and thereby contemplate that contracts may be entered into between the Company and members of the board of directors, officers and other persons with respect to indemnification;

WHEREAS, the Board of Directors of the Company (the "Board") has determined that the increased difficulty in attracting and retaining highly qualified persons such as Indemnitee is detrimental to the best interests of the Company’s stockholders;

WHEREAS, it is reasonable and prudent for the Company contractually to obligate itself to indemnify, and to advance expenses on behalf of, such persons to the fullest extent permitted by applicable law, regardless of any amendment or revocation of the Charter or the Bylaws, so that they will serve or continue to serve the Company free from undue concern that they will not be so indemnified;

WHEREAS, this Agreement is a supplement to and in furtherance of the indemnification provided in the Charter, the Bylaws and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder; and

[WHEREAS, Indemnitee has certain rights to indemnification and/or insurance provided by [Affiliated Entity] ("[Affiliated Entity]") which Indemnitee and [Affiliated Entity ] intend to be secondary to the primary obligation of the Company to indemnify Indemnitee as provided in this Agreement, with the Company’s acknowledgment and agreement to the foregoing being a material condition to Indemnitee’s willingness to serve or continue to serve on the Board.]

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NOW, THEREFORE, in consideration of the premises and the covenants contained herein, the Company and Indemnitee do hereby covenant and agree as follows:

Section 1. Services to the Company. Indemnitee agrees to [continue to] serve as a director of the Company. Indemnitee may at any time and for any reason resign from such position (subject to any other contractual obligation or any obligation imposed by law), in which event the Company shall have no obligation under this Agreement to continue Indemnitee in such position. This Agreement shall not be deemed an employment contract between the Company (or any of its subsidiaries or any Enterprise) and Indemnitee.

Section 2. Definitions.

As used in this Agreement:

(a) “Change in Control” shall mean (i) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (ii) a merger, reorganization or consolidation pursuant to which the holders of the Company’s outstanding voting power and outstanding stock immediately prior to such transaction do not own a majority of the outstanding voting power and outstanding stock or other equity interests of the resulting or successor entity (or its ultimate parent, if applicable) immediately upon completion of such transaction, (iii) the sale of all of the Stock of the Company to an unrelated person, entity or group thereof acting in concert, or (iv) any other transaction in which the owners of the Company’s outstanding voting power immediately prior to such transaction do not own at least a majority of the outstanding voting power of the Company or any successor entity immediately upon completion of the transaction other than as a result of the acquisition of securities directly from the Company.

(b) “Corporate Status” describes the status of a person as a current or former director of the Company or current or former director, manager, partner, officer, employee, agent or trustee of any other Enterprise which such person is or was serving at the request of the Company.

(c) “Enforcement Expenses” shall include all reasonable attorneys’ fees, court costs, transcript costs, fees of experts, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other out-of-pocket disbursements or expenses of the types customarily incurred in connection with an action to enforce indemnification or advancement rights, or an appeal from such action. Expenses, however, shall not include fees, salaries, wages or benefits owed to Indemnitee.

(d) “Enterprise” shall mean any corporation (other than the Company), partnership, joint venture, trust, employee benefit plan, limited liability company, or other legal entity of which Indemnitee is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee.
(e) "Expenses" shall include all reasonable attorneys' fees, court costs, transcript costs, fees of experts, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other out-of-pocket disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, or otherwise participating in, a Proceeding or an appeal resulting from a Proceeding. Expenses, however, shall not include amounts paid in settlement by Indemnitee, the amount of judgments or fines against Indemnitee or fees, salaries, wages or benefits owed to Indemnitee.

(f) "Independent Counsel" means a law firm, or a partner (or, if applicable, member or shareholder) of such a law firm, that is experienced in matters of Delaware corporation law and neither presently is, nor in the past five (5) years has been, retained to represent: (i) the Company, any subsidiary of the Company, any Enterprise or Indemnitee in any matter material to any such party; or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term "Independent Counsel" shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee's rights under this Agreement. The Company agrees to pay the reasonable fees and expenses of the Independent Counsel referred to above and to fully indemnify such counsel against any and all expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(g) The term "Proceeding" shall include any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought in the right of the Company or otherwise and whether of a civil, criminal, administrative, regulatory or investigative nature, and whether formal or informal, in which Indemnitee was, is or will be involved as a party or otherwise by reason of the fact that Indemnitee is or was a director of the Company or is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any Enterprise or by reason of any action taken by Indemnitee or of any action taken on his or her part while acting as a director of the Company or while serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any Enterprise, in each case whether or not serving in such capacity at the time any liability or expense is incurred for which indemnification, reimbursement or advancement of expenses can be provided under this Agreement; provided, however, that the term "Proceeding" shall not include any action, suit or arbitration, or part thereof, initiated by Indemnitee to enforce Indemnitee's rights under this Agreement as provided for in Section 12(a) of this Agreement.

Section 3. Indemnity in Third-Party Proceedings. The Company shall indemnify Indemnitee to the extent set forth in this Section 3 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding, other than a Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 3, Indemnitee shall be indemnified against all Expenses, judgments, fines, penalties, excise taxes, and amounts paid in settlement actually and reasonably incurred by Indemnitee or on his or her behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful.
Section 4. Indemnity in Proceedings by or in the Right of the Company. The Company shall indemnify Indemnitee to the extent set forth in this Section 4 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 4, Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by Indemnitee or on his or her behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Company. No indemnification for Expenses shall be made under this Section 4 in respect of any claim, issue or matter as to which Indemnitee shall have been finally adjudged by a court to be liable to the Company, unless and only to the extent that the Delaware Court of Chancery (the “Delaware Court”) shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnification for such expenses as the Delaware Court shall deem proper.

Section 5. Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provisions of this Agreement and except as provided in Section 7, to the extent that Indemnitee is a party to or a participant in any Proceeding and is successful in such Proceeding or in defense of any claim, issue or matter therein, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by him or her in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful as to one or more but less than all claims, issues or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee or on his or her behalf in connection with each successfully resolved claim, issue or matter. For purposes of this Section and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

Section 6. Reimbursement for Expenses of a Witness or in Response to a Subpoena. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee, by reason of his or her Corporate Status, (i) is a witness in any Proceeding to which Indemnitee is not a party and is not threatened to be made a party or (ii) receives a subpoena with respect to any Proceeding to which Indemnitee is not a party and is not threatened to be made a party, the Company shall reimburse Indemnitee for all Expenses actually and reasonably incurred by him or her or on his or her behalf in connection therewith.

Section 7. Exclusions. Notwithstanding any provision in this Agreement to the contrary, the Company shall not be obligated under this Agreement:

(a) to indemnify for amounts otherwise indemnifiable hereunder (or for which advancement is provided hereunder) if and to the extent that Indemnitee has otherwise actually received such amounts under any insurance policy, contract, agreement or otherwise; provided that the foregoing shall not affect the rights of Indemnitee or the Secondary Indemnitors as set forth in Section 13(c);
(b) to indemnify for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the
Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of state statutory law or
common law, or from the purchase or sale by Indemnitee of such securities in violation of Section 306 of the Sarbanes Oxley Act of 2002, as amended
("SOX");

(c) to indemnify with respect to any Proceeding, or part thereof, brought by Indemnitee against the Company, any legal entity which it
controls, any director or officer thereof or any third party, unless (i) the Board has consented to the initiation of such Proceeding or part thereof
and (ii) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law;
provided, however, that this Section 7(c) shall not apply to (A) counterclaims or affirmative defenses asserted by Indemnitee in an action brought
against Indemnitee or (B) any action brought by Indemnitee for indemnification or advancement from the Company under this Agreement or
under any directors’ and officers’ liability insurance policies maintained by the Company in the suit for which indemnification or advancement is
being sought as described in Section 12; or

(d) to provide any indemnification or advancement of expenses that is prohibited by applicable law (as such law exists at the time payment
would otherwise be required pursuant to this Agreement).

Section 8. Advancement of Expenses. Subject to Section 9(b), the Company shall advance, to the extent not prohibited by law, the Expenses
incurred by Indemnitee in connection with any Proceeding, and such advancement shall be made as incurred, and such advancement shall be made
within thirty (30) days after the receipt by the Company of a statement or statements requesting such advances (including any invoices received by
Indemnitee, which such invoices may be redacted as necessary to avoid the waiver of any privilege accorded by applicable law) from time to time,
whether prior to or after final disposition of any Proceeding. Advances shall be unsecured and interest free. Advances shall be made without regard to
Indemnitee’s (i) ability to repay the expenses, (ii) ultimate entitlement to indemnification under the other provisions of this Agreement, and
(iii) entitlement to and availability of insurance coverage, including advancement, payment or reimbursement of defense costs, expenses of covered loss
under the provisions of any applicable insurance policy (including, without limitation, whether such advancement, payment or reimbursement is
withheld, conditioned or delayed by the insurer(s)). Indemnitee shall qualify for advances upon the execution and delivery to the Company of this
Agreement which shall constitute an undertaking providing that Indemnitee undertakes to the fullest extent required by law to repay the advance if and
to the extent that it is ultimately determined by a court of competent jurisdiction in a final judgment, not subject to appeal, that Indemnitee is not entitled
to be indemnified by the Company. The right to advances under this paragraph shall in all events continue until final disposition of any Proceeding,
including any appeal therein. Nothing in this Section 8 shall limit Indemnitee’s right to advancement pursuant to Section 12(e) of this Agreement.

(a) To obtain indemnification under this Agreement, Indemnitee shall submit to the Company a written request therefor specifying the basis for the claim, the amounts for which Indemnitee is seeking payment under this Agreement, and all documentation related thereto as reasonably requested by the Company.

(b) In the event that the Company shall be obligated hereunder to provide indemnification for or make any advancement of Expenses with respect to any Proceeding, the Company shall be entitled to assume the defense of such Proceeding, or any claim, issue or matter therein, with counsel approved by Indemnitee (which approval shall not be unreasonably withheld or delayed) upon the delivery to Indemnitee of written notice of the Company’s election to do so. After delivery of such notice, approval of such counsel by Indemnitee and the retention of such counsel by the Company, the Company will not be liable to Indemnitee under this Agreement for any fees or expenses of separate counsel subsequently employed by or on behalf of Indemnitee with respect to the same Proceeding; provided that (i) Indemnitee shall have the right to employ separate counsel in any such Proceeding at Indemnitee’s expense and (ii) if (A) the employment of separate counsel by Indemnitee has been previously authorized by the Company, (B) Indemnitee shall have reasonably concluded that there may be a conflict of interest between the Company and Indemnitee in the conduct of such defense, or (C) the Company shall not continue to retain such counsel to defend such Proceeding, then the fees and expenses actually and reasonably incurred by Indemnitee with respect to his or her separate counsel shall be Expenses hereunder.

(c) In the event that the Company does not assume the defense in a Proceeding pursuant to paragraph (b) above, then the Company will be entitled to participate in the Proceeding at its own expense.

(d) The Company shall not be liable to indemnify Indemnitee under this Agreement for any amounts paid in settlement of any Proceeding effected without its prior written consent (which consent shall not be unreasonably withheld or delayed). The Company shall not, without the prior written consent of Indemnitee (which consent shall not be unreasonably withheld or delayed), enter into any settlement which (i) includes an admission of fault of Indemnitee, any non-monetary remedy imposed on Indemnitee or any monetary damages for which Indemnitee is not wholly and actually indemnified hereunder or (ii) with respect to any Proceeding with respect to which Indemnitee may be or is made a party or may be otherwise entitled to seek indemnification hereunder, does not include the full release of Indemnitee from all liability in respect of such Proceeding.

Section 10. Procedure Upon Application for Indemnification.

(a) Upon written request by Indemnitee for indemnification pursuant to Section 9(a), a determination, if such determination is required by applicable law, with respect to Indemnitee’s entitlement to indemnification hereunder shall be made in the specific case by one of the following methods: (x) if a Change in Control shall have occurred, by Independent Counsel in a written opinion to the Board; or (y) if a Change in Control shall not have occurred: (i) by a majority vote of the disinterested directors, even though less than a quorum; (ii) by a
committee of disinterested directors designated by a majority vote of the disinterested directors, even though less than a quorum; or (iii) if there are no disinterested directors or if the disinterested directors so direct, by Independent Counsel in a written opinion to the Board. For purposes hereof, disinterested directors are those members of the Board who are not parties to the action, suit or proceeding in respect of which indemnification is sought. In the case that such determination is made by Independent Counsel, a copy of Independent Counsel’s written opinion shall be delivered to Indemnitee and, if it is so determined that Indemnitee is entitled to indemnification, payment to Indemnitee shall be made within thirty (30) days after such determination. Indemnitee shall cooperate with the Independent Counsel or the Company, as applicable, in making such determination with respect to Indemnitee’s entitlement to indemnification, including providing to such counsel or the Company, upon reasonable advance request, any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such determination. Any out-of-pocket costs or expenses (including reasonable attorneys’ fees and disbursements) actually and reasonably incurred by Indemnitee in so cooperating with the Independent Counsel or the Company shall be borne by the Company (irrespective of the determination as to Indemnitee’s entitlement to indemnification) and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(b) If the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 10(a), the Independent Counsel shall be selected by the Board if a Change in Control shall not have occurred or, if a Change in Control shall have occurred, by Indemnitee. Indemnitee or the Company, as the case may be, may, within ten (10) days after written notice of such selection, deliver to the Company or Indemnitee, as the case may be, a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of “Independent Counsel” as defined in Section 2 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If such written objection is so made and substantiated, the Independent Counsel so selected may not serve as Independent Counsel unless and until such objection is withdrawn or the Delaware Court has determined that such objection is without merit. If, within twenty (20) days after the later of (i) submission by Indemnitee of a written request for indemnification pursuant to Section 9(a), and (ii) the final disposition of the Proceeding, including any appeal therein, no Independent Counsel shall have been selected without objection, either Indemnitee or the Company may petition the Delaware Court for resolution of any objection which shall have been made by Indemnitee or the Company to the selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate. The person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 10(a) hereof. Upon the due commencement of any judicial proceeding or arbitration pursuant to Section 12(a) of this Agreement, Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing).
Section 11. Presumptions and Effect of Certain Proceedings

(a) To the extent permitted by applicable law, in making a determination with respect to entitlement to indemnification hereunder, it shall be presumed that Indemnitee is entitled to indemnification under this Agreement if Indemnitee has submitted a request for indemnification in accordance with Section 9(a) of this Agreement, and the Company shall have the burden of proof to overcome that presumption in connection with the making of any determination contrary to that presumption. Neither (i) the failure of the Company or of Independent Counsel to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor (ii) an actual determination by the Company or by Independent Counsel that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(b) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of guilty, nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which he or she reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his or her conduct was unlawful.

(c) The knowledge and/or actions, or failure to act, of any director, manager, partner, officer, employee, agent or trustee of the Company, any subsidiary of the Company, or any Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement.

Section 12. Remedies of Indemnitee

(a) Subject to Section 12(f), in the event that (i) a determination is made pursuant to Section 10 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 8 of this Agreement, (iii) no determination of entitlement to indemnification shall have been made pursuant to Section 10(a) of this Agreement within sixty (60) days after receipt by the Company of the request for indemnification for which a determination is to be made other than by Independent Counsel, (iv) payment of indemnification or reimbursement of expenses is not made pursuant to Section 5 or 6 or the last sentence of Section 10(a) of this Agreement within thirty (30) days after receipt by the Company of a written request therefor (including any invoices received by Indemnitee, which such invoices may be redacted as necessary to avoid the waiver of any privilege accorded by applicable law) or (v) payment of indemnification pursuant to Section 3 or 4 of this Agreement is not made within thirty (30) days after a determination has been made that Indemnitee is entitled to indemnification, Indemnitee shall be entitled to an adjudication by the Delaware Court of his or her entitlement to such indemnification or advancement. Alternatively, Indemnitee, at his or her option, may seek an award in arbitration to be conducted by a single arbitrator pursuant to the Commercial Arbitration Rules of the
American Arbitration Association. Indemnitee shall commence such proceeding seeking an adjudication or an award in arbitration within 180 days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 12(a); provided, however, that the foregoing time limitation shall not apply in respect of a proceeding brought by Indemnitee to enforce his or her rights under Section 5 of this Agreement. The Company shall not oppose Indemnitee’s right to seek any such adjudication or award in arbitration.

(b) In the event that a determination shall have been made pursuant to Section 10(a) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding or arbitration commenced pursuant to this Section 12 shall be conducted in all respects as a de novo trial, or arbitration, on the merits and Indemnitee shall not be prejudiced by reason of that adverse determination. In any judicial proceeding or arbitration commenced pursuant to this Section 12, the Company shall have the burden of proving Indemnitee is not entitled to indemnification or advancement, as the case may be.

(c) If a determination shall have been made pursuant to Section 10(a) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding or arbitration commenced pursuant to this Section 12, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee’s statement not materially misleading, in connection with the request for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) The Company shall be precluded from asserting in any judicial proceeding or arbitration commenced pursuant to this Section 12 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court or before any such arbitrator that the Company is bound by all the provisions of this Agreement.

(e) The Company shall indemnify Indemnitee to the fullest extent permitted by law against any and all Enforcement Expenses and, if requested by Indemnitee, shall (within thirty (30) days after receipt by the Company of a written request therefor) advance, to the extent not prohibited by law, such Enforcement Expenses to Indemnitee, which are incurred by Indemnitee in connection with any action brought by Indemnitee for indemnification or advancement from the Company under this Agreement or under any directors’ and officers’ liability insurance policies maintained by the Company in the suit for which indemnification or advancement is being sought. Such written request for advancement shall include invoices received by Indemnitee in connection with such Enforcement Expenses but, in the case of invoices in connection with legal services, any references to legal work performed or to expenditures made that would cause Indemnitee to waive any privilege accorded by applicable law need not be included with the invoice.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding, including any appeal therein.
Section 13. Non-exclusivity; Survival of Rights; Insurance; Primacy of Indemnification; Subrogation.

(a) The rights of indemnification and to receive advancement as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Charter, the Bylaws, any agreement, a vote of stockholders or a resolution of directors, or otherwise. No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his or her Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in Delaware law, whether by statute or judicial decision, permits greater indemnification or advancement than would be afforded currently under the Charter, Bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, managers, partners, officers, employees, agents or trustees of the Company or of any other Enterprise, Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any such director, manager, partner, officer, employee, agent or trustee under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has director and officer liability insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) The Company hereby acknowledges that Indemnitee has certain rights to indemnification, advancement of expenses and/or insurance provided by [Affiliated Entity] and certain of its affiliates (collectively, the “Secondary Indemnitors”). The Company hereby agrees (i) that it is the indemnitor of first resort (i.e., its obligations to Indemnitee are primary and any obligation of the Secondary Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by Indemnitee are secondary), (ii) that it shall be required to advance the full amount of expenses incurred by Indemnitee and shall be liable for the full amount of all Expenses, judgments, penalties, fines and amounts paid in settlement to the extent legally permitted and as required by the terms of this Agreement and the Charter and/or Bylaws (or any other agreement between the Company and Indemnitee), without regard to any rights Indemnitee may have against the Secondary Indemnitors, and (iii) that it irrevocably waives, relinquishes and releases the Secondary Indemnitors from any and all claims against the Secondary Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Secondary Indemnitors on behalf of Indemnitee with respect to any claim for which Indemnitee has sought indemnification from the Company shall affect the foregoing and the Secondary Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of Indemnitee against the Company. The Company and Indemnitee agree that the Secondary Indemnitors are express third party beneficiaries of the terms of this Section 13(c).
(d) [Except as provided in paragraph (c) above,] in the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee [(other than against the Secondary Indemnitors)], who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

(e) [Except as provided in paragraph (c) above,] the Company’s obligation to provide indemnification or advancement hereunder to Indemnitee who is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any other Enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement from such other Enterprise.

Section 14. Duration of Agreement. This Agreement shall continue until and terminate upon the later of: (a) ten (10) years after the date that Indemnitee shall have ceased to serve as a director of the Company or (b) one (1) year after the final termination of any Proceeding, including any appeal, then pending in respect of which Indemnitee is granted rights of indemnification or advancement hereunder and of any proceeding commenced by Indemnitee pursuant to Section 12 of this Agreement relating thereto. This Agreement shall be binding upon the Company and its successors and assigns and shall inure to the benefit of Indemnitee and his or her heirs, executors and administrators. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all, substantially all or a substantial part, of the business and/or assets of the Company, by written agreement in form and substance satisfactory to Indemnitee, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

Section 15. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (a) the validity, legality and enforceability of the remaining provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby and shall remain enforceable to the fullest extent permitted by law; (b) such provision or provisions shall be deemed reformed to the extent necessary to conform to applicable law and to give the maximum effect to the intent of the parties hereto; and (c) to the fullest extent possible, the provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested thereby.

Section 16. Enforcement.
(a) The Company expressly confirms and agrees that it has entered into this Agreement and assumed the obligations imposed on it hereby in order to induce Indemnitee to serve or continue to serve as a director of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as a director of the Company.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof; provided, however, that this Agreement is a supplement to and in furtherance of the Charter, the Bylaws and applicable law, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee hereunder.

Section 17. Modification and Waiver. No supplement, modification or amendment, or waiver of any provision, of this Agreement shall be binding unless executed in writing by the parties thereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions of this Agreement nor shall any waiver constitute a continuing waiver. No supplement, modification or amendment of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee prior to such supplement, modification or amendment.

Section 18. Notice by Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification, reimbursement or advancement as provided hereunder. The failure of Indemnitee to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise.

Section 19. Notices. All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed to have been duly given if (i) delivered by hand and receipted for by the party to whom said notice or other communication shall have been directed, (ii) mailed by certified or registered mail with postage prepaid, on the third business day after the date on which it is so mailed, (iii) mailed by reputable overnight courier and receipted for by the party to whom said notice or other communication shall have been directed or (iv) sent by facsimile transmission, with receipt of oral confirmation that such transmission has been received:

(a) If to Indemnitee, at such address as Indemnitee shall provide to the Company.

(b) If to the Company to:

Karuna Therapeutics, Inc.
33 Arch Street, Suite 3110
Boston, Massachusetts 02110
Attention: Chief Executive Officer
Section 20. **Contribution.** To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement and/or for Expenses, in connection with any Proceeding in such proportion as is deemed fair and reasonable in light of all of the circumstances in order to reflect (i) the relative benefits received by the Company and Indemnitee in connection with the event(s) and/or transaction(s) giving rise to such Proceeding; and/or (ii) the relative fault of the Company (and its directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transactions.

Section 21. **Internal Revenue Code Section 409A.** The Company intends for this Agreement to comply with the Indemnification exception under Section 1.409A-1(b)(10) of the regulations promulgated under the Internal Revenue Code of 1986, as amended (the “Code”), which provides that indemnification of, or the purchase of an insurance policy providing for payments of, all or part of the expenses incurred or damages paid or payable by Indemnitee with respect to a bona fide claim against Indemnitee or the Company do not provide for a deferral of compensation, subject to Section 409A of the Code, where such claim is based on actions or failures to act by Indemnitee in his or her capacity as a service provider of the Company. The parties intend that this Agreement be interpreted and construed with such intent.

Section 22. **Applicable Law and Consent to Jurisdiction.** This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. Except with respect to any arbitration commenced by Indemnitee pursuant to Section 12(a) of this Agreement, the Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Delaware Court, and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) consent to service of process at the address set forth in Section 19 of this Agreement with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

Section 23. **Headings.** The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.
Section 24. Identical Counterparts. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement. Only one such counterpart signed by the party against whom enforceability is sought needs to be produced to evidence the existence of this Agreement.
IN WITNESS WHEREOF, the parties have caused this Agreement to be signed as of the day and year first above written.

KARUNA THERAPEUTICS, INC.

By: ____________________________________________
Name: __________________________________________
Title: __________________________________________

[Indemnitee]
This Indemnification Agreement ("Agreement") is made as of [ ________________ ] by and between Karuna Therapeutics, Inc., a Delaware corporation (the "Company"), and [Officer] ("Indemnitee").

RECITALS

WHEREAS, the Company desires to attract and retain the services of highly qualified individuals, such as Indemnitee, to serve the Company;

WHEREAS, in order to induce Indemnitee to provide or continue to provide services to the Company, the Company wishes to provide for the indemnification of, and advancement of expenses to, Indemnitee to the maximum extent permitted by law;

WHEREAS, the Amended and Restated Certificate of Incorporation (as amended and in effect from time to time, the "Charter") and the Amended and Restated Bylaws (as amended and in effect from time to time, the "Bylaws") of the Company require indemnification of the officers and directors of the Company, and Indemnitee may also be entitled to indemnification pursuant to the General Corporation Law of the State of Delaware (the "DGCL");

WHEREAS, the Charter, the Bylaws and the DGCL expressly provide that the indemnification provisions set forth therein are not exclusive, and thereby contemplate that contracts may be entered into between the Company and members of the board of directors, officers and other persons with respect to indemnification;

WHEREAS, the Board of Directors of the Company (the "Board") has determined that the increased difficulty in attracting and retaining highly qualified persons such as Indemnitee is detrimental to the best interests of the Company’s stockholders;

WHEREAS, it is reasonable and prudent for the Company contractually to obligate itself to indemnify, and to advance expenses on behalf of, such persons to the fullest extent permitted by applicable law, regardless of any amendment or revocation of the Charter or the Bylaws, so that they will serve or continue to serve the Company free from undue concern that they will not be so indemnified; and

WHEREAS, this Agreement is a supplement to and in furtherance of the indemnification provided in the Charter, the Bylaws and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder.

NOW, THEREFORE, in consideration of the premises and the covenants contained herein, the Company and Indemnitee do hereby covenant and agree as follows:

1 To be entered into with all C-level officers and Section 16 officers.
Section 1. Services to the Company. Indemnitee agrees to serve as a director and an officer of the Company. Indemnitee may at any time and for any reason resign from any such position (subject to any other contractual obligation or any obligation imposed by law), in which event the Company shall have no obligation under this Agreement to continue Indemnitee in such position. This Agreement shall not be deemed an employment contract between the Company (or any of its subsidiaries or any Enterprise) and Indemnitee.

Section 2. Definitions.

As used in this Agreement:

(a) “Change in Control” shall mean (i) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (ii) a merger, reorganization or consolidation pursuant to which the holders of the Company’s outstanding voting power and outstanding stock immediately prior to such transaction do not own a majority of the outstanding voting power and outstanding stock or other equity interests of the resulting or successor entity (or its ultimate parent, if applicable) immediately upon completion of such transaction, (iii) the sale of all of the Stock of the Company to an unrelated person, entity or group thereof acting in concert, or (iv) any other transaction in which the owners of the Company’s outstanding voting power immediately prior to such transaction do not own at least a majority of the outstanding voting power of the Company or any successor entity immediately upon completion of the transaction other than as a result of the acquisition of securities directly from the Company.

(b) “Corporate Status” describes the status of a person as a current or former director or officer of the Company or current or former director, manager, partner, officer, employee, agent or trustee of any other Enterprise which such person is or was serving at the request of the Company.

(c) “Enforcement Expenses” shall include all reasonable attorneys’ fees, court costs, transcript costs, fees of experts, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other out-of-pocket disbursements or expenses of the types customarily incurred in connection with an action to enforce indemnification or advancement rights, or an appeal from such action. Expenses, however, shall not include fees, salaries, wages or benefits owed to Indemnitee.

(d) “Enterprise” shall mean any corporation (other than the Company), partnership, joint venture, trust, employee benefit plan, limited liability company, or other legal entity of which Indemnitee is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee.

(e) “Expenses” shall include all reasonable attorneys’ fees, court costs, transcript costs, fees of experts, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other out-of-pocket disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, or otherwise participating in, a Proceeding or an appeal resulting from a Proceeding. Expenses, however, shall not include amounts paid in settlement by Indemnitee, the amount of judgments or fines against Indemnitee or fees, salaries, wages or benefits owed to Indemnitee.
(f) “Independent Counsel” means a law firm, or a partner (or, if applicable, member or shareholder) of such a law firm, that is experienced in matters of Delaware corporation law and neither presently is, nor in the past five (5) years has been, retained to represent: (i) the Company, any subsidiary of the Company, any Enterprise or Indemnitee in any matter material to any such party; or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term “Independent Counsel” shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee’s rights under this Agreement. The Company agrees to pay the reasonable fees and expenses of the Independent Counsel referred to above and to fully indemnify such counsel against any and all expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(g) The term “Proceeding” shall include any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought in the right of the Company or otherwise and whether of a civil, criminal, administrative, regulatory or investigative nature, and whether formal or informal, in which Indemnitee was, is or will be involved as a party or otherwise by reason of the fact that Indemnitee is or was [a director or] an officer of the Company or is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any Enterprise or by reason of any action taken by Indemnitee or of any action taken on his or her part while acting as [a director or] an officer of the Company or while serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any Enterprise, in each case whether or not serving in such capacity at the time any liability or expense is incurred for which indemnification, reimbursement or advancement of expenses can be provided under this Agreement; provided, however, that the term “Proceeding” shall not include any action, suit or arbitration, or part thereof, initiated by Indemnitee to enforce Indemnitee’s rights under this Agreement as provided for in Section 12(a) of this Agreement.
Section 4. Indemnity in Proceedings by or in the Right of the Company. The Company shall indemnify Indemnitee to the extent set forth in this Section 4 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 4, Indemnitee shall be indemnified against all Expenses actually and reasonably incurred by Indemnitee or on his or her behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Company. No indemnification for Expenses shall be made under this Section 4 in respect of any claim, issue or matter as to which Indemnitee shall have been finally adjudged by a court to be liable to the Company, unless and only to the extent that the Delaware Court of Chancery (the “Delaware Court”) shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnification for such expenses as the Delaware Court shall deem proper.

Section 5. Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provisions of this Agreement and except as provided in Section 7, to the extent that Indemnitee is a party to or a participant in any Proceeding and is successful in such Proceeding or in defense of any claim, issue or matter therein, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by him or her in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful as to one or more but less than all claims, issues or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee or on his or her behalf in connection with each successfully resolved claim, issue or matter. For purposes of this Section and without limitation, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

Section 6. Reimbursement for Expenses of a Witness or in Response to a Subpoena. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee, by reason of his or her Corporate Status, (i) is a witness in any Proceeding to which Indemnitee is not a party and is not threatened to be made a party or (ii) receives a subpoena with respect to any Proceeding to which Indemnitee is not a party and is not threatened to be made a party, the Company shall reimburse Indemnitee for all Expenses actually and reasonably incurred by him or her or on his or her behalf in connection therewith.

Section 7. Exclusions. Notwithstanding any provision in this Agreement to the contrary, the Company shall not be obligated under this Agreement:

(a) to indemnify for amounts otherwise indemnifiable hereunder (or for which advancement is provided hereunder) if and to the extent that Indemnitee has otherwise actually received such amounts under any insurance policy, contract, agreement or otherwise;

(b) to indemnify for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of state statutory law or common law, or from the purchase or sale by Indemnitee of such securities in violation of Section 306 of the Sarbanes-Oxley Act of 2002, as amended ("SOX");
(c) to indemnify for any reimbursement of, or payment to, the Company by Indemnitee of any bonus or other incentive-based or equity-based compensation or of any profits realized by Indemnitee from the sale of securities of the Company pursuant to Section 304 of SOX or any formal policy of the Company adopted by the Board (or a committee thereof), or any other remuneration paid to Indemnitee if it shall be determined by a final judgment or other final adjudication that such remuneration was in violation of law;

(d) to indemnify with respect to any Proceeding, or part thereof, brought by Indemnitee against the Company, any legal entity which it controls, any director or officer thereof or any third party, unless (i) the Board has consented to the initiation of such Proceeding or part thereof and (ii) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law; provided, however, that this Section 7(d) shall not apply to (A) counterclaims or affirmative defenses asserted by Indemnitee in an action brought against Indemnitee or (B) any action brought by Indemnitee for indemnification or advancement from the Company under this Agreement or under any directors’ and officers’ liability insurance policies maintained by the Company in the suit for which indemnification or advancement is being sought as described in Section 12; or

(e) to provide any indemnification or advancement of expenses that is prohibited by applicable law (as such law exists at the time payment would otherwise be required pursuant to this Agreement).

Section 8. Advancement of Expenses. Subject to Section 9(b), the Company shall advance, to the extent not prohibited by law, the Expenses incurred by Indemnitee in connection with any Proceeding, and such advancement shall be made as incurred, and such advancement shall be made within thirty (30) days after the receipt by the Company of a statement or statements requesting such advances (including any invoices received by Indemnitee, which such invoices may be redacted as necessary to avoid the waiver of any privilege accorded by applicable law) from time to time, whether prior to or after final disposition of any Proceeding. Advances shall be unsecured and interest free. Advances shall be made without regard to Indemnitee’s (i) ability to repay the expenses, (ii) ultimate entitlement to indemnification under the other provisions of this Agreement, and (iii) entitlement to and availability of insurance coverage, including advancement, payment or reimbursement of defense costs, expenses of covered loss under the provisions of any applicable insurance policy (including, without limitation, whether such advancement, payment or reimbursement is withheld, conditioned or delayed by the insurer(s)). Indemnitee shall qualify for advances upon the execution and delivery to the Company of this Agreement which shall constitute an undertaking providing that Indemnitee undertakes to the fullest extent required by law to repay the advance if and to the extent that it is ultimately determined by a court of competent jurisdiction in a final judgment, not subject to appeal, that Indemnitee is not entitled to be indemnified by the Company. The right to advances under this paragraph shall in all events continue until final disposition of any Proceeding, including any appeal therein. Nothing in this Section 8 shall limit Indemnitee’s right to advancement pursuant to Section 12(e) of this Agreement.

(a) To obtain indemnification under this Agreement, Indemnitee shall submit to the Company a written request therefor specifying the basis for the claim, the amounts for which Indemnitee is seeking payment under this Agreement, and all documentation related thereto as reasonably requested by the Company.

(b) In the event that the Company shall be obligated hereunder to provide indemnification for or make any advancement of Expenses with respect to any Proceeding, the Company shall be entitled to assume the defense of such Proceeding, or any claim, issue or matter therein, with counsel approved by Indemnitee (which approval shall not be unreasonably withheld or delayed) upon the delivery to Indemnitee of written notice of the Company’s election to do so. After delivery of such notice, approval of such counsel by Indemnitee and the retention of such counsel by the Company, the Company will not be liable to Indemnitee under this Agreement for any fees or expenses of separate counsel subsequently employed by or on behalf of Indemnitee with respect to the same Proceeding; provided that (i) Indemnitee shall have the right to employ separate counsel in any such Proceeding at Indemnitee’s expense and (ii) if (A) the employment of separate counsel by Indemnitee has been previously authorized by the Company, (B) Indemnitee shall have reasonably concluded that there may be a conflict of interest between the Company and Indemnitee in the conduct of such defense, or (C) the Company shall not continue to retain such counsel to defend such Proceeding, then the fees and expenses actually and reasonably incurred by Indemnitee with respect to his or her separate counsel shall be Expenses hereunder.

(c) In the event that the Company does not assume the defense in a Proceeding pursuant to paragraph (b) above, then the Company will be entitled to participate in the Proceeding at its own expense.

(d) The Company shall not be liable to indemnify Indemnitee under this Agreement for any amounts paid in settlement of any Proceeding effected without its prior written consent (which consent shall not be unreasonably withheld or delayed). The Company shall not, without the prior written consent of Indemnitee (which consent shall not be unreasonably withheld or delayed), enter into any settlement which (i) includes an admission of fault of Indemnitee, any non-monetary remedy imposed on Indemnitee or any monetary damages for which Indemnitee is not wholly and actually indemnified hereunder or (ii) with respect to any Proceeding with respect to which Indemnitee may be or is made a party or may be otherwise entitled to seek indemnification hereunder, does not include the full release of Indemnitee from all liability in respect of such Proceeding.

Section 10. Procedure Upon Application for Indemnification.

(a) Upon written request by Indemnitee for indemnification pursuant to Section 9(a), a determination, if such determination is required by applicable law, with respect to Indemnitee’s entitlement to indemnification hereunder shall be made in the specific case by one of the following methods: [(x) if a Change in Control shall have occurred and indemnification is

Bracketed portions for CEO Director version only
being requested by Indemnitee hereunder in his or her capacity as a director of the Company, by Independent Counsel in a written opinion to the Board; or (y) in any other case, (i) by a majority vote of the disinterested directors, even though less than a quorum; (ii) by a committee of disinterested directors designated by a majority vote of the disinterested directors, even though less than a quorum; or (iii) if there are no disinterested directors or if the disinterested directors so direct, by Independent Counsel in a written opinion to the Board. For purposes hereof, disinterested directors are those members of the Board who are not parties to the action, suit or proceeding in respect of which indemnification is sought. In the case that such determination is made by Independent Counsel, a copy of Independent Counsel’s written opinion shall be delivered to Indemnitee and, if it is so determined that Indemnitee is entitled to indemnification, payment to Indemnitee shall be made within thirty (30) days after such determination. Indemnitee shall cooperate with the Independent Counsel or the Company, as applicable, in making such determination with respect to Indemnitee’s entitlement to indemnification, including providing to such counsel or the Company, upon reasonable advance request, any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to Indemnitee and reasonably necessary to such determination. Any out-of-pocket costs or expenses (including reasonable attorneys’ fees and disbursements) actually and reasonably incurred by Indemnitee in so cooperating with the Independent Counsel or the Company shall be borne by the Company (irrespective of the determination as to Indemnitee’s entitlement to indemnification) and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(b) If the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 10(a), the Independent Counsel shall be selected by the Board; provided that, if a Change in Control shall have occurred and indemnification is being requested by Indemnitee hereunder in his or her capacity as a director of the Company, the Independent Counsel shall be selected by Indemnitee. Indemnitee [or the Company, as the case may be,) may, within ten (10) days after written notice of such selection, deliver to the Company [or Indemnitee, as the case may be,] a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of “Independent Counsel” as defined in Section 2 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If such written objection is so made and substantiated, the Independent Counsel so selected may not serve as Independent Counsel unless and until such objection is withdrawn or the Delaware Court has determined that such objection is without merit. If, within twenty (20) days after the later of (i) submission by Indemnitee of a written request for indemnification pursuant to Section 9(a), and (ii) the final disposition of the Proceeding, including any appeal therein, no Independent Counsel shall have been selected without objection, either Indemnitee or the Company may petition the Delaware Court for resolution of any objection which shall have been made by Indemnitee or the Company to the selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate. The person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 10(a) hereof. Upon the due commencement of any judicial proceeding or arbitration pursuant to Section 12(a) of this Agreement, Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing).

(a) To the extent permitted by applicable law, in making a determination with respect to entitlement to indemnification hereunder, it shall be presumed that Indemnitee is entitled to indemnification under this Agreement if Indemnitee has submitted a request for indemnification in accordance with Section 9(a) of this Agreement, and the Company shall have the burden of proof to overcome that presumption in connection with the making of any determination contrary to that presumption. Neither (i) the failure of the Company or of Independent Counsel to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor (ii) an actual determination by the Company or by Independent Counsel that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(b) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of guilty, nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which he or she reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his or her conduct was unlawful.

(c) The knowledge and/or actions, or failure to act, of any director, manager, partner, officer, employee, agent or trustee of the Company, any subsidiary of the Company, or any Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement.

Section 12. Remedies of Indemnitee.

(a) Subject to Section 12(f), in the event that (i) a determination is made pursuant to Section 10 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 8 of this Agreement, (iii) no determination of entitlement to indemnification shall have been made pursuant to Section 10(a) of this Agreement within sixty (60) days after receipt by the Company of the request for indemnification for which a determination is to be made other than by Independent Counsel, (iv) payment of indemnification or reimbursement of expenses is not made pursuant to Section 5 or 6 or the last sentence of Section 10(a) of this Agreement within thirty (30) days after receipt by the Company of a written request therefor (including any invoices received by Indemnitee, which such invoices may be redacted as necessary to avoid the waiver of any privilege accorded by applicable law) or (v) payment of indemnification pursuant to Section 3 or 4 of this Agreement is not made within thirty (30) days after a determination has been made that Indemnitee is entitled to indemnification, Indemnitee shall be entitled to an adjudication by the Delaware Court of his or her entitlement to such indemnification or advancement. Alternatively, Indemnitee, at his or her option, may seek an award in arbitration to
be conducted by a single arbitrator pursuant to the Commercial Arbitration Rules of the American Arbitration Association. Indemnitee shall commence such proceeding seeking an adjudication or an award in arbitration within 180 days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 12(a); provided, however, that the foregoing time limitation shall not apply in respect of a proceeding brought by Indemnitee to enforce his or her rights under Section 5 of this Agreement. The Company shall not oppose Indemnitee’s right to seek any such adjudication or award in arbitration.

(b) In the event that a determination shall have been made pursuant to Section 10(a) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding or arbitration commenced pursuant to this Section 12 shall be conducted in all respects as a de novo trial, or arbitration, on the merits and Indemnitee shall not be prejudiced by reason of that adverse determination. In any judicial proceeding or arbitration commenced pursuant to this Section 12, the Company shall have the burden of proving Indemnitee is not entitled to indemnification or advancement, as the case may be.

(c) If a determination shall have been made pursuant to Section 10(a) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding or arbitration commenced pursuant to this Section 12, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee’s statement not materially misleading, in connection with the request for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) The Company shall be precluded from asserting in any judicial proceeding or arbitration commenced pursuant to this Section 12 that the procedures and presumptions of this Agreement are not valid, binding and enforceable and shall stipulate in any such court or before any such arbitrator that the Company is bound by all the provisions of this Agreement.

(e) The Company shall indemnify Indemnitee to the fullest extent permitted by law against any and all Enforcement Expenses and, if requested by Indemnitee, shall (within thirty (30) days after receipt by the Company of a written request therefor) advance, to the extent not prohibited by law, such Enforcement Expenses to Indemnitee in connection with any action brought by Indemnitee for indemnification or advancement from the Company under this Agreement or under any directors’ and officers’ liability insurance policies maintained by the Company in the suit for which indemnification or advancement is being sought. Such written request for advancement shall include invoices received by Indemnitee in connection with such Enforcement Expenses but, in the case of invoices in connection with legal services, any references to legal work performed or to expenditures made that would cause Indemnitee to waive any privilege accorded by applicable law need not be included with the invoice.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding, including any appeal therein.
Section 13. Non-exclusivity; Survival of Rights; Insurance; Subrogation.

(a) The rights of indemnification and to receive advancement as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Charter, the Bylaws, any agreement, a vote of stockholders or a resolution of directors, or otherwise. No amendment, alteration or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his or her Corporate Status prior to such amendment, alteration or repeal. To the extent that a change in Delaware law, whether by statute or judicial decision, permits greater indemnification or advancement than would be afforded currently under the Charter, Bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, managers, partners, officers, employees, agents or trustees of the Company or of any other Enterprise, Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any such director, manager, partner, officer, employee, agent or trustee under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has director and officer liability insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) In the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

(d) The Company’s obligation to provide indemnification or advancement hereunder to Indemnitee who is or was serving at the request of the Company as a director, manager, partner, officer, employee, agent or trustee of any other Enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement from such other Enterprise.

Section 14. Duration of Agreement. This Agreement shall continue until and terminate upon the later of: (a) ten (10) years after the date that Indemnitee shall have ceased to serve as [both a director and] an officer of the Company or (b) one (1) year after the final termination of any Proceeding, including any appeal, then pending in respect of which Indemnitee is granted rights of indemnification or advancement hereunder and of any proceeding.
commenced by Indemnitee pursuant to Section 12 of this Agreement relating thereto. This Agreement shall be binding upon the Company and its successors and assigns and shall inure to the benefit of Indemnitee and his or her heirs, executors and administrators. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all, substantially all or a substantial part, of the business and/or assets of the Company, by written agreement in form and substance satisfactory to Indemnitee, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

Section 15. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (a) the validity, legality and enforceability of the remaining provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby and shall remain enforceable to the fullest extent permitted by law; (b) such provision or provisions shall be deemed reformed to the extent necessary to conform to applicable law and to give the maximum effect to the intent of the parties hereto; and (c) to the fullest extent possible, the provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested thereby.

Section 16. Enforcement. (a) The Company expressly confirms and agrees that it has entered into this Agreement and assumed the obligations imposed on it hereby in order to induce Indemnitee to serve or continue to serve as [a director and] an officer of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as [a director and] an officer of the Company.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof; provided, however, that this Agreement is a supplement to and in furtherance of the Charter, the Bylaws and applicable law, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder.

Section 17. Modification and Waiver. No supplement, modification or amendment, or waiver of any provision, of this Agreement shall be binding unless executed in writing by the parties thereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions of this Agreement nor shall any waiver constitute a continuing waiver. No supplement, modification or amendment of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee prior to such supplement, modification or amendment.
Section 18. Notice by Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification, reimbursement or advancement as provided hereunder. The failure of Indemnitee to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise.

Section 19. Notices. All notices, requests, demands and other communications under this Agreement shall be in writing and shall be deemed to have been duly given if (i) delivered by hand and receipted for by the party to whom said notice or other communication shall have been directed, (ii) mailed by certified or registered mail with postage prepaid, on the third business day after the date on which it is so mailed, (iii) mailed by reputable overnight courier and receipted for by the party to whom said notice or other communication shall have been directed or (iv) sent by facsimile transmission, with receipt of oral confirmation that such transmission has been received:

(a) If to Indemnitee, at such address as Indemnitee shall provide to the Company.

(b) If to the Company to:

Karuna Therapeutics, Inc.
33 Arch Street, Suite 3110
Boston, Massachusetts 02110
Attention: Chief Executive Officer

or to any other address as may have been furnished to Indemnitee by the Company.

Section 20. Contribution. To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement and/or for Expenses, in connection with any Proceeding in such proportion as is deemed fair and reasonable in light of all of the circumstances in order to reflect (i) the relative benefits received by the Company and Indemnitee in connection with the event(s) and/or transaction(s) giving rise to such Proceeding; and/or (ii) the relative fault of the Company (and its directors, officers, employees and agents) and Indemnitee in connection with such event(s) and/or transactions.

Section 21. Internal Revenue Code Section 409A. The Company intends for this Agreement to comply with the Indemnification exception under Section 1.409A-1(b)(10) of the regulations promulgated under the Internal Revenue Code of 1986, as amended (the “Code”), which provides that indemnification of, or the purchase of an insurance policy providing for payments of, all or part of the expenses incurred or damages paid or payable by Indemnitee with respect to a bona fide claim against Indemnitee or the Company do not provide for a deferral of compensation, subject to Section 409A of the Code, where such claim is based on actions or failures to act by Indemnitee in his or her capacity as a service provider of the Company. The parties intend that this Agreement be interpreted and construed with such intent.
Section 22. Applicable Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. Except with respect to any arbitration commenced by Indemnitee pursuant to Section 12(a) of this Agreement, the Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Delaware Court, and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) consent to service of process at the address set forth in Section 19 of this Agreement with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court, and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

Section 23. Headings. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

Section 24. Identical Counterparts. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement. Only one such counterpart signed by the party against whom enforceability is sought needs to be produced to evidence the existence of this Agreement.
IN WITNESS WHEREOF, the parties have caused this Agreement to be signed as of the day and year first above written.

KARUNA THERAPEUTICS, INC.

By: ________________________________
Name: ______________________________
Title: ______________________________

[Name of Indemnitee]
KARUNA THERAPEUTICS, INC.

SENIOR EXECUTIVE CASH INCENTIVE BONUS PLAN

1. Purpose

This Senior Executive Cash Incentive Bonus Plan (the “Incentive Plan”) is intended to provide an incentive for superior work and to motivate eligible executives of Karuna Therapeutics, Inc. (the “Company”) and its subsidiaries toward even higher achievement and business results, to tie their goals and interests to those of the Company and its stockholders and to enable the Company to attract and retain highly qualified executives. The Incentive Plan is for the benefit of Covered Executives (as defined below).

2. Covered Executives

From time to time, the Compensation Committee of the Board of Directors of the Company (the “Compensation Committee”) may select certain key executives (the “Covered Executives”) to be eligible to receive bonuses hereunder. Participation in this Plan does not change the “at will” nature of a Covered Executive’s employment with the Company.

3. Administration

The Compensation Committee shall have the sole discretion and authority to administer and interpret the Incentive Plan.

4. Bonus Determinations

(a) Corporate Performance Goals. A Covered Executive may receive a bonus payment under the Incentive Plan based upon the attainment of one or more performance objectives that are established by the Compensation Committee and relate to financial and operational metrics with respect to the Company or any of its subsidiaries (the “Corporate Performance Goals”), including the following: cash flow (including, but not limited to operating cash flow and free cash flow); revenue; corporate revenue; earnings before interest, taxes, depreciation and amortization; net income (loss) (either before or after interest, taxes, depreciation and/or amortization); changes in the market price of the Company’s common stock; economic value-added; development, clinical, regulatory or commercial milestones; acquisitions or strategic transactions; operating income (loss); return on capital, assets, equity, or investment; stockholder returns; return on sales; gross or net profit levels; productivity; expense efficiency; margins; operating efficiency; customer satisfaction; working capital; earnings (loss) per share of the Company’s common stock; bookings, new bookings or renewals; sales or market shares; number of customers; number of new customers or customer references; operating income and/or net annual recurring revenue, any of which may be (A) measured in absolute terms or compared to any incremental increase, (B) measured in terms of growth, (C) compared to another company or companies or to results of a peer group, (D) measured against the market as a whole and/or as compared to applicable market indices and/or (E) measured on a pre-tax or post-tax basis (if applicable). Further, any Corporate Performance Goals may be used to measure the performance of the Company as a whole or a business unit or other segment of the Company, or one or more product lines or specific markets. The Corporate Performance Goals may differ from Covered Executive to Covered Executive.
Calculation of Corporate Performance Goals. At the beginning of each applicable performance period, the Compensation Committee will determine whether any significant element(s) will be included in or excluded from the calculation of any Corporate Performance Goal with respect to any Covered Executive. In all other respects, Corporate Performance Goals will be calculated in accordance with the Company's financial statements, generally accepted accounting principles, or under a methodology established by the Compensation Committee at the beginning of the performance period and which is consistently applied with respect to a Corporate Performance Goal in the relevant performance period.

Target; Minimum; Maximum. Each Corporate Performance Goal shall have a "target" (100 percent attainment of the Corporate Performance Goal) and may also have a "minimum" hurdle and/or a "maximum" amount.

Bonus Requirements; Individual Goals. Except as otherwise set forth in this Section 4(d): (i) any bonuses paid to Covered Executives under the Incentive Plan shall be based upon objectively determinable bonus formulas that tie such bonuses to one or more performance targets relating to the Corporate Performance Goals, (ii) bonus formulas for Covered Executives shall be adopted in each performance period by the Compensation Committee and communicated to each Covered Executive at the beginning of each performance period and (iii) no bonuses shall be paid to Covered Executives unless and until the Compensation Committee makes a determination with respect to the attainment of the performance targets relating to the Corporate Performance Goals. Notwithstanding the foregoing, the Compensation Committee may adjust bonuses payable under the Incentive Plan based on achievement of one or more individual performance objectives or pay bonuses (including, without limitation, discretionary bonuses) to Covered Executives under the Incentive Plan based on individual performance goals and/or upon such other terms and conditions as the Compensation Committee may in its discretion determine.

Individual Target Bonuses. The Compensation Committee shall establish a target bonus opportunity for each Covered Executive for each performance period. For each Covered Executive, the Compensation Committee shall have the authority to apportion the target award so that a portion of the target award shall be tied to attainment of Corporate Performance Goals and a portion of the target award shall be tied to attainment of individual performance objectives.

Employment Requirement. Subject to any additional terms contained in a written agreement between the Covered Executive and the Company, the payment of a bonus to a Covered Executive with respect to a performance period shall be conditioned upon the Covered Executive’s employment by the Company on the bonus payment date. If a Covered Executive was not employed for an entire performance period, the Compensation Committee may pro rate the bonus based on the number of days employed during such period.
5. **Timing of Payment**

(a) With respect to Corporate Performance Goals established and measured on a basis more frequently than annually (e.g., quarterly or semi-annually), the Corporate Performance Goals will be measured at the end of each performance period after the Company’s financial reports with respect to such period(s) have been published. If the Corporate Performance Goals and/or individual goals for such period are met, payments will be made as soon as practicable following the end of such period, but not later than 74 days after the end of the fiscal year in which such performance period ends.

(b) With respect to Corporate Performance Goals established and measured on an annual or multi-year basis, Corporate Performance Goals will be measured as of the end of each such performance period (e.g., the end of each fiscal year) after the Company’s financial reports with respect to such period(s) have been published. If the Corporate Performance Goals and/or individual goals for any such period are met, bonus payments will be made as soon as practicable, but not later than 74 days after the end of the relevant fiscal year.

(c) For the avoidance of doubt, bonuses earned at any time in a fiscal year must be paid no later than 74 days after the last day of such fiscal year.

6. **Amendment and Termination**

The Company reserves the right to amend or terminate the Incentive Plan at any time in its sole discretion.
Consent of Independent Registered Public Accounting Firm

The Board of Directors
Karuna Therapeutics, Inc.:

We consent to the use of our report included herein and to the reference to our firm under the heading “Experts” in the prospectus.

/s/ KPMG

Cambridge, Massachusetts
May 31, 2019
CONSENT TO BE NAMED

I hereby confirm my consent to be named as a director of Karuna Therapeutics, Inc. (the “Company”), in the Registration Statement on Form S-1 filed by the Company with the Securities and Exchange Commission, including any and all amendments and post-effective amendments thereto and any amendments filed under Rule 462(b) (collectively, the “Registration Statement”). This consent may be filed as an exhibit to the Registration Statement.

DATED: May 21, 2019

/s/ James I. Healy
James I. Healy, M.D., Ph.D.
CONSENT TO BE NAMED

I hereby confirm my consent to be named as a director of Karuna Therapeutics, Inc. (the “Company”), in the Registration Statement on Form S-1 filed by the Company with the Securities and Exchange Commission, including any and all amendments and post-effective amendments thereto and any amendments filed under Rule 462(b) (collectively, the “Registration Statement”). This consent may be filed as an exhibit to the Registration Statement.

DATED: May 28, 2019

/s/ Atul Pande
Atul Pande, M.D.