

Use these links to rapidly review the document

[TABLE OF CONTENTS](#)

[Table of Contents](#)

As Filed with the Securities and Exchange Commission on June 12, 2018

Registration No. 333-225410

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

Amendment No. 1
to

FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

CATABASIS PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of incorporation or organization)

2834
(Primary Standard Industrial Classification Code Number)

26-3687168
(I.R.S. Employer Identification No.)

**One Kendall Square
Bldg. 1400E, Suite B14202
Cambridge, Massachusetts 02139
(617) 349-1971**

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

Jill C. Milne, Ph.D.
President and Chief Executive Officer
Catabasis Pharmaceuticals, Inc.
One Kendall Square
Bldg. 1400E, Suite B14202
Cambridge, Massachusetts 02139
(617) 349-1971

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

Copies to:

Rosemary G. Reilly, Esq.
WilmerHale
60 State Street
Boston, MA 02109
Telephone: (617) 526-6000
Fax: (617) 526-5000

John D. Hogoboom
Lowenstein Sandler LLP
1251 Avenue of the Americas
New York, NY 10020
Telephone: (212) 262-6700
Fax: (212) 262-7402

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, a 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
(Do not check if a
smaller reporting company)

Smaller reporting company
Emerging growth company

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Proposed Maximum Aggregate Offering Price(1)(2)	Amount of Registration Fee
Common Units, each Common Unit consisting of one share of common stock, par value \$0.001 per share, and one warrant to purchase one share of common stock	\$30,000,000(3)	\$3,735
(i) Common stock included in the Common Units(4)		
(ii) Warrants included in the Common Units(4)		
Pre-funded Units, each Pre-funded Unit consisting of one Pre-funded Warrant to purchase one share of common stock, and one Warrant to purchase one share of common stock	(3)	(3)
(i) Pre-funded Warrants included in the Pre-funded Units(4)		
(ii) Warrants included in the Pre-funded Units(4)		
Shares of common stock underlying Pre-funded Warrants included in the Pre-funded Units(4)	(3)	(3)
Shares of common stock underlying Warrants included in the Common Units and the Pre-funded Units(5)	\$36,000,000	\$4,482
Total	\$66,000,000	\$8,217(6)

- (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) Pursuant to Rule 416(a) under the Securities Act of 1933, as amended, this registration statement shall also cover an indeterminate number of shares that may be issued and resold resulting from stock splits, stock dividends or similar transactions.
- (3) The proposed maximum aggregate offering price of the Common Units proposed to be sold in the offering will be reduced on a dollar-for-dollar basis based on the offering price of any Pre-funded Units offered and sold in the offering, and the proposed maximum aggregate offering price of the Pre-funded Units to be sold in the offering will be reduced on a dollar-for-dollar basis based on the offering price of any Common Units sold in the offering. Accordingly, the proposed maximum aggregate offering price of the Common Units and Pre-funded Units (including the common stock issuable upon exercise of the Pre-funded Warrants included in the Pre-funded Units), if any, is \$30,000,000.
- (4) Filing fee included with the Common Units or Pre-funded Units, as applicable.
- (5) Pursuant to Staff Compliance and Disclosure Interpretation 240.06, equals the aggregate exercise price of the Warrants.
- (6) The Registrant previously paid a registration fee of \$3,735 in connection with the initial filing of this registration statement. Accordingly, the registrant has paid an additional registration fee of \$4,482 in connection with the filing of this Amendment No. 1.

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.

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 offers to buy these securities in any state or other jurisdiction where the offer or sale is not permitted.

**SUBJECT TO COMPLETION, DATED JUNE 12, 2018
PRELIMINARY PROSPECTUS**



Catabasis Pharmaceuticals, Inc.

**20,270,270 Common Units, Each Consisting of One Share of Common Stock
and a Warrant to Purchase One Share of Common Stock**

**20,270,270 Pre-funded Units, Each Consisting of a Pre-funded Warrant to
Purchase One Share of Common Stock and a Warrant to Purchase
One Share of Common Stock**

We are offering 20,270,270 common units (each a "Common Unit"), each Common Unit consisting of one share of our common stock and a warrant to purchase one share of our common stock at an exercise price per share of common stock equal to 120% of the public offering price per Common Unit (each a "Warrant"). Each Warrant will be exercisable immediately and will expire five years from the date of issuance.

We are also offering to those purchasers, if any, whose purchase of Common Units in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock immediately following the consummation of this offering, the opportunity to purchase, if the purchaser so chooses, pre-funded units (each a "Pre-funded Unit") in lieu of Common Units that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock. We are offering a maximum of 20,270,270 Pre-funded Units. Each Pre-funded Unit will consist of a pre-funded warrant to purchase one share of our common stock at an exercise price of \$0.01 per share (each a "Pre-funded Warrant") and a Warrant. The purchase price of each Pre-funded Unit is equal to the price per Common Unit being sold to the public in this offering, minus \$0.01. The Pre-funded Warrants will be immediately exercisable and may be exercised at any time until all of the Pre-funded Warrants are exercised in full.

We are also offering the shares of common stock that are issuable from time to time upon exercise of the Warrants and Pre-funded Warrants being offered by this prospectus.

For each Pre-funded Unit we sell, the number of Common Units we are offering will be decreased on a one-for-one basis. Common Units and Pre-funded Units will not be issued or certificated. The shares of common stock or Pre-funded Warrants, as the case may be, and the Warrants included in the Common Units or the Pre-funded Units, can only be purchased together in this offering, but the securities contained in the Common Units or Pre-funded Units will be issued separately and will be immediately separable upon issuance.

There is no established public trading market for the Warrants or the Pre-funded Warrants, and we do not expect a market to develop. We do not intend to apply for listing of the Warrants or the Pre-funded Warrants on any securities exchange or other nationally recognized trading system. Without an active trading market, the liquidity of the Warrants or the Pre-funded Warrants will be limited.

Our common stock is listed on the Nasdaq Global Market under the symbol "CATB." On June 8, 2018, the last reported sale price of our common stock on the Nasdaq Global Market was \$1.48 per share. The public offering price per Common Unit or Pre-funded Unit, as the case may be, will be determined between us, the underwriters and investors based on market conditions at the time of pricing, and may be at a discount to the current market price of our common stock. Therefore, the recent market price used throughout this prospectus may not be indicative of the final offering price.

We are an "emerging growth company" under applicable Securities and Exchange Commission rules and are subject to reduced public company disclosure requirements. See "Summary – Implications of Being an Emerging Growth Company."

You should read this prospectus, together with additional information described under the headings "Incorporation of Certain Documents by Reference" and "Where You Can Find More Information," carefully before you invest in any of our securities.

Investing in our securities involves risks. See "Risk Factors" beginning on page 12 of this prospectus and in our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which is incorporated herein by reference.

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

	<u>Per Common Unit</u>	<u>Per Pre-funded Unit</u>	<u>Total</u>
Price to the public	\$	\$	\$
Underwriting discount and commissions(1)	\$	\$	\$
Proceeds to us (before expenses)	\$	\$	\$

(1) We refer you to "Underwriting" beginning on page 41 for additional information regarding the compensation payable to the underwriters.

Delivery of the securities offered hereby is expected to be made on or about _____, 2018.

Oppenheimer & Co.

TABLE OF CONTENTS

ABOUT THIS PROSPECTUS	1
PROSPECTUS SUMMARY	2
THE OFFERING	9
RISK FACTORS	12
CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS	17
USE OF PROCEEDS	19
DIVIDEND POLICY	20
DILUTION	21
PRICE RANGE OF OUR COMMON STOCK	23
DESCRIPTION OF CAPITAL STOCK	24
DESCRIPTION OF SECURITIES WE ARE OFFERING	29
MATERIAL U.S. FEDERAL TAX CONSIDERATIONS FOR HOLDERS OF OUR COMMON STOCK, PRE-FUNDED WARRANTS AND WARRANTS	33
UNDERWRITING	41
LEGAL MATTERS	48
EXPERTS	48
WHERE YOU CAN FIND MORE INFORMATION	48
INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE	48

ABOUT THIS PROSPECTUS

We have not, and the underwriters have not, authorized anyone to provide you with information that is different from that contained in this prospectus or in any free writing prospectus we may authorize to be delivered or made available to you. When you make a decision about whether to invest in our securities, you should not rely upon any information other than the information contained in or incorporated by reference in this prospectus or in any free writing prospectus that we may authorize to be delivered or made available to you. Neither the delivery of this prospectus nor the sale of our securities means that the information contained in this prospectus or any free writing prospectus is correct after the date of this prospectus or such free writing prospectus. This prospectus is not an offer to sell or the solicitation of an offer to buy our securities in any circumstances under which the offer or solicitation is unlawful.

For investors outside the United States: we have not, and the underwriters have not, taken any action 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 securities covered hereby and the distribution of this prospectus outside the United States.

Unless otherwise indicated, information contained in this prospectus concerning our industry and the markets in which we operate, including our general expectations and market position, market opportunity and market share, is based on information from our own management estimates and research, as well as from industry and general publications and research, surveys and studies conducted by third parties. Management estimates are derived from publicly available information, our knowledge of our industry and assumptions based on such information and knowledge, which we believe to be reasonable. Our management estimates have not been verified by any independent source, and we have not independently verified any third-party information. In addition, assumptions and estimates of our and our industry's future performance are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in "Risk Factors" beginning on page 12 of this prospectus and included under the section entitled "Risk Factors" in our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which is incorporated by reference herein. These and other factors could cause our future performance to differ materially from our assumptions and estimates. See "Cautionary Note Regarding Forward-Looking Statements."

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to the registration statement of which this prospectus is a part were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

We have proprietary rights to trademarks used in this prospectus, including MoveDMD®. Solely for our convenience, trademarks and trade names referred to in this prospectus may appear without the "®" or "™" symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent possible under applicable law, our rights or the rights to these trademarks and trade names. We do not intend our use or display of other companies' trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Each trademark, trade name, or service mark of any other company appearing in this prospectus is the property of its respective holder.

PROSPECTUS SUMMARY

This summary highlights information contained in other parts of this prospectus or incorporated by reference into this prospectus from our Annual Report on Form 10-K for the year ended December 31, 2017, our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, our definitive proxy statement on Schedule 14A filed with the Securities and Exchange Commission, or the SEC, on April 26, 2018 and our other filings with the SEC listed in the section of the prospectus entitled "Incorporation of Certain Documents by Reference." Because it is only a summary, it does not contain all of the information that you should consider before investing in our securities and it is qualified in its entirety by, and should be read in conjunction with, the more detailed information appearing elsewhere or incorporated by reference in this prospectus. You should read the entire prospectus, the registration statement of which this prospectus is a part, and the information incorporated by reference herein in their entirety before investing in our securities, including the "Risk Factors" section beginning on page 12 of this prospectus and the information in our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which include our financial statements and the related notes. Except as otherwise indicated herein or as the context otherwise requires, references in this prospectus to "Catabasis," "the company," "we," "us" and "our" refer to Catabasis Pharmaceuticals, Inc. and its consolidated subsidiary.

Overview

We are a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel therapeutics based on our proprietary Safely Metabolized And Rationally Targeted linker, or SMART LinkerSM, drug discovery platform. Our SMART Linker drug discovery platform enables us to engineer product candidates that can simultaneously modulate multiple targets in a disease. Our proprietary product candidates impact pathways that are central to diseases where efficacy may be optimized by a multiple target approach. We have applied our SMART Linker drug discovery platform to build an internal pipeline of product candidates for rare diseases, including our primary focus, edasalonexent, in development for the treatment of Duchenne muscular dystrophy, or DMD.

Our lead product candidate is edasalonexent, formerly known as CAT-1004, which we believe has the potential to be a disease-modifying therapy for all patients affected by DMD, regardless of the underlying dystrophin mutation. Edasalonexent is an oral small molecule that inhibits NF- κ B, or nuclear factor kappa-light-chain-enhancer of activated B cells. DMD is an ultimately fatal genetic disorder involving progressive muscle degeneration. The United States Food and Drug Administration, or FDA, has granted orphan drug, fast track and rare pediatric disease designations to edasalonexent for the treatment of DMD. The European Commission, or EC, has granted orphan medicinal product designation to edasalonexent for the treatment of DMD.

Our MoveDMD[®] Phase 1/2 trial enrolled ambulatory boys four to seven years old with a genetically confirmed diagnosis of DMD who were steroid naive or had not used steroids for at least six months prior to the trial. Boys enrolled in the trial were not limited to any specific dystrophin mutations and the 31 boys in the trial had 26 different dystrophin mutations. The MoveDMD trial was designed to be conducted in three sequential parts, Phase 1, Phase 2, and an open-label extension, which is on-going. We have completed key efficacy and safety assessments from the MoveDMD trial and have observed substantial slowing of DMD disease progression as supported by functional assessments, magnetic resonance imaging, or MRI, results and biomarker results with edasalonexent treatment.

In the open-label extension of the MoveDMD trial after more than a year of oral 100 mg/kg/day edasalonexent treatment, we observed preserved muscle function and consistent improvements in all

four assessments of muscle function compared to the rates of change in the control period for boys prior to receiving edasalonexent treatment. Additionally, changes in non-effort based measures of muscle health were seen, supporting the durability of edasalonexent treatment effects. Specifically, we observed statistically significant improvement in the rate of change in lower leg composite magnetic resonance imaging T2 through 12, 24, 36 and 48 weeks on oral 100 mg/kg of edasalonexent treatment compared to the off-treatment control period. The relative proportion of fat in muscle, which is referred to as fat fraction and is correlated with functional ability, can also be determined by magnetic resonance spectroscopy, or MRS. Improvements in the MRS fat fraction rate of change through 48 weeks of edasalonexent treatment compared to the off-treatment control period were observed in both soleus and vastus lateralis leg muscles, which are strongly correlated with ambulatory function. Through more than one year of treatment, edasalonexent continued to be well tolerated with no safety signals observed in the trial. We plan to initiate a global Phase 3 clinical trial for the treatment of DMD to evaluate the efficacy and safety of edasalonexent for registration purposes, dependent on raising capital.

We are also evaluating other diseases where the inhibition of NF- κ B may be beneficial for further therapeutic applications of edasalonexent, such as Becker muscular dystrophy, or BMD. Patients with BMD express low levels of dystrophin due to mutations in the dystrophin gene. Dystrophin production is reduced through the NF- κ B-mediated induction of microRNAs that inhibit dystrophin translation. Inhibition of NF- κ B in BMD directly enhances dystrophin production.

In addition to edasalonexent, we have developed additional product candidates using our SMART Linker drug discovery platform as potential treatments for rare diseases, including CAT-5571, a potential treatment for cystic fibrosis, or CF. CAT-5571 is a small molecule that is designed to activate autophagy, a mechanism for recycling cellular components and digesting pathogens, which is important for host defenses and is depressed in CF. We have completed investigational new drug, or IND, application-enabling activities for CAT-5571.

As of April 30, 2018, we owned six issued U.S. patents with composition of matter and method of use claims directed to edasalonexent and four issued U.S. patents with composition of matter and method of use claims directed to CAT-5571. These patents are expected to expire between 2029 and 2030, without taking into account potential patent term extensions. In addition, our patent portfolio includes over 70 issued foreign patents, seven pending U.S. patent applications and 20 pending foreign patent applications. This patent portfolio does not include a number of patents and patent applications related to the development of certain product candidates other than those directed to edasalonexent and CAT-5571, because we have elected to abandon those patents or patent applications as part of our recent restructuring in April 2018.

For additional information regarding our business, see the sections entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and the related notes thereto included in our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, as well as the section entitled "Business" included in our Annual Report on Form 10-K for the year ended December 31, 2017, each of which is incorporated by reference into this prospectus.

Our Product Candidates

The following chart summarizes key information regarding our product candidates. We hold rights to all of our product candidates throughout the world.

Product Candidate (Pathway)	Discovery	Preclin	Phase 1	Phase 2	Phase 3
Edasalonexent CAT-1004 (NF-κB)	Duchenne muscular dystrophy (4-7 yo)				<ul style="list-style-type: none"> Phase 2 complete Preparing for Phase 3
Edasalonexent CAT-1004 (NF-κB)	Non-Ambulatory DMD			<ul style="list-style-type: none"> Designing Phase 2 	
Edasalonexent CAT-1004 (NF-κB)	Becker Muscular Dystrophy			<ul style="list-style-type: none"> Exploring potential in BMD 	
CAT-5571 (Autophagy)	Cystic fibrosis		<ul style="list-style-type: none"> IND-enabled 		

Edasalonexent

Edasalonexent is a SMART Linker conjugate of salicylic acid and the omega-3 fatty acid docosahexaenoic acid, or DHA, a naturally occurring unsaturated fatty acid with anti-inflammatory properties. We designed edasalonexent to inhibit NF-κB, a protein that is activated in DMD and that drives inflammation, fibrosis and muscle degeneration, and suppresses muscle regeneration. We have reported results from Phase 1, Phase 2 and the open-label extension of the MoveDMD trial through administration of edasalonexent for up to 60 weeks, as described further below under " – Edasalonexent Clinical Development." The FDA has granted edasalonexent orphan drug, fast track and rare pediatric disease designations for the treatment of DMD. The EC has granted orphan medicinal product designation to edasalonexent for the treatment of DMD.

Edasalonexent Clinical Development

MoveDMD Phase 1/2 Trial of Edasalonexent in Patients with DMD

Our MoveDMD Phase 1/2 trial enrolled ambulatory boys ages four to seven with a genetically confirmed diagnosis of DMD, regardless of mutation, who were steroid naive or had not used steroids for at least six months prior to the trial. The MoveDMD trial was designed to be conducted in three sequential parts, Phase 1, Phase 2, and an open-label extension, which is on-going. We have completed key efficacy and safety assessments from the MoveDMD trial and have observed substantial slowing of DMD disease progression as supported by functional assessments, MRI results and biomarker results with edasalonexent treatment. Edasalonexent has been well tolerated with no clinical safety signals.

We have evaluated the data collected in the MoveDMD trial against two benchmarks. Our MoveDMD trial design pre-specified an assessment of the rate of change of muscle function and magnetic resonance, or MR, for boys participating in the MoveDMD trial during off-treatment periods prior to the Phase 2 portion of the trial, which averaged more than 6 months. We also compared the

MoveDMD trial data to an ImagingDMD natural history study in which muscle function and MR were assessed annually. We observed a decline in muscle function in boys in the MoveDMD trial during the off-treatment control period consistent with the ImagingDMD natural history study observations of muscle function for boys not receiving corticosteroids in this age range. We believe the ImagingDMD data provide important corroboration of the MoveDMD off-treatment control period observations of muscle function.

Changes in MRI measures, particularly the relative proportion of fat in muscle, which is referred to as fat fraction, have been correlated in natural history studies with longer-term changes in clinically meaningful measures of functional activity. Histological changes in muscle in DMD include inflammation present from an early age, and, as boys with DMD get older, the amount of fat in their muscles increases with consequent loss of functional abilities. While MRI T2 measures both inflammation and fat, MRI T2 increases over time in DMD largely reflect fat infiltration and are strongly correlated with worse performance on timed function tests and predict future loss of functional abilities. MRS measures fat fraction and is strongly correlated with MRI T2, and is similarly correlated with worse performance on timed function tests and predict future loss of functional abilities. We observed an increase in MRI T2 and an increase in MRS fat fraction in boys in the MoveDMD trial during the off-treatment control period. In addition, in the ImagingDMD natural history study, where more than three quarters of the boys with MR measurements were receiving corticosteroids, the MRI T2 and MRS fat fraction increased year after year.

In April 2018, we reported data showing significantly slowed DMD disease progression as measured by MR through 48 weeks of treatment. We reported statistically significant improvement in the rate of change in lower leg composite MRI T2 through 12, 24, 36 and 48 weeks on oral 100 mg/kg of edasalonexent treatment compared to the off-treatment control period ($p < 0.05$ for all time points²). The rate of increase in MRS fat fraction in the soleus and vastus lateralis muscles with edasalonexent treatment in the MoveDMD trial were numerically less through 48 weeks compared to the rate of increase in boys prior to treatment. MRI T2 and MRS fat fraction rates of change in boys in the MoveDMD trial were less than those observed in the ImagingDMD natural history study. In recent guidance on DMD development, the FDA stated that it considers MRI measures to be important supportive early endpoints demonstrating therapeutic effect.

Consistent with the edasalonexent MR data, in February 2018, we reported a preservation of muscle function and slowing of DMD disease progression in the Phase 2 MoveDMD trial and open-label extension in boys treated with edasalonexent compared to the rates of change during the control period prior to receiving edasalonexent. Through a year of treatment, the 100 mg/kg/day treatment group showed consistent and clinically meaningful improvements in rates of decline compared to rates of change during the control period across all four assessments of muscle function in the trial: the three timed function tests (10-meter walk/run, 4-stair climb and time to stand), as well as the North Star Ambulatory Assessment, an integrated global assessment of muscle function. In recent guidance on DMD development, the FDA identified these four assessments of muscle function as age-appropriate tests for assessing DMD disease progression in young boys.

Additional supportive measures of muscle health also reinforce the positive edasalonexent treatment effects observed in the 100 mg/kg/day treatment group. All four muscle enzymes tested (creatine kinase, alanine aminotransferase, aspartate aminotransferase and lactate dehydrogenase) were significantly decreased compared to baseline following edasalonexent treatment at 12 weeks and later time points through 60 weeks ($p < 0.05$), consistent with the observations that edasalonexent slowed muscle degeneration and improve muscle integrity. Biomarker results showed that C-reactive protein, or CRP,

¹ P-value is a conventional statistical method for measuring the statistical significance of clinical results. A p-value of 0.05 or less represents statistical significance, meaning that there is a 1-in-20 or less statistical probability that the observed results occurred by chance.

was significantly decreased with edasalonexent at 12, 24, 36 and 48 weeks compared to baseline in the 100 mg/kg/day treatment group ($p < 0.001$). CRP is a well-characterized blood test marker that provides a global assessment of inflammation and is elevated in boys affected by DMD. The significant decrease observed in CRP supports a conclusion that the biological activity of edasalonexent in inhibiting NF- κ B can decrease inflammation.

In addition, to provide a preclinical understanding of a potential future clinical dosing regimen, we developed a population pharmacokinetic model using data from multiple clinical trials. We observed in the MoveDMD Phase 1 data that edasalonexent produces dose-related reductions in NF- κ B regulated and inflammation-related gene transcripts that are driven by C_{trough} , which is the lowest concentration of drug substance prior to receiving the next dose. In preclinical models, we observed that C_{trough} is a driver of efficacy. Our pharmacokinetic/pharmacodynamic profiles and population pharmacokinetic modeling suggest that dosing frequency to maximize time over a certain threshold drug concentration, rather than maximum concentration or drug total exposure, primarily drives pharmacologic effect.

Edasalonexent has been well tolerated in the MoveDMD trial with no clinical safety signals observed to date. The majority of adverse events, or AEs, have been mild in nature with no serious AEs, no drug discontinuations and no dose reductions. Height, weight and BMI growth patterns were similar to standard growth curves for unaffected boys in the age range of the boys participating in the MoveDMD trial, unlike the adverse treatment effects on these growth patterns with the current standard of care in DMD, corticosteroids. Additionally, boys with DMD in this age range typically have resting tachycardia, a heart rate that exceeds the normal resting rate, and the heart rate of the boys treated with edasalonexent decreased toward age-normative values during treatment through the last measurements taken at 48 weeks.

Planned Phase 3 Clinical Trial

We plan to initiate a single global Phase 3 clinical trial for the treatment of DMD in 2018 with top-line results expected in the second quarter of 2020, assuming the completion of this offering. The purpose of the trial is to evaluate the efficacy and safety of edasalonexent for registration purposes. The design of this randomized, double-blind, placebo-controlled trial has been informed by discussions with the FDA and the European Medicines Agency. We expect that the Phase 3 clinical trial will have many key elements in common with the Phase 2 trial, including the patient population and endpoints. We anticipate enrolling approximately 125 boys, four to seven years old, who have not been on steroids for at least 6 months. We may consider enrolling boys on a stable dose of EXONDYS 51, one of two therapies approved by the FDA for the treatment of DMD, dependent on final trial design.

Overview of DMD

DMD is a rare pediatric disorder involving progressive muscle degeneration that eventually leads to death. DMD is caused by various mutations in the dystrophin gene that result in a lack of functional dystrophin in muscle fibers, which renders muscle fibers more susceptible to mechanical stress. Dystrophin is a protein that resides in the membrane of muscle cells and is critical to the structural and membrane stability of muscle fibers in skeletal, diaphragm, and cardiac muscle. When muscles contract or stretch during normal use, the absence of normally functioning dystrophin results in activation of the NF- κ B pathway, triggering inflammation in the muscles, initiating muscle degeneration, and reducing the ability of muscles to regenerate. As muscle damage progresses, connective and adipose tissues replace muscle fibers, resulting in inexorable muscle weakness.

DMD is the most common fatal genetic childhood disease and it occurs almost exclusively in males, occurring in approximately 1 in 3,500 live male births. Based on this incidence rate, we estimate that

DMD affects a total of approximately 15,000 patients in the United States and approximately 19,000 patients in the European Union.

Children with DMD typically begin to show symptoms of disease between ages two and five, when they develop a waddling gait, frequently fall and have difficulty rising from the floor. Progressive weakness then develops in the muscles in the arms, legs and trunk. This muscle weakness is accompanied by fixations, or contractures, of joints, such as knees, hips and elbows. By age eight, most patients have difficulty ascending stairs. Patients typically lose walking ability between the ages of ten and fourteen and, by about twelve years of age, most people with DMD are unable to walk and need to use a wheelchair on a regular basis. Patients' cardiac and respiratory muscles are also adversely affected, typically requiring use of ventilators in their late teens. Progressive weakening of cardiac and respiratory muscles of DMD patients eventually results in death, generally in the patient's mid-twenties.

CAT-5571

CAT-5571 is a SMART Linker conjugate that contains cysteamine, a naturally occurring molecule that is a degradation product of the amino acid cysteine, and DHA. We have developed CAT-5571 as a potential oral treatment for CF, designed to activate autophagy and thereby restore host defense. Autophagy is a mechanism for recycling cellular components and digesting pathogens, which is depressed in CF. CAT-5571 has been shown to restore autophagy, reestablish host defense and enhance the clearance of pathogens, including *P. aeruginosa* and *B. cenocepacia* in preclinical models of CF. We have completed IND-enabling activities for CAT-5571.

CF is a rare, chronic, genetic, life-shortening orphan disease that affects over 70,000 patients worldwide, predominantly in the Caucasian population. In CF, a malfunctioning cystic fibrosis transmembrane conductance regulator ion channel impairs chloride secretion, with deleterious effects on multiple organs, and particularly devastating effects on pulmonary, intestinal and pancreatic function. Patients affected with CF are also predisposed to respiratory failure caused by persistent lung infections, notably bacteria and most commonly *P. aeruginosa*, that are difficult to treat with standard antibiotics. CF patients have frequent pulmonary exacerbations due to their inability to clear the persistent lung infections. Advancement in research and treatments have extended the life expectancy for those living with CF, however, there is currently no cure.

Our Corporate Information

We were incorporated under the laws of the State of Delaware on June 26, 2008 under the name Catabasis Pharmaceuticals, Inc. Our executive offices are located at One Kendall Square, Bldg. 1400E, Suite B14202, Cambridge, Massachusetts 02139, and our telephone number is (617) 349-1971. Our website address is www.catabasis.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

We qualify as an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and we may remain an emerging growth company until the end of our 2020 fiscal year. However, if certain events occur prior to the end of such period, including if we become a "large accelerated filer," our annual gross revenue exceeds \$1.07 billion, or we issue more than \$1.0 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such period. For so long as we remain an emerging growth company, we are permitted and intend 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:

- reduced disclosure about our executive compensation arrangements;
- exemption from holding non-binding advisory votes on executive compensation, including golden parachute arrangements; and
- exemption from the auditor attestation requirement in the assessment of our internal controls over financial reporting.

Accordingly, the information contained in this prospectus, and the information incorporated herein by reference, may be different than the information you receive from other public companies in which you hold stock. However, we have irrevocably elected not to avail ourselves of the extended transition period for complying with new or revised accounting standards, and, therefore, we are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

THE OFFERING

Common Units offered

We are offering 20,270,270 Common Units in this offering, assuming a public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market. Each Common Unit will consist of one share of our common stock and a warrant to purchase one share of our common stock at an exercise price per share equal to 120% of the public offering price per Common Unit (each a "Warrant").

Pre-funded Units offered

We are also offering to those purchasers, if any, whose purchase of Common Units in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock immediately following the consummation of this offering, the opportunity to purchase, if the purchaser so chooses, pre-funded units (each a "Pre-funded Unit") in lieu of Common Units that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock. Each Pre-funded Unit will consist of a pre-funded warrant to purchase one share of our common stock at an exercise price of \$0.01 per share (each a "Pre-funded Warrant") and a Warrant. The purchase price of each Pre-funded Unit is equal to the price per Common Unit being sold to the public in this offering, minus \$0.01. The Pre-funded Warrants will be immediately exercisable and may be exercised at any time until all of the Pre-funded Warrants are exercised in full. For each Pre-funded Unit we sell, the number of Common Units we are offering will be decreased on a one-for-one basis. We are offering a maximum of 20,270,270 Pre-funded Units. Because we will issue one Warrant as part of each Common Unit or Pre-funded Unit, the number of Warrants sold in this offering will not change as a result of a change in the mix of the Common Units and Pre-funded Units sold. This prospectus also relates to the offering of the shares of our common stock issuable upon exercise of the Pre-funded Warrants.

Warrants offered	Each Warrant included in the Common Units will have an exercise price per share of common stock equal to 120% of the public offering price per Common Unit, will be immediately exercisable and will be exercisable for five years from the date of issuance. This prospectus also relates to the offering of the shares of our common stock issuable upon exercise of the Warrants.
Common stock to be outstanding immediately following this offering	49,308,689 shares assuming we sell only Common Units in this offering at an assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018 as reported on the Nasdaq Global Market and assuming no exercise of the Warrants being offered in this offering.
Use of proceeds	We plan to use the net proceeds from this offering to fund our planned Phase 3 clinical trial of edasalonexent for the treatment of Duchenne muscular dystrophy, as well as for working capital and general corporate purposes. Based on our planned use of the net proceeds from this offering and our existing cash and cash equivalents, we estimate that such funds will be sufficient to enable us to obtain top-line data from our planned Phase 3 clinical trial of edasalonexent, and fund our operating expenses, debt service and capital expenditure requirements at least into the second quarter of 2020. 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 beginning on page 12 hereof and the "Risk Factors" section included in our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which is incorporated by reference, for a discussion of factors to consider carefully before deciding to invest in our securities.

Nasdaq Global Market symbol

Our common stock is listed on the Nasdaq Global Market under the symbol "CATB". There is no established public trading market for the Warrants or the Pre-funded Warrants, and we do not expect a market to develop. We do not intend to apply for listing of the Warrants or the Pre-funded Warrants on any securities exchange or other nationally recognized trading system. Without an active trading market, the liquidity of the Warrants or the Pre-funded Warrants will be limited.

The number of shares of our common stock to be outstanding after this offering is based on 29,035,502 shares of our common stock outstanding as of April 30, 2018.

The number of shares of our common stock to be outstanding after this offering excludes:

- 3,660,951 shares of our common stock issuable upon the exercise of stock options outstanding as of April 30, 2018 at a weighted-average exercise price of \$3.76 per share;
- 954,642 shares of our common stock available for future issuance as of April 30, 2018 under our 2015 stock incentive plan;
- 24,566 shares of our common stock issuable upon the exercise of warrants outstanding as of April 30, 2018, at an exercise price of \$12.2114 per share; and
- 760,111 shares of our common stock available for future issuance as of April 30, 2018 under our 2015 employee stock purchase plan.

Unless otherwise indicated, all information in this prospectus assumes:

- no exercise of the outstanding options or warrants described in the bullets above; and
- no sale of Pre-funded Units in this offering and no exercise of the Warrants being offered in this offering.

RISK FACTORS

Investing in our securities involves a high degree of risk. Before you decide to invest in our securities, you should consider carefully the risks described below and the risks discussed under the section entitled "Risk Factors" in our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which is incorporated by reference herein, together with the other information contained in this prospectus and the information incorporated by reference herein and in any free writing prospectus that we may authorize for use in connection with this offering. We believe the risks described below and incorporated by reference herein are the risks that are material to us as of the date of this prospectus. If any of these risks actually occur, our business, financial condition, results of operations and future 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 Additional Capital

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

Developing pharmaceutical products, including conducting preclinical studies and clinical trials, is a very time-consuming, expensive and uncertain process that takes years to complete. We expect our expenses to increase, if and to the extent of certain ongoing activities, particularly if we initiate new clinical trials of our product candidates, such as our planned Phase 3 clinical trial of edasalonexent for the treatment of Duchenne muscular dystrophy, or DMD, or initiate new research and preclinical development efforts for and seek marketing approval for, our product candidates. In addition, if we obtain marketing approval for any of our product candidates, we may incur significant commercialization expenses related to product sales, marketing, manufacturing and distribution to the extent that such sales, marketing, manufacturing and distribution are not the responsibility of a future collaborator. Furthermore, we have incurred and will continue to incur significant additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we may be forced to delay, reduce or eliminate our research and development programs or any future commercialization efforts. For example, we have recently elected to abandon certain patents related to development of certain product candidates, other than those directed to edasalonexent and CAT-5571.

We will be required to expend significant funds in order to advance the development of edasalonexent. Even if this offering is successful, we will not have sufficient funding to complete clinical development or commercialization of edasalonexent. Accordingly, we will need to raise additional funding and such funding may not be available to us on acceptable terms, on a timely basis or at all. In the event that we are unable to obtain such funding on acceptable terms and in a timely manner or at all, we may not be able to complete the clinical development or commercialization of edasalonexent.

Further, our ability to obtain additional debt financing may be limited by covenants we have made under our loan and security agreement, with MidCap Financial Trust, or MidCap, Flexpoint MCLS SPV LLC, or Flexpoint, and Square 1 Bank, or Square 1, including our negative pledge with respect to intellectual property in favor of Flexpoint and Square 1, as well as our pledge to MidCap, Flexpoint and Square 1 of substantially all of our assets, other than our intellectual property, as collateral. Our failure to raise capital on acceptable terms as and when needed would have a material adverse effect on our business, results of operations, financial condition and ability to pursue our business strategy.

We believe that the anticipated net proceeds from this offering, together with our existing cash, will enable us to obtain top-line data from our planned Phase 3 clinical trial of edasalonexent for the treatment of DMD and fund operations into the second quarter of 2020. Without giving effect to the anticipated net proceeds from this offering, we expect that our existing cash will be sufficient to fund operations through December 2018. Based on our available cash resources, we do not have sufficient cash on hand to support current operations for at least the next twelve months from the date of filing our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018. This condition raises substantial doubt about our ability to continue as a going concern.

Our estimate as to how long we expect our cash and cash equivalents to be able to fund our operations is based on assumptions that 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. Changes in estimates and assumptions underlying our operating plan could impact our ability to continue as a going concern for a period of one year from the date of issuance of the financial statements contained in the registration statement of which this prospectus is a part. We believe that the impact of these changes would be mitigated by our ability to significantly delay or reduce certain direct program expenditures. Our future funding requirements, both short-term and long-term, will depend on many factors, including:

- the progress, timing, costs and results of clinical trials of, and research and preclinical development efforts for, our product candidates and potential product candidates, including current and future clinical trials;
- our ability to enter into and the terms and timing of any additional collaborations, licensing or other arrangements that we may establish;
- the number and characteristics of future product candidates that we pursue and their development requirements;
- the outcome, timing and costs of seeking regulatory approvals;
- the costs of commercialization activities for any of our product candidates that receive marketing 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 marketing approval, revenue, if any, received from commercial sales of our product candidates;
- 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 and defending against intellectual property related claims; and
- the costs of operating as a public company.

Our independent registered public accounting firm has included an explanatory paragraph relating to our ability to continue as a going concern in its report on our audited financial statements included in this prospectus.

The report from our independent registered public accounting firm for the year ended December 31, 2017 includes an explanatory paragraph stating that our recurring losses from operations since inception and required additional funding to finance our operations raise substantial doubt about our

ability to continue as a going concern. If we are unable to obtain sufficient funding, our business, prospects, financial condition and results of operations will be materially and adversely affected, and we may be unable to continue as a going concern. If we are unable to continue as a going concern, we may have to liquidate our assets and may receive less than the value at which those assets are carried on our audited financial statements, and it is likely that investors will lose all or a part of their investment. After this offering, future reports from our independent registered public accounting firm may also contain statements expressing substantial doubt about our ability to continue as a going concern. If we seek additional financing to fund our business activities in the future and there remains substantial doubt about our ability to continue as a going concern, investors or other financing sources may be unwilling to provide additional funding to us on commercially reasonable terms or at all.

Risks Related to this Offering

If you purchase securities in this offering, you will suffer immediate dilution of your investment.

The public offering prices of the Common Units and the Pre-funded Units are substantially higher than the net tangible book value per share of our common stock. Therefore, if you purchase securities in this offering, you will pay an effective price per share of common stock you acquire that substantially exceeds our net tangible book value per share after this offering. Based on an assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, and assuming no sale of any Pre-funded Units in this offering, no exercise of the Warrants being offered in this offering, no value is attributed to such Warrants and such Warrants are classified as and accounted for as equity, you will experience immediate dilution of \$0.65 per share, representing the difference between our as adjusted net tangible book value per share after giving effect to this offering and the assumed public offering price of the Common Units. In addition, if previously issued options to acquire common stock are exercised at prices below the offering price or the Warrants are accounted for as liabilities, you will experience further dilution. For a further description of the dilution that you will experience immediately after this offering, see "Dilution."

There is no public market for the Pre-Funded Warrants or the Warrants to purchase shares of our common stock being offered by us in this offering.

There is no established public trading market for the Pre-Funded Warrants or the Warrants being offered in this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the Pre-Funded Warrants or the Warrants on any national securities exchange or other nationally recognized trading system, including the Nasdaq Global Market. Without an active market, the liquidity of the Pre-Funded Warrants and the Warrants will be limited.

You may experience future dilution as a result of future equity offerings.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may not be the same as the public offering prices of the Common Units and the Pre-funded Units in this offering. We may sell shares or other securities in any other offering at prices that are less than the prices paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The prices per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the prices paid by investors in this offering.

We have broad discretion over the use of our cash and cash equivalents, including the net proceeds we receive in this offering, and may not use them effectively.

Our management has broad discretion to use our cash and cash equivalents, including the net proceeds we receive in this offering, to fund our operations and could spend these funds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use to fund operations, we may invest our cash and cash equivalents in a manner that does not produce income or that loses value.

Holders of Pre-funded Warrants and Warrants purchased in this offering will have no rights as common stockholders until such holders exercise their Pre-funded Warrants or Warrants and acquire our common stock.

Until holders of Pre-funded Warrants or Warrants acquire shares of our common stock upon exercise thereof, such holders will have no rights with respect to the shares of our common stock underlying the Pre-funded Warrants and the Warrants. Upon exercise of the Pre-funded Warrants or Warrants, the holders will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

The Warrants are speculative in nature.

The Warrants do not confer any rights of common stock ownership on their holders, such as voting rights or the right to receive dividends, but rather merely represent the right to acquire shares of common stock at a fixed price for a limited period of time. Specifically, commencing on the date of issuance, holders of the Warrants may exercise their right to acquire the common stock and pay an exercise price per share equal to 120% of the public offering price per Common Unit, subject to certain adjustments, prior to five years from the date of issuance, after which date any unexercised Warrants will expire and have no further value. Moreover, following this offering, the market value of the Warrants, if any, is uncertain and there can be no assurance that the market value of the Warrants will equal or exceed their imputed offering price. The Warrants will not be listed or quoted for trading on any market or exchange. There can be no assurance that the market price of the common stock will ever equal or exceed the exercise price of the Warrants, and consequently, it may not ever be profitable for holders of the Warrants to exercise the Warrants.

We might not be able to utilize a significant portion of our net operating loss carryforwards and tax credit carryforwards.

As of December 31, 2017, we had approximately \$152.1 million of federal and \$150.4 million of state net operating loss carryforwards to offset future taxable income, if any. Such net operating loss carryforwards expire at varying times through the year 2037, if not utilized. We had approximately \$4.5 million of federal and \$1.8 million of state tax credit carryforwards available to reduce future tax liabilities as of December 31, 2017, which will expire at varying times through the year 2037. The Internal Revenue Code of 1986, as amended, or the Code, provides for a limitation on the annual use of net operating losses and other tax attributes (such as research and development tax credit carryforwards) in certain circumstances. Under Section 382 of the Code and corresponding provisions of state law, if a corporation undergoes an "ownership change," which is generally defined as a greater than 50% change, by value, in its equity ownership over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its

post-change income may be limited. At this time, we have not completed a study to assess whether an ownership change under Section 382 of the Code has occurred, or whether there have been multiple ownership changes since our formation, due to the costs and complexities associated with such a study. We may have experienced various ownership changes, as defined by the Code, as a result of past financing transactions, and we may experience ownership changes in the future as a result of subsequent changes in our stock ownership, including this offering, some of which may be outside of our control. Accordingly, our ability to utilize the aforementioned carryforwards may be limited. Additionally, U.S. tax laws limit the time during which these carryforwards may be applied against future taxes. Therefore, we may not be able to take full advantage of these carryforwards for federal or state income tax purposes.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference herein contain forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical facts, contained in this prospectus and the documents incorporated by reference herein, 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:

- our plans to initiate a single global Phase 3 clinical trial of edasalonexent for the treatment of Duchenne muscular dystrophy, report top-line data from the Phase 3 clinical trial in the second quarter of 2020, and continue to evaluate data from the open-label extension of our MoveDMD® clinical trial of edasalonexent;
- our plans to identify, develop and commercialize novel therapeutics based on our SMART LinkerSM drug discovery platform;
- ongoing and planned clinical trials for edasalonexent, whether conducted by us or by any future collaborators, including the timing of initiation of these trials and of the anticipated results;
- our plans to enter into collaborations for the development and commercialization of product candidates;
- the potential benefits of any future collaboration;
- our ability to receive research and development funding and achieve anticipated milestones under any future collaborations;
- the timing of and our ability to obtain and maintain regulatory approvals for our product candidates;
- the rate and degree of market acceptance and clinical utility of any products 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 products or product candidates with significant commercial potential;
- 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 continue as a going concern;
- 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 of this prospectus and in the "Risk Factors" section of our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018, which is incorporated herein by reference, 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.

You should read this prospectus, the information incorporated by reference herein 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.

USE OF PROCEEDS

We estimate that the net proceeds from this offering will be approximately \$27.8 million, assuming we sell only Common Units in this offering, after deducting the underwriting discount and commissions and estimated offering expenses payable by us. The public offering price per Common Unit or Pre-funded Unit will be determined between us, the underwriters and investors based on market conditions at the time of pricing and may be at a discount to the current market price of our common stock. These estimates exclude the proceeds, if any, from exercise of the Warrants sold in this offering. If all of the Warrants sold in this offering were to be exercised in cash at an exercise price per share equal to 120% of the public offering price per Common Unit, we would receive additional net proceeds of approximately \$36 million. We cannot predict when or if these Warrants will be exercised. It is possible that these Warrants may expire and may never be exercised.

A \$0.10 increase or decrease in the assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, would increase or decrease the net proceeds to us by approximately \$1.9 million, assuming the number of Common Units offered by us as set forth on the cover page of this prospectus remains the same, and after deducting the estimated underwriting discount and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the Warrants issued in this offering.

We may also increase or decrease the number of units we are offering. An increase or decrease of 500,000 in the number of Common Units offered by us, as set forth on the cover page of this prospectus, would increase or decrease the net proceeds to us by approximately \$0.7 million, assuming the assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, remains the same, and after deducting the estimated underwriting discount and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from the exercise of the Warrants issued in this offering.

We plan to use the net proceeds from this offering to fund our planned Phase 3 clinical trial of edasalonexent for the treatment of Duchenne muscular dystrophy, as well as for working capital and general corporate purposes. Without additional funding beyond this offering, we do not intend to continue research and development activities for our other pipeline programs. We cannot predict with certainty all of the particular uses for the net proceeds to be received upon the completion of this offering. Accordingly, our management will have broad discretion and flexibility in applying the net proceeds from the sale of securities sold pursuant to this prospectus.

Based on our planned use of the net proceeds from this offering and our existing cash and cash equivalents, we estimate that such funds will be sufficient to enable us to obtain top-line data from our planned Phase 3 clinical trial of edasalonexent, and fund our operating expenses, debt service and capital expenditure requirements at least into the second quarter of 2020. 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 expect that the net proceeds from this offering and our existing cash and cash equivalents will be sufficient to enable us to fund the completion of development of edasalonexent or any of our other product candidates.

Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in short term, investment grade, interest-bearing instruments and U.S. government securities.

DIVIDEND POLICY

We have never declared nor paid cash dividends on our common 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 common stock in the foreseeable future. In addition, our ability to pay cash dividends on our common stock is prohibited by the covenants of our credit facility with MidCap Financial Trust, Flexpoint MCLS SPV LLC and Square 1 Bank.

DILUTION

Our net tangible book value as of March 31, 2018 was approximately \$12.9 million, or approximately \$0.45 per share of common stock. Net tangible book value per share is equal to our total tangible assets, less our total liabilities, divided by the number of shares outstanding as of the date in question. Dilution with respect to net tangible book value per share represents the difference between the effective price per share paid by purchasers of shares of common stock in this offering and the net tangible book value per share of our common stock immediately after this offering.

After giving effect to the assumed issuance and sale of 20,270,270 Common Units in this offering at an assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, after deducting the estimated underwriting discount and commissions and estimated offering expenses payable by us, and assuming no sale of Pre-funded Units in this offering, no exercise of the Warrants offered hereby, no value is attributed to such Warrants and such Warrants are classified as and accounted for as equity, our as adjusted net tangible book value as of March 31, 2018 would have been approximately \$40.7 million, or approximately \$0.83 per share of common stock. This represents an immediate increase in net tangible book value of \$0.38 per share to our existing stockholders and an immediate dilution of \$0.65 per share to investors purchasing our common stock in this offering. The following table illustrates this calculation on a per share basis:

Assumed public offering price per Common Unit	\$ 1.48
Net tangible book value per share as of March 31, 2018	\$ 0.45
Increase in net tangible book value per share attributable to the offering	<u>0.38</u>
As adjusted net tangible book value per share as of March 31, 2018, after giving effect to the offering	0.83
Dilution per share to new investors purchasing our common stock in this offering	<u>\$ 0.65</u>

In addition, if previously issued options to acquire common stock are exercised at prices below the public offering price or the Warrants are accounted for as liabilities, you will experience further dilution.

A \$0.10 increase or decrease in the assumed public offering price per Common Unit of \$1.48, the last sales price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, would increase or decrease our as adjusted net tangible book value per share after this offering by \$0.04 and dilution per share to investors participating in this offering by \$0.06, after deducting the estimated underwriting discount and commissions and estimated offering expenses payable by us, and assuming no sale of any Pre-funded Units in this offering and no exercise of the Warrants being offered in this offering.

We may also increase or decrease the number of units we are offering. An increase or decrease of 500,000 in the number of Common Units offered by us would increase or decrease our adjusted net tangible book value per share after this offering by approximately \$0.7 million, or approximately \$0.01 per share, and increase or decrease the dilution per share to new investors in this offering by approximately \$0.01 per share, assuming the assumed public offering price of \$1.48 per Common Unit, the last sale price per share of our common stock on June 8, 2018, as reported on the Nasdaq Global Market, remains the same, and after deducting the estimated underwriting discount and commissions and estimated offering expenses payable by us and excluding the proceeds, if any, from exercise of the Warrants issued in this offering. The information discussed above is illustrative only and will adjust

based on the actual offering price, the actual number of units we offer in this offering, and other terms of this offering determined at pricing.

The table and discussion above are based on 29,035,502 shares of our common stock outstanding as of March 31, 2018. The number of shares outstanding as of March 31, 2018 excludes:

- 3,775,626 shares of our common stock issuable upon the exercise of stock options outstanding as of March 31, 2018, at a weighted-average exercise price of \$3.73 per share;
- 839,975 shares of our common stock available for future issuance as of March 31, 2018 under our 2015 stock incentive plan;
- 24,566 shares of our common stock issuable upon the exercise of warrants outstanding as of March 31, 2018, at an exercise price of \$12.2114 per share; and
- 760,111 shares of our common stock available for future issuance as of March 31, 2018 under our 2015 employee stock purchase plan.

PRICE RANGE OF OUR COMMON STOCK

Market Information

Our common stock has been publicly traded on the Nasdaq Global Market under the symbol "CATB" since June 25, 2015. Prior to that time, there was no public market for our common stock. As of June 8, 2018, there were approximately 32 stockholders of record of our common stock, and the closing price of our common stock reported on the Nasdaq Global Market on such date was \$1.48 per share. The following table sets forth the high and low intraday sales prices of our common stock as reported on the Nasdaq Global Market for the periods indicated:

	Common Stock	
	High	Low
2018		
First Quarter	\$ 2.38	\$ 1.15
Second Quarter (through June 8, 2018)	\$ 1.89	\$ 1.47
2017		
First Quarter	\$ 5.51	\$ 1.08
Second Quarter	\$ 2.05	\$ 1.23
Third Quarter	\$ 2.25	\$ 1.09
Fourth Quarter	\$ 3.78	\$ 1.48
2016		
First Quarter	\$ 8.15	\$ 3.90
Second Quarter	\$ 7.23	\$ 3.53
Third Quarter	\$ 7.89	\$ 3.31
Fourth Quarter	\$ 6.25	\$ 3.22
2015		
First Quarter	\$ N/A	\$ NA
Second Quarter (from June 25, 2015)	\$ 14.00	\$ 11.51
Third Quarter	\$ 16.96	\$ 7.31
Fourth Quarter	\$ 10.83	\$ 6.32

DESCRIPTION OF CAPITAL STOCK

General

The following description of our capital stock is intended as a summary only and therefore is not a complete description of our capital stock. This description is based upon, and is qualified by reference to, our certificate of incorporation, our by-laws and applicable provisions of Delaware corporate law. You should read our certificate of incorporation and by-laws, which are filed as exhibits to the registration statement of which this prospectus forms a part, for the provisions that are important to you.

Our authorized capital stock consists of 150,000,000 shares of common stock, \$0.001 par value per share, and 5,000,000 shares of preferred stock, \$0.001 par value per share. As of April 30, 2018, 29,035,502 shares of common stock were outstanding and no shares of preferred stock were outstanding.

Common Stock

Voting Rights. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders, except that unless otherwise required by law, holders of our common stock are not entitled to vote on any amendment to the 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 as a class with the holders of one or more such other series, to vote thereon pursuant to the certificate of incorporation. Holders of our common stock do not have cumulative voting rights.

An election of directors will be decided by a plurality of the votes cast by the stockholders entitled to vote on the election at a duly held stockholders' meeting at which a quorum is present. All other questions will be decided by a majority of the votes cast by stockholders entitled to vote thereon at a duly held meeting of stockholders at which a quorum is present, except when a different vote is required by law, our certificate of incorporation or by-laws.

Dividends. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend or other rights of any series of preferred stock that we may designate and issue in the future.

Liquidation and Dissolution. In the event of our liquidation or dissolution, the holders of common stock are entitled to receive proportionately our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock.

Other Rights. Holders of common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future.

Transfer Agent and Registrar. The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC.

Listing on The Nasdaq Global Market. Our common stock is listed on the Nasdaq Global Market under the symbol "CATB."

Preferred Stock

We currently have no outstanding shares of preferred stock. Under our restated certificate of incorporation, we are authorized to issue "blank check" preferred stock, which may be issued in one or more series upon authorization of our board of directors. Our board of directors is authorized to fix the designation of the series, the number of authorized shares of the series, dividend rights and terms, conversion rights, voting rights, redemption rights and terms, liquidation preferences and any other rights, powers, preferences and limitations applicable to each series of preferred stock. The authorized shares of our preferred stock are available for issuance without further action by our stockholders, unless such action is required by applicable law or the rules of any stock exchange on which our securities may be listed. If the approval of our stockholders is not required for the issuance of shares of our preferred stock, our board may determine not to seek stockholder approval.

A series of our preferred stock could, depending on the terms of such series, impede the completion of a merger, tender offer or other takeover attempt. Our board of directors will make any determination to issue preferred shares based upon its judgment as to the best interests of our stockholders. Our directors, in so acting, could issue preferred stock having terms that could discourage an acquisition attempt through which an acquirer may be able to change the composition of our board of directors, including a tender offer or other transaction that some, or a majority, of our stockholders might believe to be in their best interests or in which stockholders might receive a premium for their stock over the then-current market price of the stock.

Stock Options

As of April 30, 2018, options to purchase 3,660,951 shares of our common stock at a weighted-average exercise price of \$3.76 per share were outstanding, of which options to purchase 1,619,205 shares of our common stock were exercisable, at a weighted-average exercise price of \$5.26 per share.

Other Warrants

As of April 30, 2018, we had outstanding warrants to purchase shares of our common stock exercisable for an aggregate of 24,566 shares of our common stock at an exercise price of \$12.2114 per share.

Registration Rights

Our second amended and restated investor rights agreement, or the Investor Rights Agreement, provides certain holders of our preferred stock, including some of our directors and 5% stockholders and their respective affiliates and entities affiliated with our officers and directors, the right to require us to file registration statements under the Securities Act covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. In addition, the holders of warrants to purchase shares of our preferred stock have rights under those warrants to become party to the Investor Rights Agreement following exercise of the warrants, following which they will have, with respect to the shares acquired on exercise of the warrants, the same rights to require us to register the shares as the other investor parties to the Investor Rights Agreement. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act in the public market, subject to volume limitations applicable to affiliates.

Demand Registration Rights

Subject to specified limitations set forth in the Investor Rights Agreement, at any time the holders of a majority of then outstanding registrable securities, as defined in the Investor Rights Agreement, acting

together, 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 least \$10.0 million. We are not obligated to file a registration statement pursuant to this demand provision on more than two occasions, subject to specified exceptions.

In addition, at any time when we are eligible to file a registration statement on Form S-3 under the Securities Act, subject to specified limitations, the holders of at least 35% of the registrable securities then outstanding may demand in writing that we register on Form S-3 registrable shares held by them 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 least \$1.0 million.

Incidental Registration Rights

If we propose to file a registration statement to register any of our securities under the Securities Act, either for our own account or for the account of any of our stockholders that are not holders of registrable shares, solely for cash and on a form that would also permit the registration of registrable shares, the holders of our registrable shares are entitled to notice of registration and, subject to specified exceptions, we will be required to register the registrable shares then held by them that they request that we register.

Expenses

Pursuant to the Investor Rights Agreement, we are required to pay all registration expenses, including registration fees, printing expenses, fees and disbursements of our counsel and accountants and reasonable fees and disbursements of one counsel representing the selling stockholders, other than any underwriting discounts and commissions, related to any demand or incidental registration. The Investor Rights Agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders 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 in the registration statement attributable to them.

Anti-Takeover Effects of Delaware Law and Our Charter and By-laws

Delaware law, our certificate of incorporation and our by-laws contain provisions that could have the effect of delaying, deferring or discouraging another party from acquiring control of us. These provisions, which are summarized below, may discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our board of directors.

Staggered Board; Removal of Directors

Our certificate of incorporation and by-laws divide our board of directors into three classes with staggered three-year terms. In addition, a director is only able to be removed for cause and only by the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in an annual election of directors. Any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, can only be filled by vote of a majority of our directors then in office. The classification of our board of directors and the limitations on the removal of directors and filling of vacancies could make it more difficult for a third party to acquire, or discourage a third party from seeking to acquire, control of our company.

Stockholder Action by Written Consent; Special Meetings

Our certificate of incorporation provides that any action required or permitted to be taken by our stockholders must be effected at a duly called annual or special meeting of such holders and may not be effected by any consent in writing by such holders. Our certificate of incorporation and by-laws also provide that, except as otherwise required by law, special meetings of our stockholders can only be called by our chairman of the board, our Chief Executive Officer or our board of directors.

Advance Notice Requirements for Stockholder Proposals

Our by-laws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of stockholders, including proposed nominations of persons for election to our board of directors. Stockholders at an annual meeting are only able to consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors or by a stockholder of record on the record date for the meeting who is entitled to vote at the meeting and who has delivered timely written notice in proper form to our secretary of the stockholder's intention to bring such business before the meeting. These provisions could have the effect of delaying until the next stockholder meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities.

Delaware Business Combination Statute

We are subject to Section 203 of the General Corporation Law of the State of Delaware. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a "business combination" with any "interested stockholder" for three years following the date that the person became an interested stockholder, unless the interested stockholder attained such status with the approval of our board of directors or unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger or consolidation involving us and the "interested stockholder" and the sale of more than 10% of our assets. In general, an "interested stockholder" is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person.

Amendment of Certificate of Incorporation and By-laws

The General Corporation Law of the State of Delaware provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or by-laws, unless a corporation's certificate of incorporation or by-laws, as the case may be, requires a greater percentage. Our by-laws may be amended or repealed by a majority vote of our board of directors or by the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes that all of our stockholders would be entitled to cast in any annual election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above under " – Staggered Board; Removal of Directors" and " – Stockholder Action by Written Consent; Special Meetings."

Exclusive Forum Selection

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or if the Court of Chancery does not have jurisdiction, the federal district court for the District of Delaware) shall be the sole and

exclusive forum for (1) any derivative action or proceeding brought on behalf of our company, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or employees to our company or our stockholders, (3) any action asserting a claim against our company arising pursuant to any provision of the General Corporation Law of the State of Delaware or our certificate of incorporation or by-laws, or (4) any action asserting a claim against our company governed by the internal affairs doctrine. Although our certificate of incorporation contains the choice of forum provision described above, it is possible that a court could rule that such a provision is inapplicable for a particular claim or action or that such provision is unenforceable.

Listing on The Nasdaq Global Market

Our common stock is listed on the Nasdaq Global Market under the symbol "CATB."

Authorized but Unissued Shares

The authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval, subject to any limitations imposed by the listing requirements of the Nasdaq Global Market. These additional shares may be used for a variety of corporate finance transactions, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could make it more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company.

DESCRIPTION OF SECURITIES WE ARE OFFERING

We are offering 20,270,270 Common Units, each Common Unit consisting of one share of our common stock and one Warrant. We are also offering to those purchasers, if any, whose purchase of Common Units in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock immediately following the consummation of this offering, the opportunity to purchase, if the purchaser so chooses, Pre-funded Units in lieu of Common Units that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock, each Pre-funded Unit consisting of one Pre-Funded Warrant and one Warrant. For each Pre-funded Unit we sell, the number of Common Units we are offering will be decreased on a one-for-one basis. Common Units and Pre-funded Units will not be issued or certificated. We are offering a maximum of 20,270,270 Pre-funded Units. The shares of common stock or Pre-funded Warrants, as the case may be, and the Warrants included in the Common Units or the Pre-funded Units, can only be purchased together in this offering, but the securities contained in the Common Units or Pre-funded Units will be issued separately and will be immediately separable upon issuance. We are also registering the shares of common stock included in the Common Units and the shares of common stock issuable from time to time upon exercise of the Pre-funded Warrants included in Pre-funded Units and Warrants included in the Common Units and the Pre-funded Units offered hereby.

Pre-Funded Warrants

The following summary of certain terms and provisions of the Pre-funded Warrants included in the Pre-funded Units that are being offered hereby is not complete and is subject to, and qualified in its entirety by, the provisions of the Pre-funded Warrant, the form of which is filed as an exhibit to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the form of Pre-funded Warrant for a complete description of the terms and conditions of the Pre-funded Warrants.

Duration and Exercise Price

Each Pre-funded Warrant offered hereby will have an initial exercise price per share equal to \$0.01. The Pre-funded Warrants will be immediately exercisable and may be exercised at any time until the Pre-funded Warrants are exercised in full. The exercise price and number of shares of common stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting our common stock and the exercise price. The Pre-funded Warrants will be issued separately from the accompanying Warrants included in the Pre-funded Units.

Exercisability

The Pre-funded Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our common stock purchased upon such exercise (except in the case of a cashless exercise as discussed below). A holder (together with its affiliates) may not exercise any portion of a Pre-funded Warrant to the extent that the holder would own more than 4.99% of the outstanding common stock immediately after exercise, except that upon at least 61 days' prior notice from the holder to us, the holder may increase the amount of ownership of outstanding stock after exercising the holder's Pre-funded Warrants up to 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the Pre-funded Warrants. Purchasers of Pre-funded Units in this offering

may also elect prior to the issuance of the Pre-funded Units to have the initial exercise limitation set at 9.99% of our outstanding common stock.

Cashless Exercise

If, at the time a holder exercises its Pre-funded Warrants, a registration statement registering the issuance of the shares of common stock underlying the Pre-funded Warrants under the Securities Act of 1933, as amended, or the Securities Act, is not then effective or available for the issuance of such shares, then in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of common stock determined according to a formula set forth in the Pre-funded Warrants.

Transferability

Subject to applicable laws, a Pre-funded Warrant may be transferred at the option of the holder upon surrender of the Pre-funded Warrant to us together with the appropriate instruments of transfer.

Fractional Shares

No fractional shares of common stock will be issued upon the exercise of the Pre-funded Warrants. Rather, the number of shares of common stock to be issued will be rounded to the nearest whole number.

Trading Market

There is no trading market available for the Pre-funded Warrants on any securities exchange or nationally recognized trading system. The common stock issuable upon exercise of the Pre-funded Warrants is currently listed on the Nasdaq Global Market.

Right as a Stockholder

Except as otherwise provided in the Pre-funded Warrants or by virtue of such holder's ownership of shares of our common stock, the holders of the Pre-funded Warrants do not have the rights or privileges of holders of our common stock, including any voting rights, until they exercise their Pre-funded Warrants.

Fundamental Transaction

In the event of a fundamental transaction, as described in the Pre-funded Warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of at least 50% of our outstanding common stock, or any person or group becoming the beneficial owner of at least 50% of the voting power represented by our outstanding common stock, the holders of the pre-funded warrants will be entitled to receive upon exercise of the Pre-funded Warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the Pre-funded Warrants immediately prior to such fundamental transaction.

Warrants for Common Stock

The following summary of certain terms and provisions of the Warrants included in the Common Units and the Pre-funded Units that are being offered hereby is not complete and is subject to, and qualified

in its entirety by, the provisions of the Warrants, the form of which is filed as an exhibit to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the form of Warrant for a complete description of the terms and conditions of the Warrants.

Duration and Exercise Price

Each Warrant included in the Common Units and the Pre-funded Units offered hereby will have an initial exercise price per share equal to 120% of the public offering price per Common Unit. The Warrants will be immediately exercisable and will expire on the fifth anniversary the original issuance date. The exercise price and number of shares of common stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting our common stock and the exercise price. The Warrants will be issued separately from the common stock included in the Common Units, or the Pre-funded Warrants included in the Pre-funded Units, as the case may be. A Warrant to purchase one share of our common stock will be included in each Common Unit or Pre-funded Unit purchased in this offering.

Cashless Exercise

If, at the time a holder exercises its Warrants, a registration statement registering the issuance of the shares of common stock underlying the Warrants under the Securities Act is not then effective or available for the issuance of such shares, then in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of common stock determined according to a formula set forth in the Warrants.

Exercisability

The Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of our common stock purchased upon such exercise (except in the case of a cashless exercise as discussed above). A holder (together with its affiliates) may not exercise any portion of a Warrant to the extent that the holder would own more than 4.99% of the outstanding common stock immediately after exercise, except that upon at least 61 days' prior notice from the holder to us, the holder may increase the amount of ownership of outstanding stock after exercising the holder's Warrants up to 9.99% of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the Warrants. Purchasers of Warrants in this offering may also elect prior to the issuance of Warrants to have the initial exercise limitation set at 9.99% of our outstanding common stock.

Fractional Shares

No fractional shares of common stock will be issued upon the exercise of the Warrants. Rather, the number of shares of common stock to be issued will be rounded to the nearest whole number.

Transferability

Subject to applicable laws, a Warrant may be transferred at the option of the holder upon surrender of the Warrant to us together with the appropriate instruments of transfer.

Exchange Listing

We do not intend to list the Warrants on any securities exchange or nationally recognized trading system. The common stock issuable upon exercise of the Warrants is currently listed on the Nasdaq Global Market.

Right as a Stockholder

Except as otherwise provided in the Warrants or by virtue of such holder's ownership of shares of our common stock, the holders of the Warrants do not have the rights or privileges of holders of our common stock, including any voting rights, until they exercise their Warrants.

Fundamental Transaction

In the event of a fundamental transaction, as described in the Warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of at least 50% of our outstanding common stock, or any person or group becoming the beneficial owner of at least 50% of the voting power represented by our outstanding common stock, the holders of the Warrants will be entitled to receive upon exercise of the Warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the Warrants immediately prior to such fundamental transaction. In addition, in the event of a fundamental transaction which is approved by our Board, the holders of the Warrants have the right to require us or a successor entity to redeem the Warrants for cash in the amount of the Black-Scholes value of the unexercised portion of the Warrants on the date of the consummation of the fundamental transaction. In the event of a fundamental transaction which is not approved by our Board, the holders of the Warrants have the right to require us or a successor entity to redeem the Warrants for the consideration paid in the fundamental transaction in the amount of the Black Scholes value of the unexercised portion of the Warrants on the date of the consummation of the fundamental transaction payable at our option in either shares of our common stock (or, in certain cases, in the securities of the successor entity) or cash.

MATERIAL U.S. FEDERAL TAX CONSIDERATIONS FOR HOLDERS OF OUR COMMON STOCK, PRE-FUNDED WARRANTS AND WARRANTS

The following discussion describes the material U.S. federal income tax consequences of the acquisition, ownership and disposition of our common stock, Pre-funded Warrants and Warrants acquired in this offering. This discussion is based on the current provisions of the Internal Revenue Code of 1986, as amended, referred to as the Code, existing and proposed U.S. Treasury regulations promulgated thereunder, and administrative rulings and court decisions in effect as of the date hereof, all of which are subject to change at any time, possibly with retroactive effect. No ruling has been or will be sought from the Internal Revenue Service, or IRS, with respect to the matters discussed below, and there can be no assurance the IRS will not take a contrary position regarding the tax consequences of the acquisition, ownership or disposition of our common stock, Pre-funded Warrants or Warrants, or that any such contrary position would not be sustained by a court.

We assume in this discussion that the shares of our common stock, Pre-funded Warrants and Warrants will be held as capital assets (generally, property held for investment). This discussion does not address all aspects of U.S. federal income taxes, does not discuss the potential application of the Medicare contribution tax, the alternative minimum tax and does not deal with state or local taxes, U.S. federal gift and estate tax laws, except as specifically provided below with respect to non-U.S. holders, or any non-U.S. tax consequences that may be relevant to holders in light of their particular circumstances. This discussion also does not address the special tax rules applicable to particular holders, such as:

- financial institutions;
- brokers or dealers in securities;
- tax-exempt organizations;
- pension plans;
- regulated investment companies;
- owners that hold our common stock, Pre-funded Warrants or Warrants as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- insurance companies;
- controlled foreign corporations, passive foreign investment companies, or corporations that accumulate earnings to avoid U.S. federal income tax; and
- certain U.S. expatriates.

In addition, this discussion does not address the tax treatment of partnerships or other pass-through entities or persons who hold our common stock, Pre-funded Warrants or Warrants through partnerships or other entities which are pass-through entities for U.S. federal income tax purposes. A partner in a partnership or other pass-through entity that will hold our common stock, Pre-funded Warrants or Warrants should consult his, her or its own tax advisor regarding the tax consequences of the ownership and disposition of our common stock, Pre-funded Warrants or Warrants through a partnership or other pass-through entity, as applicable.

This discussion of U.S. federal income tax considerations is for general information purposes only and is not tax advice. Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local and non-U.S. income and other tax considerations of acquiring, holding and disposing of our common stock, Pre-funded Warrants and Warrants.

For the purposes of this discussion, a "U.S. Holder" means a beneficial owner of our common stock, Pre-funded Warrants or Warrants that is for U.S. federal income tax purposes (a) an individual citizen or resident of the United States, (b) a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes), created or organized in or under the laws of the United States, any state thereof or the District of Columbia, (c) an estate the income of which is subject to U.S. federal income taxation regardless of its source, or (d) a trust if it (1) is subject to the primary supervision of a court within the United States and one or more U.S. persons (within the meaning of Section 7701(a)(30) of the Code) have the authority to control all substantial decisions of the trust or (2) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person. A "Non-U.S. Holder" is, for U.S. federal income tax purposes, a beneficial owner of common stock, Pre-funded Warrants or Warrants that is not a U.S. Holder or a partnership for U.S. federal income tax purposes.

Tax Cuts and Jobs Act

Under tax legislation signed into law in December 2017 commonly known as the Tax Cuts and Jobs Act of 2017, U.S. Holders that use an accrual method of accounting for tax purposes and have certain financial statements generally will be required to include certain amounts in income no later than the time such amounts are taken into account as revenue in such financial statements. The application of this rule thus may require the accrual of income earlier than would be the case under the general tax rules described below, although the precise application of this rule is unclear at this time. This rule generally will be effective for taxable years beginning after December 31, 2017. U.S. Holders that use an accrual method of accounting should consult with their tax advisors regarding the potential applicability of this legislation to their particular situation.

Allocation of Purchase Price of Common Unit and Pre-funded Unit

For U.S. federal income tax purposes, each Common Unit and Pre-funded Unit will be treated as an "investment unit" consisting of one share of common stock and one Pre-funded Warrant, as applicable, and a warrant to acquire one share of our common. The purchase price for each investment unit will be allocated between these two components in proportion to their relative fair market values at the time the unit is purchased by the holder. This allocation of the purchase price for each unit will establish the holder's initial tax basis for U.S. federal income tax purposes in the share of common stock or Pre-funded Warrant, as applicable, and the Warrant included in each unit. The separation of the share of common stock or Pre-funded Warrant, as applicable, and the Warrant included in each unit should not be a taxable event for U.S. federal income tax purposes. Each holder should consult his, her or its own tax advisor regarding the allocation of the purchase price for a unit.

Treatment of Pre-funded Warrants

Although it is not entirely free from doubt, a Pre-funded Warrant should be treated as a share of our common stock for U.S. federal income tax purposes and a holder of Pre-funded Warrants should generally be taxed in the same manner as a holder of common stock as described below. Accordingly, upon exercise, the holding period of a Pre-funded Warrant should carry over to the share of common stock received. Similarly, the tax basis of the Pre-funded Warrant should carry over to the share of common stock received upon exercise increased by the exercise price of \$0.01. Each holder should consult his, her or its own tax advisor regarding the risks associated with the acquisition of a unit pursuant to this offering (including potential alternative characterizations). The balance of this discussion generally assumes that the characterization described above is respected for U.S. federal income tax purposes.

Tax Considerations Applicable to U.S. Holders

Exercise and Expiration of Warrants

In general, a U.S. Holder will not recognize gain or loss for U.S. federal income tax purposes upon exercise of a Warrant. The U.S. Holder will take a tax basis in the shares acquired on the exercise of a Warrant equal to the exercise price of the Warrant, increased by the U.S. Holder's adjusted tax basis in the Warrant exercised (as determined pursuant to the rules discussed above). The U.S. Holder's holding period in the shares of our common stock acquired on exercise of the Warrant will begin on the date of exercise of the Warrant, and will not include any period for which the U.S. Holder held the Warrant.

In certain limited circumstances, a U.S. Holder may be permitted to undertake a cashless exercise of Warrants into our common stock. The U.S. federal income tax treatment of a cashless exercise of Warrants into our common stock is unclear, and the tax consequences of a cashless exercise could differ from the consequences upon the exercise of a Warrant described in the preceding paragraph. U.S. Holders should consult their own tax advisors regarding the U.S. federal income tax consequences of a cashless exercise of Warrants.

The lapse or expiration of a Warrant will be treated as if the U.S. Holder sold or exchanged the Warrant and recognized a capital loss equal to the U.S. Holder's tax basis in the Warrant. The deductibility of capital losses is subject to limitations.

Certain Adjustments to and Distributions on Warrants

Under Section 305 of the Code, an adjustment to the number of shares of common stock issued on the exercise of the Warrants, or an adjustment to the exercise price of the Warrants, may be treated as a constructive distribution to a U.S. Holder of the Warrants if, and to the extent that, such adjustment has the effect of increasing such U.S. Holder's proportionate interest in our "earnings and profits" or assets, depending on the circumstances of such adjustment (for example, if such adjustment is to compensate for a distribution of cash or other property to our shareholders). An adjustment made pursuant to a bona fide reasonable adjustment formula that has the effect of preventing dilution should generally not be considered to result in a constructive distribution. Any such constructive distribution would be taxable whether or not there is an actual distribution of cash or other property to the holders of Warrants. In certain circumstances, if we were to make a distribution in cash or other property with respect to our common stock after the issuance of the Warrants, then we may make a corresponding distribution to a Warrant holder. The taxation of a distribution received with respect to a Warrant is unclear. It is possible such a distribution would be treated as a distribution (or constructive distribution), although other treatments are possible. For more information regarding the tax considerations related to distributions, see the discussion below regarding "Distributions". U.S. Holders should consult their tax advisors regarding the proper treatment of any adjustments to the Warrants and any distributions with respect to the Warrants.

Distributions

As discussed above, we currently anticipate that we will retain future earnings, if any, to finance the growth and development of our business and do not intend to pay cash dividends in respect of our common stock in the foreseeable future. In the event that we do make distributions on our common stock or Pre-funded Warrants to a U.S. Holder, those distributions generally will constitute dividends for U.S. tax purposes to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital that is applied against and reduces,

but not below zero, a U.S. Holder's adjusted tax basis in our common stock or Pre-funded Warrant, as applicable. Any remaining excess will be treated as gain realized on the sale or exchange of our common stock or Pre-funded Warrant as described below under the section titled " – Disposition of Our Common Stock, Pre-Funded Warrants or Warrants."

Disposition of Our Common Stock, Pre-Funded Warrants or Warrants

Upon a sale or other taxable disposition of our common stock, Pre-funded Warrants or Warrants, a U.S. Holder generally will recognize capital gain or loss in an amount equal to the difference between the amount realized and the U.S. Holder's adjusted tax basis in the common stock, Pre-funded Warrants or Warrants. Capital gain or loss will constitute long-term capital gain or loss if the U.S. Holder's holding period for the common stock, Pre-funded Warrants or Warrants exceeds one year. The deductibility of capital losses is subject to certain limitations. U.S. Holders who recognize losses with respect to a disposition of our common stock, Pre-funded Warrants or Warrants should consult their own tax advisors regarding the tax treatment of such losses.

Information Reporting and Backup Reporting

Information reporting requirements generally will apply to payments of dividends (including constructive dividends) on the common stock, Pre-funded Warrants and Warrants and to the proceeds of a sale or other disposition of common stock, Pre-funded Warrants and Warrants paid by us to a U.S. Holder unless such U.S. Holder is an exempt recipient, such as a corporation. Backup withholding will apply to those payments if the U.S. Holder fails to provide the holder's taxpayer identification number, or certification of exempt status, or if the holder otherwise fails to comply with applicable requirements to establish an exemption.

Backup withholding is not an additional tax. Rather, any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against the U.S. Holder's U.S. federal income tax liability provided the required information is timely furnished to the IRS. U.S. Holders should consult their own tax advisors regarding their qualification for exemption from information reporting and backup withholding and the procedure for obtaining such exemption.

Tax Considerations Applicable To Non-U.S. Holders

Exercise and Expiration of Warrants

In general, a Non-U.S. Holder will not recognize gain or loss for U.S. federal income tax purposes upon the exercise of Warrants into shares of common stock. The U.S. federal income tax treatment of a cashless exercise of Warrants into our common stock is unclear. A Non-U.S. Holder should consult his, her, or its own tax advisor regarding the U.S. federal income tax consequences of a cashless exercise of Warrants.

The expiration of a Warrant will be treated as if the Non-U.S. Holder sold or exchanged the Warrant and recognized a capital loss equal to the Non-U.S. Holder's tax basis in the Warrant. However, a Non-U.S. Holder will not be able to utilize a loss recognized upon expiration of a Warrant against the Non-U.S. Holder's U.S. federal income tax liability unless the loss is effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if an income tax treaty applies, is attributable to a permanent establishment or fixed base in the United States) or is treated as a U.S.-source loss and the Non-U.S. Holder is present 183 days or more in the taxable year of disposition and certain other conditions are met.

Certain Adjustments to and Distributions on Warrants

As described under " – U.S. Holders – Certain Adjustments to Warrants", an adjustment to the Warrants could result in a constructive distribution to a Non-U.S. Holder, which would be treated as described under "Distributions below, and the tax treatment of distributions on the warrants is unclear. Any resulting withholding tax attributable to deemed dividends would be collected from other amounts payable or distributable to the Non-U.S. Holder. Non-U.S. Holders should consult their tax advisors regarding the proper treatment of any adjustments to and distributions on the Warrants.

Distributions

As discussed above, we currently anticipate that we will retain future earnings, if any, to finance the growth and development of our business and do not intend to pay cash dividends in respect of our common stock in the foreseeable future. In the event that we do make distributions on our common stock or Pre-funded Warrants to a Non-U.S. Holder, those distributions generally will constitute dividends for U.S. federal income tax purposes as described in " – U.S. Holders – Distributions".

Any distribution (including constructive distributions) on our common stock or Pre-funded Warrants that is treated as a dividend paid to a Non-U.S. Holder that is not effectively connected with the holder's conduct of a trade or business in the United States will generally be subject to withholding tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and the Non-U.S. Holder's country of residence. To obtain a reduced rate of withholding under a treaty, a Non-U.S. Holder generally will be required to provide the applicable withholding agent with a properly executed IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate form, certifying the Non-U.S. Holder's entitlement to benefits under that treaty. Such form must be provided prior to the payment of dividends and must be updated periodically. If a Non-U.S. Holder holds stock through a financial institution or other agent acting on the holder's behalf, the holder will be required to provide appropriate documentation to such agent. The holder's agent may then be required to provide certification to the applicable withholding agent, either directly or through other intermediaries. If you are eligible for a reduced rate of U.S. withholding tax under an income tax treaty, you should consult with your own tax advisor to determine if you are able to obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for a refund with the IRS.

We generally are not required to withhold tax on dividends paid (or constructive dividends deemed paid) to a Non-U.S. Holder that are effectively connected with the holder's conduct of a trade or business within the United States (and, if required by an applicable income tax treaty, are attributable to a permanent establishment or fixed base that the holder maintains in the United States) if a properly executed IRS Form W-8ECI, stating that the dividends are so connected, is furnished to us (or, if stock is held through a financial institution or other agent, to the applicable withholding agent). In general, such effectively connected dividends will be subject to U.S. federal income tax on a net income basis at the regular graduated rates applicable to U.S. persons. A corporate Non-U.S. Holder receiving effectively connected dividends may also be subject to an additional "branch profits tax," which is imposed, under certain circumstances, at a rate of 30% (or such lower rate as may be specified by an applicable treaty) on the corporate Non-U.S. Holder's effectively connected earnings and profits, subject to certain adjustments.

See also the sections below titled " – Backup Withholding and Information Reporting" and " – Foreign Accounts" for additional withholding rules that may apply to dividends paid to certain foreign financial institutions or non-financial foreign entities.

Disposition of Our Common Stock, Pre-Funded Warrants or Warrants

Subject to the discussions below under the sections titled " – Backup Withholding and Information Reporting" and " – Foreign Accounts," a Non-U.S. Holder generally will not be subject to U.S. federal income or withholding tax with respect to gain realized on a sale or other disposition of our common stock, Pre-funded Warrant or Warrants unless:

- the gain is effectively connected with the Non-U.S. Holder's conduct of a trade or business in the United States, and if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the Non-U.S. Holder in the United States; in these cases, the Non-U.S. Holder will be taxed on a net income basis at the regular graduated rates and in the manner applicable to U.S. persons, and if the Non-U.S. Holder is a corporation, an additional branch profits tax at a rate of 30%, or a lower rate as may be specified by an applicable income tax treaty, may also apply;
- the Non-U.S. Holder is a nonresident alien present in the United States for 183 days or more in the taxable year of the disposition and certain other requirements 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; or
- our common stock constitutes a U.S. real property interest because we are, or have been at any time during the five-year period preceding such disposition (or the Non-U.S. Holder's holding period of the common stock, Pre-funded Warrants or Warrants, 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 held no more than 5% of our outstanding common stock, directly or indirectly, during the shorter of the five-year period ending on the date of the disposition or the period that the Non-U.S. Holder held our common stock. Special rules may apply to the determination of the 5% threshold in the case of a holder of a Pre-funded Warrant or Warrant. Non-U.S. Holders are urged to consult their own tax advisors regarding the effect of holding our Pre-funded Warrants or Warrants on the calculation of such 5% threshold. Generally, a corporation is a "U.S. real property holding corporation" if the fair market value of its "U.S. real property interests" (as defined in the Code and applicable regulations) 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 believe that we are not currently, and we do not anticipate becoming, a "U.S. real property holding corporation" for U.S. federal income tax purposes. 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. Non-U.S. Holders are urged to consult their own tax advisors regarding the U.S. federal income tax considerations that could result if we are, or become, a "U.S. real property holding corporation".

See the sections titled " – Backup Withholding and Information Reporting" and " – Foreign Accounts" for additional information regarding withholding rules that may apply to proceeds of a disposition of our common stock, Pre-funded Warrants or Warrants paid to foreign financial institutions or non-financial foreign entities.

Federal Estate Tax

Common stock or Pre-funded Warrants owned or treated as owned by an individual who is not a citizen or resident of the United States (as specially defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty

provides otherwise. The foregoing may also apply to Warrants. A Non-U.S. Holder should consult his, her, or its own tax advisor regarding the U.S. federal estate tax consequences of the ownership or disposition of shares of our common stock, Pre-funded Warrants and Warrants.

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 (including constructive distributions) on our common stock, Pre-funded Warrants or Warrants 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 U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate, currently 24%, with respect to dividends (or constructive dividends) on our common stock, Pre-funded Warrants or Warrants. Generally, a holder will comply with such procedures if it provides a properly executed IRS Form W-8BEN (or other applicable Form W-8) or otherwise meets documentary evidence requirements for establishing that it is a Non-U.S. Holder, or otherwise establishes an exemption. Dividends paid to Non-U.S. Holders subject to withholding of U.S. federal income tax, as described above under the heading "Dividends," will generally be exempt from U.S. backup withholding.

Information reporting and backup withholding generally will apply to the proceeds of a disposition of our common stock, Pre-funded Warrants or Warrants 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 own 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 timely filed with the IRS.

Foreign Accounts

The Foreign Account Tax Compliance Act, or FATCA, generally imposes a 30% withholding tax on dividends (including constructive dividends) on, and gross proceeds from the sale or other disposition of, our common stock, Pre-funded Warrants and Warrants if paid to a non-U.S. entity unless (i) if the non-U.S. entity is a "foreign financial institution," the non-U.S. entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the non-U.S. entity is not a "foreign financial institution," the non-U.S. entity identifies certain of its U.S. investors, if any, or (iii) the non-U.S. entity is otherwise exempt under FATCA.

Withholding under FATCA generally (1) applies to payments of dividends (including constructive dividends) on our common stock, Pre-funded Warrants and Warrants and (2) will apply to payments of gross proceeds from a sale or other disposition of our common stock, Pre-funded Warrants and Warrants made after December 31, 2018. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this section. Under certain circumstances, a holder may be eligible for refunds or credits of the tax. Holders should consult their

own tax advisors regarding the possible implications of FATCA on their investment in our common stock, Pre-funded Warrants or Warrants.

The preceding discussion of material U.S. federal tax considerations is for information only. It is not tax advice. Prospective investors should consult their own tax advisors regarding the particular U.S. federal, state, local and non-U.S. tax consequences of purchasing, holding and disposing of our common stock, Pre-funded Warrants or Warrants, including the consequences of any proposed changes in applicable laws.

UNDERWRITING

We entered into an underwriting agreement with the underwriters named below on _____, 2018. Oppenheimer & Co. Inc. is acting as the sole book-running manager and representative of the underwriters. The underwriting agreement provides for the purchase of a specific number of units by each of the underwriters. The underwriters' obligations are several, which means that each underwriter is required to purchase a specified number of units, but is not responsible for the commitment of any other underwriter to purchase units. Subject to the terms and conditions of the underwriting agreement, each underwriter has severally agreed to purchase the number of Common Units and Pre-funded Units set forth opposite its name below:

Underwriter	Number of Common Units	Number of Pre-Funded Units
Oppenheimer & Co. Inc.		
Total		

We expect that delivery of the Common Units and/or Pre-funded Units will be made to investors on or about _____, 2018 (such settlement date being referred to as "T+2") against immediately available funds. The underwriters may, in their discretion, allow one or more purchasers to settle on a date that is later than T+2. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. To prevent a failed settlement, purchasers that elect to settle on a date that is later than T+2 shall not be permitted to trade such securities in advance of the applicable settlement date, and should consult with their advisors in connection therewith.

The units offered hereby are expected to be ready for delivery on or about _____, 2018 against payment in immediately available funds.

The underwriters are offering the units subject to various conditions and may reject all or part of any order. The representative of the underwriters has advised us that the underwriters propose initially to offer the Common Units and the Pre-funded Units, as the case may be, to the public at the public offering prices set forth on the cover page of this prospectus and to dealers at a price less a concession not in excess of \$ _____ per share of unit to brokers and dealers. After the units are released for sale to the public, the representative may change the offering price, the concession, and other selling terms at various times.

The following table provides information regarding the amount of the discount and commissions to be paid to the underwriters by us, before expenses:

	Per Common Unit	Per Pre-Funded Unit	Total
Public offering price			
Underwriting discount and commissions			
Proceeds, before expenses, to us			

We have agreed, subject to certain conditions, limitations and exceptions, to provide the Oppenheimer & Co. Inc. with a right of first refusal to act as underwriter, initial purchaser, placement agent or selling agent, as the case may be, on any equity financing that may be undertaken by us on or before _____.

We estimate that our total expenses of the offering, excluding the estimated underwriting discount and commissions, will be \$425,000, which includes \$125,000 of fees and expenses for which we have agreed to reimburse the underwriters.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act of 1933.

We and our officers and directors have agreed to a 90-day "lock-up" with respect to shares of our common stock and other of our securities that they beneficially own, including securities that are convertible into shares of common stock and securities that are exchangeable or exercisable for shares of common stock. This means that, subject to certain exceptions, for a period of 90 days following the date of this prospectus, we and such persons may not offer, sell, pledge or otherwise dispose of these securities without the prior written consent of Oppenheimer & Co. Inc.

The underwriters have advised us that they do not intend to conduct any stabilization or over-allotment activities in connection with this offering.

Electronic Delivery of Prospectus: A prospectus in electronic format may be delivered to potential investors by one or more of the underwriters participating in this offering. The prospectus in electronic format will be identical to the paper version of such prospectus. Other than the prospectus in electronic format, the information on any underwriter's website and any information contained in any other website maintained by an underwriter is not part of this prospectus or the registration statement of which this prospectus forms a part.

The underwriters and their affiliates have provided in the past and may provide from time to time in the future certain commercial banking, financial advisory, investment banking and other services for us and our affiliates in the ordinary course of their business, for which they may receive customary fees and commissions. In addition, from time to time, the underwriters and their affiliates may effect transactions for their own accounts or the accounts of customers, and hold on behalf of themselves or their customers, long or short positions in our debt or equity securities or loans, and may do so in the future.

Notice to Prospective Investors in the European Economic Area

In relation to each member state of the European Economic Area that has implemented the Prospectus Directive (each, a relevant member state), with effect from and including the date on which the Prospectus Directive is implemented in that relevant member state (the relevant implementation date), an offer of our securities described in this prospectus may not be made to the public in that relevant member state other than:

- to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- to fewer than 100 or, if the relevant member state has implemented the relevant provision of the 2010 PD Amending Directive, 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the relevant Dealer or Dealers nominated by us for any such offer; or
- in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares of our securities shall require us or the underwriters to publish a prospectus pursuant to Article 3 of the Prospectus Directive.

For purposes of this provision, the expression an "offer of securities to the public" 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 securities to be offered so as to enable an investor to decide to purchase or subscribe for any securities, as the expression may be varied in that member state by any measure implementing the Prospectus Directive in that member state, the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the relevant member state) and includes any relevant implementing measure in the relevant member state, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

We and the underwriters have not authorized and do not authorize the making of any offer of our securities through any financial intermediary on our or their behalf, other than offers made by the underwriters with a view to the final placement of our securities as contemplated in this prospectus. Accordingly, no purchaser of our securities, other than the underwriters, is authorized to make any further offer of our securities on behalf of us or the underwriters.

Notice to Prospective Investors in the United Kingdom

This prospectus is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors within the meaning of Article 2(1) (e) of the Prospectus Directive that are also (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, or 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 (each such person being referred to as a relevant person).

This prospectus and its contents are confidential and should not be distributed, published or reproduced (in whole or in part) or disclosed by recipients to any other persons in the United Kingdom. Any person in the United Kingdom that is not a relevant person should not act or rely on this document or any of its contents.

Notice to Prospective Investors in Canada

This document constitutes an "exempt offering document" as defined in and for the purposes of applicable Canadian securities laws. No prospectus has been filed with any securities commission or similar regulatory authority in Canada in connection with the offer and sale of the securities described herein (the "Securities"). No securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon this document or on the merits of the Securities and any representation to the contrary is an offence.

Canadian investors are advised that this document has been prepared in reliance on section 3A.3 of National Instrument 33-105 Underwriting Conflicts ("NI 33-105"). Pursuant to section 3A.3 of NI 33-105, this document is exempt from the requirement to provide investors with certain conflicts of interest disclosure pertaining to "connected issuer" and/or "related issuer" relationships as would otherwise be required pursuant to subsection 2.1(1) of NI 33-105.

Resale Restrictions

The offer and sale of the securities in Canada is being made on a private placement basis only and is exempt from the requirement to prepare and file a prospectus under applicable Canadian securities laws. Any resale of Securities acquired by a Canadian investor in this offering must be made in accordance with applicable Canadian securities laws, which may vary depending on the relevant jurisdiction, and which may require resales to be made in accordance with Canadian prospectus requirements, a statutory exemption from the prospectus requirements, in a transaction exempt from the prospectus requirements or otherwise under a discretionary exemption from the prospectus

requirements granted by the applicable local Canadian securities regulatory authority. These resale restrictions may under certain circumstances apply to resales of the Securities outside of Canada.

Representations of Purchasers

Each Canadian investor who purchases the securities will be deemed to have represented to the issuer and to each dealer from whom a purchase confirmation is received, as applicable, that the investor (i) is purchasing as principal, or is deemed to be purchasing as principal in accordance with applicable Canadian securities laws, for investment only and not with a view to resale or redistribution; (ii) is an "accredited investor" as such term is defined in section 1.1 of National Instrument 45-106 Prospectus Exemptions ("NI 45-106") or, in Ontario, as such term is defined in section 73.3(1) of the Securities Act (Ontario); and (iii) is a "permitted client" as such term is defined in section 1.1 of National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations.

Taxation and Eligibility for Investment

Any discussion of taxation and related matters contained in this document does not purport to be a comprehensive description of all of the tax considerations that may be relevant to a Canadian investor when deciding to purchase the securities and, in particular, does not address any Canadian tax considerations. No representation or warranty is hereby made as to the tax consequences to a resident, or deemed resident, of Canada of an investment in the securities or with respect to the eligibility of the securities for investment by such investor under relevant Canadian federal and provincial legislation and regulations.

Rights of Action for Damages or Rescission

Securities legislation in certain of the Canadian jurisdictions provides certain purchasers of securities pursuant to an offering memorandum, including where the distribution involves an "eligible foreign security" as such term is defined in Ontario Securities Commission Rule 45-501 Ontario Prospectus and Registration Exemptions and in Multilateral Instrument 45-107 Listing Representation and Statutory Rights of Action Disclosure Exemptions, as applicable, with a remedy for damages or rescission, or both, in addition to any other rights they may have at law, where the offering memorandum, or other offering document that constitutes an offering memorandum, and any amendment thereto, contains a "misrepresentation" as defined under applicable Canadian securities laws. These remedies, or notice with respect to these remedies, must be exercised or delivered, as the case may be, by the purchaser within the time limits prescribed under, and are subject to limitations and defences under, applicable Canadian securities legislation. In addition, these remedies are in addition to and without derogation from any other right or remedy available at law to the investor.

Language of Documents

Upon receipt of this document, each Canadian investor hereby confirms that it has expressly requested that all documents evidencing or relating in any way to the sale of the Securities described herein (including for greater certainty any purchase confirmation or any notice) be drawn up in the English language only. *Par la réception de ce document, chaque investisseur canadien confirme par les présentes qu'il a expressément exigé que tous les documents faisant foi ou se rapportant de quelque manière que ce soit à la vente des valeurs mobilières décrites aux présentes (incluant, pour plus de certitude, toute confirmation d'achat ou tout avis) soient rédigés en anglais seulement.*

Notice to Prospective Investors in Australia

No prospectus or other disclosure document (as defined in the Corporations Act 2001 (Cth) of Australia, or Corporations Act) in relation to our securities has been or will be lodged with the Australian Securities & Investments Commission, or ASIC. This document has not been lodged with ASIC and is only directed to certain categories of exempt persons. Accordingly, if you receive this document in Australia you confirm and warrant that you are either:

- a "sophisticated investor" under section 708(8)(a) or (b) of the Corporations Act;
- a "sophisticated investor" under section 708(8)(c) or (d) of the Corporations Act and that you have provided an accountant's certificate to us which complies with the requirements of section 708(8)(c)(i) or (ii) of the Corporations Act and related regulations before the offer has been made;
- a person associated with the company under section 708(12) of the Corporations Act; or
- a "professional investor" within the meaning of section 708(11)(a) or (b) of the Corporations Act, and to the extent that you are unable to confirm or warrant that you are an exempt sophisticated investor, associated person or professional investor under the Corporations Act any offer made to you under this document is void and incapable of acceptance; and
- you warrant and agree that you will not offer any of our securities for resale in Australia within 12 months of those securities being issued unless any such resale offer is exempt from the requirement to issue a disclosure document under section 708 of the Corporations Act.

Notice to Prospective Investors in France

Neither this prospectus nor any other offering material relating to our securities described in this prospectus has been submitted to the clearance procedures of the *Autorité des Marchés Financiers* or of the competent authority of another member state of the European Economic Area and notified to the *Autorité des Marchés Financiers*. These securities have not been offered or sold and will not be offered or sold, directly or indirectly, to the public in France. Neither this prospectus nor any other offering material relating to our securities has been or will be:

- released, issued, distributed or caused to be released, issued or distributed to the public in France; or
- used in connection with any offer for subscription or sale of our securities to the public in France.

Such offers, sales and distributions will be made in France only:

- to qualified investors (*investisseurs qualifiés*) and/or to a restricted circle of investors (*cercle restreint d'investisseurs*), in each case investing for their own account, all as defined in, and in accordance with articles L.411-2, D.411-1, D.411-2, D.734-1, D.744-1, D.754-1 and D.764-1 of the French Code monétaire et financier;
- to investment services providers authorized to engage in portfolio management on behalf of third parties; or
- in a transaction that, in accordance with article L.411-2-II-1°-or-2°-or 3° of the French Code monétaire et financier and article 211-2 of the General Regulations (*Règlement Général*) of the *Autorité des Marchés Financiers*, does not constitute a public offer (*appel public à l'épargne*).

Our securities may be resold directly or indirectly, only in compliance with articles L.411-1, L.411-2, L.412-1 and L.621-8 through L.621-8-3 of the French Code monétaire et financier.

Notice to Prospective Investors in Chile

Our securities are not registered in the Securities Registry (Registro de Valores) or subject to the control of the Chilean Securities and Exchange Commission (Superintendencia de Valores y Seguros de Chile). This prospectus and other offering materials relating to the offer of the securities do not constitute a public offer of, or an invitation to subscribe for or purchase, the shares in the Republic of Chile, other than to individually identified purchasers pursuant to a private offering within the meaning of Article 4 of the Chilean Securities Market Act (Ley de Mercado de Valores) (an offer that is not "addressed to the public at large or to a certain sector or specific group of the public").

Notice to Prospective Investors in Hong Kong

Our 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 Ordinance (Cap. 32, Laws of Hong Kong), or (ii) to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a "prospectus" within the meaning of the Companies Ordinance (Cap. 32, Laws of Hong Kong) and no advertisement, invitation or document relating to our 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 laws of Hong Kong) other than with respect to our securities which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder.

Notice to Prospective Investors in the State of Israel

In the State of Israel this prospectus shall not be regarded as an offer to the public to purchase securities under the Israeli Securities Law, 5728 - 1968, which requires a prospectus to be published and authorized by the Israel Securities Authority, if it complies with certain provisions of Section 15 of the Israeli Securities Law, 5728 - 1968, including, inter alia, if: (i) the offer is made, distributed or directed to not more than 35 investors, subject to certain conditions (the "Addressed Investors"); or (ii) the offer is made, distributed or directed to certain qualified investors defined in the First Addendum of the Israeli Securities Law, 5728 - 1968, subject to certain conditions (the "Qualified Investors"). The Qualified Investors shall not be taken into account in the count of the Addressed Investors and may be offered to purchase securities in addition to the 35 Addressed Investors. The company has not and will not take any action that would require it to publish a prospectus in accordance with and subject to the Israeli Securities Law, 5728 - 1968. We have not and will not distribute this prospectus or make, distribute or direct an offer to subscribe for our securities to any person within the State of Israel, other than to Qualified Investors and up to 35 Addressed Investors.

Qualified Investors may have to submit written evidence that they meet the definitions set out in of the First Addendum to the Israeli Securities Law, 5728 - 1968. In particular, we may request, as a condition to be offered securities, that Qualified Investors will each represent, warrant and certify to us and/or to anyone acting on our behalf: (i) that it is an investor falling within one of the categories listed in the First Addendum to the Israeli Securities Law, 5728 - 1968; (ii) which of the categories listed in the First Addendum to the Israeli Securities Law, 5728 - 1968 regarding Qualified Investors is applicable to it; (iii) that it will abide by all provisions set forth in the Israeli Securities Law, 5728 - 1968 and the regulations promulgated thereunder in connection with the offer to be issued common stock; (iv) that

the securities that it will be issued are, subject to exemptions available under the Israeli Securities Law, 5728 - 1968: (a) for its own account; (b) for investment purposes only; and (c) not issued with a view to resale within the State of Israel, other than in accordance with the provisions of the Israeli Securities Law, 5728 - 1968; and (v) that it is willing to provide further evidence of its Qualified Investor status. Addressed Investors may have to submit written evidence in respect of their identity and may have to sign and submit a declaration containing, inter alia, the Addressed Investor's name, address and passport number or Israeli identification number.

Notice to Prospective Investors in Japan

Our securities offered in this prospectus have not been and will not be registered under the Financial Instruments and Exchange Law of Japan. Our securities have not been offered or sold and will not be offered or sold, directly or indirectly, in Japan or to or for the account of any resident of Japan (including any corporation or other entity organized under the laws of Japan), except (i) pursuant to an exemption from the registration requirements of the Financial Instruments and Exchange Law and (ii) in compliance with any other applicable requirements of Japanese law.

Notice to Prospective Investors in 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 our securities may not be circulated or distributed, nor may our securities 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 under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore, or the SFA, (ii) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), 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 compliance with conditions set forth in the SFA.

Where our securities are subscribed or purchased under Section 275 of the SFA by a relevant party 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; or
- a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

shares, debentures and units of our securities and debentures of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired our securities pursuant to an offer made under Section 275 of the SFA except:

- to an institutional investor (for corporations, under Section 274 of the SFA) or to a relevant person defined in Section 275(2) of the SFA, or to any person pursuant to an offer that is made on terms that such shares, debentures and units of our securities and debentures of that corporation or such rights and interest in that trust are acquired at a consideration of not less than \$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, and further for corporations, in accordance with the conditions specified in Section 275 of the SFA;
- where no consideration is or will be given for the transfer; or
- where the transfer is by operation of law.

LEGAL MATTERS

The validity of the securities offered hereby is being passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP, Boston, Massachusetts. Lowenstein Sandler LLP, New York, New York, is acting as counsel for the underwriters in connection with this offering.

EXPERTS

Ernst & Young, LLP, independent registered public accounting firm, has audited our consolidated financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2017, as set forth in their report (which contains an explanatory paragraph describing the conditions that raise substantial doubt about the Company's ability to continue as a going concern as described in Note 1 – Organization and Operations to the consolidated financial statements), which is incorporated by reference in this prospectus and elsewhere in the registration statement. Our financial statements are incorporated by reference in reliance on Ernst & Young LLP's report, given on their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the Securities and Exchange Commission, or the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov>. Copies of certain information filed by us with the SEC are also available on our website at www.catabasis.com. Our website is not a part of this prospectus and is not incorporated by reference in this prospectus. You may also read and copy any document we file at the SEC's Public Reference Room, 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room.

This prospectus is part of a registration statement we filed with the SEC. This prospectus omits some information contained in the registration statement in accordance with SEC rules and regulations. You should review the information and exhibits in the registration statement for further information about us and our consolidated subsidiary and the securities we are offering. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified by reference to these filings. You should review the complete document to evaluate these statements.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to incorporate by reference much of the information we file with it, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference in this prospectus is considered to be part of this prospectus. Any statement contained in a previously filed document incorporated by reference will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus modifies or replaces that statement. This prospectus incorporates by reference the documents listed below (File No. 001-37467 unless otherwise indicated), other than the portions of those documents not deemed to be filed.

- our Annual Report on Form 10-K for the year ended December 31, 2017;

- our Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2018;
- our definitive proxy statement on Schedule 14A filed with the SEC on April 26, 2018;
- the information under the caption "Certain Relationships and Related Person Transactions" from our definitive proxy statements on Schedule 14A filed with the SEC on April 26, 2016 and April 26, 2017; and
- our Current Reports on Form 8-K filed with the SEC on February 13, 2018, April 17, 2018 and June 8, 2018.

Upon written or oral request, we will provide, without charge, to each person, including any beneficial owner, to whom a copy of this prospectus is delivered a copy of the documents incorporated by reference into this prospectus. You may request a copy of these filings, and any exhibits we have specifically incorporated by reference as an exhibit in this prospectus, at no cost by writing or telephoning us at the following address:

Catabasis Pharmaceuticals, Inc.

One Kendall Square
Building 1400E, Suite B14202
Cambridge, MA 02139
Telephone: 617-349-1971

You also may access these filings on our Internet site at www.catabasis.com. Our web site and the information contained on that site, or connected to that site, are not incorporated into this prospectus or the Registration Statement on Form S-1.

CATABASIS PHARMACEUTICALS, INC.

20,270,270 Common Units, Each Consisting of One Share of Common Stock and a Warrant to Purchase One Share of Common Stock

20,270,270 Pre-funded Units, Each Consisting of a Pre-funded Warrant to Purchase One Share of Common Stock and a Warrant to Purchase One Share of Common Stock

PROSPECTUS

, 2018

Oppenheimer & Co.

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. Other Expenses of Issuance and Distribution.

The expenses payable by Catabasis Pharmaceuticals, Inc. ("we," "us," "our," the "Registrant" or the "Company") in connection with the issuance and distribution of the securities being registered (other than underwriting discounts and commissions, if any) are set forth below. Each item listed is estimated, except for the Securities and Exchange Commission (the "SEC") registration fee.

SEC registration fee	\$ 8,217
Financial Industry Regulatory Authority, Inc. filing fee	10,400
Legal fees and expenses	295,000
Accounting fees and expenses	75,000
Transfer agent fees and expenses	5,000
Printing fees and expenses	20,000
Miscellaneous	11,383
Total	<u>\$ 425,000</u>

Item 14. Indemnification of Directors and Officers.

Section 102 of the Delaware General Corporation Law (the "DGCL") permits a corporation to eliminate the personal liability of its directors or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of Delaware corporate law or obtained an improper personal benefit. Our certificate of incorporation provides that no director shall be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the DGCL prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she is or is threatened to be made a party by reason of such position, if such person 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 corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnification for such expenses which the Court of Chancery or such other court shall deem proper.

Our certificate of incorporation provides that we will indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of us), by reason of the fact that he or she is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an Indemnitee), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), judgments,

finances and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding and any appeal therefrom if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, and, with respect to any criminal action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful.

Our certificate of incorporation also provides that we will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of us to procure a judgment in our favor by reason of the fact that the Indemnitee is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee or, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, and any appeal therefrom, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to us, unless a court determines that, despite such adjudication but in view of all of the circumstances, he or she is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified by us against all expenses (including attorneys' fees) actually and reasonably incurred by him or her or on his or her behalf in connection therewith. If we do not assume the defense, expenses must be advanced to an Indemnitee under certain circumstances.

We have entered into indemnification agreements with our directors and executive officers. In general, these agreements provide that we will indemnify the director or executive officer to the fullest extent permitted by law for claims arising in his or her capacity as a director or officer of our company or in connection with their service at our request for another corporation or entity. The indemnification agreements also provide for procedures that will apply in the event that a director or executive officer makes a claim for indemnification and establish certain presumptions that are favorable to the director or executive officer.

We maintain a general liability insurance policy that covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers.

In any underwriting agreement we enter into in connection with the sale of the securities being registered hereby, the underwriters will agree to indemnify, under certain conditions, us, our directors and officers (as well as certain other persons) against certain liabilities arising in connection with such offering.

Insofar as the foregoing provisions permit indemnification of directors, executive officers, or persons controlling us for liability arising under the Securities Act of 1933, as amended (the "Securities Act"), 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.

Item 15. Recent Sales of Unregistered Securities.

Set forth below is information regarding the shares of common stock and preferred stock and the warrants issued, and options granted, by us in the three years preceding the filing of this registration statement that were not registered under the Securities Act.

Warrant Exercises

- (1) In February 2016, we issued 2,917 shares of our common stock upon the exercise of warrants at an exercise price of \$1.67 per share.
-

- (2) In March 2016, we issued 11,668 shares of our common stock upon the exercise of warrants at an exercise price of \$1.67 per share, and 5,987 shares of our common stock upon the cashless exercise of warrants to purchase 8,753 shares of our common stock.
- (3) In April 2016, we issued 10,669 shares of our common stock upon the exercise of warrants at an exercise price of \$1.67 per share.

All recipients either received adequate information about us or had access, through relationships with us, to such information. These shares of our common stock were issued in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) of the Securities Act, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required.

Conversion of Shares of Preferred Stock

On June 30, 2015, upon the closing of our initial public offering, all 116,030,239 shares of our then-outstanding redeemable convertible preferred stock were automatically converted into 9,029,549 shares of common stock. The issuance of such shares of common stock was exempt from the registration requirements of the Securities Act, pursuant to Section 3(a)(9) of the Securities Act.

Stock Option Grants and Option Exercises

Between June 1, 2015 and August 14, 2015, we granted options to purchase an aggregate of 217,337 shares of common stock, with exercise prices ranging from \$12.21 to \$14.05 per share, to employees, directors and consultants pursuant to our 2008 equity incentive plan. Between June 1, 2015 and August 14, 2015, we did not issue any shares of common stock upon the exercise of options.

No underwriters were involved in the foregoing issuance of securities. The issuances of stock options and the shares of our common stock issued upon the exercise of the options described above were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act, or as set forth in Section 4(a)(2) of 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 relationships with us, to such information.

Item 16. Exhibits and Financial Statement Schedules.

A list of exhibits filed with this registration statement on Form S-1 is set forth in the following Exhibit Index.

EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Description of Exhibit</u>
1.1	Form of Underwriting Agreement
3.1	Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on July 1, 2015)
3.2	Amended and Restated By-laws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on July 1, 2015)
4.1	Specimen stock certificate evidencing the shares of common stock (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 11, 2015)
4.2	Form of Pre-Funded Warrant
4.3	Form of Warrant
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP
10.1	Warrant to purchase shares of Series B Preferred Stock issued on August 27, 2014 by the Registrant to Square 1 Bank (incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.2	Warrant to purchase shares of Series B Preferred Stock issued on August 27, 2014 by the Registrant to Midcap Financial SBIC, L.P. (incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.3	Amended and Restated 2008 Equity Incentive Plan, as amended (incorporated by reference to Exhibit 10.4 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.4	Form of Incentive Stock Option Agreement under Amended and Restated 2008 Equity Incentive Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.5	Form of Nonstatutory Stock Option Agreement under Amended and Restated 2008 Equity Incentive Plan (incorporated by reference to Exhibit 10.6 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.6	2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.7 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 11, 2015)
10.7	Form of Incentive Stock Option Agreement under 2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.8 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 3, 2015)
10.8	Form of Nonstatutory Stock Option Agreement under 2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.9 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 3, 2015)

<u>Exhibit Number</u>	<u>Description of Exhibit</u>
10.9	2015 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.22 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 3, 2015)
10.10	Second Amended and Restated Investors' Rights Agreement, dated as of March 17, 2015, among the Registrant and the other parties thereto, as amended June 10, 2015 (incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on June 11, 2015)
10.11	Amended and Restated Employment Agreement, dated as of April 7, 2010, by and between the Registrant and Jill C. Milne, as amended (incorporated by reference to Exhibit 10.10 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.12	Offer Letter, dated as of September 30, 2015, by and between the Registrant and Deirdre Cunnane (incorporated by reference to Exhibit 10.23 to the Registrant's Annual Report on Form 10-K (File No. 001-37467) filed with the Securities and Exchange Commission on March 15, 2016)
10.13	Catabasis Pharmaceuticals, Inc. Executive Severance Benefits Plan effective April 15, 2016 (incorporated by reference to Exhibit 99.1 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on April 19, 2016)
10.14	Form of Indemnification Agreement by and between the Registrant and each of its executive officers and directors (incorporated by reference to Exhibit 10.13 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.15	Credit and Security Agreement, dated as of August 27, 2014, by and among the Registrant, Midcap Financial SBIC, L.P., Square 1 Bank and the other lenders identified therein, as amended on March 31, 2015 (incorporated by reference to Exhibit 10.14 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.16	Second Amendment to Credit and Security Agreement, dated as of December 22, 2015, by and among the Registrant, Midcap Financial SBIC, L.P., Square 1 Bank and the other lenders identified therein (incorporated by reference to Exhibit 10.24 to the Registrant's Annual Report on Form 10-K (File No. 001-37467) filed with the Securities and Exchange Commission on March 15, 2016)
10.17	Indenture of Lease, dated as of December 17, 2010, by and between the Registrant and RB Kendall Fee, LLC, as amended (incorporated by reference to Exhibit 10.15 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.18	Second Amendment of Lease, dated as of July 16, 2015, by and between the Registrant and DWF IV One Kendall, LLC (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-37467) filed with the Securities and Exchange Commission on November 11, 2015)
10.19	Third Amendment of Lease, dated as of November 3, 2016, by and between the Registrant and DWF IV One Kendall, LLC (incorporated by reference to Exhibit 99.1 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on November 7, 2016)

<u>Exhibit Number</u>	<u>Description of Exhibit</u>
10.20	Fourth Amendment of Lease, dated as of August 7, 2017, by and between the Registrant and ARE-MA REGION NO. 59, LLC (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-37467) filed with the Securities and Exchange Commission on August 10, 2017)
10.21	Warrant to purchase shares of Series B Preferred Stock issued on March 31, 2015 to Square 1 Bank (incorporated by reference to Exhibit 10.19 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.22	Warrant to purchase shares of Series B Preferred Stock issued on March 31, 2015 to Midcap Financial Trust (incorporated by reference to Exhibit 10.20 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.23	Warrant to purchase shares of Series B Preferred Stock issued on March 31, 2015 to Flexpoint MCLS Holdings, LLC (incorporated by reference to Exhibit 10.21 to the Registrant's Registration Statement on Form S-1 (File No. 333-204144) filed with the Securities and Exchange Commission on May 13, 2015)
10.24	Summary of Non-employee Director Compensation Program (incorporated by reference to Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-37467) filed with the Securities and Exchange Commission on May 12, 2016)
10.25	Sales Agreement, dated as of August 11, 2016, by and between the Registrant and Cowen and Company, LLC (incorporated by reference to Exhibit 1.1 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on August 11, 2016)
10.26	Sales Agreement, dated as of October 13, 2017, by and between the Registrant and Cowen and Company, LLC (incorporated by reference to Exhibit 1.1 to the Registrant's Current Report on Form 8-K (File No. 001-37467) filed with the Securities and Exchange Commission on October 13, 2017)
21.1	Subsidiaries of the Registrant (incorporated by reference to Exhibit 21.1 to the Registrant's Annual Report on Form 10-K (File No. 001-37467) filed with the Securities and Exchange Commission on March 15, 2016)
23.1	Consent of Ernst & Young LLP, independent registered public accounting firm
23.2	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)
24.1*	Power of Attorney

* Previously filed

Item 17. Undertakings.

The undersigned registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
 - (i) to include any prospectus required by Section 10(a)(3) of the Securities Act of 1933, as amended (the "Securities Act");
 - (ii) to reflect in the prospectus any facts or events arising after the effective date of this registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this registration
-

statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Securities and Exchange Commission (the "Commission") pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

- (iii) to include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement.
- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment 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.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) That, for the purpose of determining liability of the registrant under the Securities Act to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:
- (i) any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
 - (ii) any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
 - (iii) the portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
 - (iv) any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.
- (5) That:
- (i) For purposes of determining any liability under the Securities Act of 1933, 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 of 1933 shall be deemed to be part of this registration statement as of the time it was declared effective; and
 - (ii) For the purpose of determining any liability under the Securities Act of 1933, 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.
- (6) Insofar as indemnification for liabilities arising under the Securities Act of 1933 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 of 1933 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 of 1933 and will be governed by the final adjudication of such issue.

[·] Common Units, Each Consisting of One Share of Common Stock and a Warrant to Purchase One Share of Common Stock

[·] Pre-Funded Units, Each Consisting of a Pre-Funded Warrant to Purchase One Share of Common Stock and a Warrant to Purchase One Share of Common Stock

CATABASIS PHARMACEUTICALS, INC.

FORM OF UNDERWRITING AGREEMENT

[·], 2018

Oppenheimer & Co. Inc.
 as Representative of the several
 Underwriters named on Schedule 1 hereto
 c/o Oppenheimer & Co. Inc.
 85 Broad Street
 New York, New York 10004

Ladies and Gentlemen:

Catabasis Pharmaceuticals, Inc., a Delaware corporation (the "Company"), proposes, subject to the terms and conditions stated herein, to issue and sell to Oppenheimer & Co. Inc., as representative (the "Representative") of the several underwriters named in Schedule 1 hereto (each, an "Underwriter"), (i) an aggregate of [·] authorized but unissued shares (the "Shares") of Common Stock, par value \$0.001 per share, of the Company (the "Common Stock"), (ii) pre-funded warrants (the "Pre-Funded Warrants") to purchase up to an aggregate of [·] shares of Common Stock at an exercise price of \$0.01 per share (the "Pre-Funded Warrant Shares"), and (iii) warrants (the "Warrants") to purchase up to an aggregate of [·] shares of Common Stock (the "Warrant Shares"). The Shares, the Warrants, the Pre-Funded Warrants, the Pre-Funded Warrant Shares and the Warrant Shares are collectively referred to as the "Securities."

The transaction consists of units. The units will consist of (i) Shares and Warrants, each consisting of one share of Common Stock and a Warrant to purchase one share of Common Stock, sold together as a fixed combination (the "Common Units"), or (ii) Pre-Funded Warrants and Warrants, each consisting of a Pre-Funded Warrant that is exercisable for one share of Common Stock and a Warrant to purchase one share of Common Stock, sold together as a fixed combination (the "Pre-Funded Units" and together with the Common Units, the "Units"). The Shares and the Warrants comprising the Common Units and the Pre-Funded Warrants and the Warrants comprising the Pre-Funded Units shall be immediately separable and transferable upon issuance. The terms of the Warrants are set forth in the form of Warrant attached hereto as **Exhibit A**. The terms of the Pre-Funded Warrants are set forth in the form of Pre-Funded Warrant attached hereto as **Exhibit B**.

The Company and the Underwriters hereby confirm their agreement as follows:

1. Registration Statement and Prospectus. The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") a registration statement on Form S-1 (File No. 333-225410), including the related preliminary prospectus or prospectuses, covering the registration of the sale of the Securities under the Securities Act of 1933, as amended (the "Securities Act"), and the rules and regulations of the Commission thereunder (the "Rules and Regulations"). Promptly after execution and delivery of this Agreement, the Company will prepare and file a prospectus in accordance with the provisions of Rule 430A ("Rule 430A") of the Rules and Regulations and Rule 424(b) ("Rule 424(b)") of the Rules and Regulations. The information included in such prospectus that was omitted from such registration statement at the time it became effective but that is deemed to be part of such registration statement at the time it became effective pursuant to Rule 430A(b) is herein called the "Rule 430A Information." Such registration statement, including the amendments thereto, the exhibits thereto and any schedules thereto, at the time it became effective, and including the Rule 430A Information, is herein called the "Registration Statement." Any registration statement filed pursuant to Rule 462(b) of the Rules and Regulations is herein called the "Rule 462(b) Registration Statement" and, after such filing, the term "Registration Statement" shall include the Rule 462(b) Registration Statement. Each prospectus used prior to the effectiveness of the Registration Statement, and each prospectus that omitted the Rule 430A Information that was used after such effectiveness and prior to the execution and delivery of this Agreement, is herein called a "preliminary prospectus." The prospectus, in the form first furnished to the Underwriters for use in connection with the offering of the Securities, is herein called the "Prospectus." For purposes of this Agreement, all references to the Registration Statement, any preliminary prospectus, the Prospectus or any amendment or supplement to any of the foregoing shall be deemed to include the copy filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval system or any successor system ("EDGAR").

2

All references in this Agreement to financial statements and schedules and other information which is "described," "contained," "included" or "stated" in the Registration Statement or the Prospectus (or other references of like import) shall be deemed to mean and include all such financial statements, pro forma financial information and schedules and other information which is incorporated by reference in or otherwise deemed by the Rules and Regulations to be a part of or included in the Registration Statement or the Prospectus, as the case may be; and all references in this Agreement to amendments or supplements to the Registration Statement or the Prospectus shall be deemed to mean and include the subsequent filing of any document under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), that is deemed to be incorporated therein by reference or otherwise deemed by the Rules and Regulations to be a part thereof.

2. Representations and Warranties of the Company Regarding the Offering.

(a) The Company represents and warrants to, and agrees with, the Underwriters, as of the date hereof and as of the Closing Date (as defined in Section 4(b) below), except as otherwise indicated, as follows:

(i) At the time of effectiveness, as of the date hereof and at the Closing Date, the Registration Statement and any post-effective amendment thereto complied or will comply in all material respects with the requirements of the Securities Act and the Rules and Regulations and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The Time of Sale Disclosure Package (as defined in Section 2(a)(iii)(A)(1) below) as of the date hereof and at the Closing Date, and the Prospectus, as amended or supplemented, as of its date, at the time of filing pursuant to Rule 424(b) under the Securities Act and at the Closing Date, did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the two immediately preceding sentences shall not apply to statements in or omissions from the Registration Statement, the Time of Sale Disclosure Package or any Prospectus in reliance upon, and in conformity with, written information furnished to the Company through the Representative by or behalf of any Underwriter specifically for use in the preparation thereof, which written information is described in Section 7(f). The Registration Statement contains all exhibits and schedules required to be filed by the Securities Act or the Rules and Regulations. No stop order preventing or suspending the effectiveness or use of the Registration Statement or any Prospectus is in effect and no proceedings for such purpose have been instituted or are pending, or, to the knowledge of the Company, are contemplated or threatened by the Commission.

(ii) The Company has not distributed any prospectus or other offering material in connection with the offering and sale of the Securities other than the Time of Sale Disclosure Package and the roadshow or investor presentations delivered to and approved by the Representative in connection with the marketing of the offering of the Securities (the "Marketing Materials"). The documents incorporated by reference in the

3

Registration Statement, the Time of Sale Disclosure Package and any Prospectus, when they became effective or were filed with the Commission, as the case may be, conformed in all material respects to the requirements of the Securities Act or the Exchange Act and the respective rules thereunder, as applicable, were filed on a timely basis with the Commission and none of such documents, when they were filed (or, if amendments to such documents were filed, when such amendments were filed), contained an untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading. Any further documents so filed and incorporated by reference in the Registration Statement, the Time of Sale Disclosure Package or the Prospectus, when such documents are filed with the Commission, will conform in all material respects to the requirements of the Exchange Act, and will not contain an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(iii) (A) The Company has provided to the Representative a copy of each Issuer Free Writing Prospectus (as defined below) used in the sale of the Securities, if any. The Company has filed all Issuer Free Writing Prospectuses required to be so filed with the Commission, and no stop order preventing or suspending the effectiveness or use of any Issuer Free Writing Prospectus is in effect and no proceedings for such purpose have been instituted or are pending, or, to the knowledge of the Company, are contemplated or threatened by the Commission. When taken together with the rest of the Time of Sale Disclosure Package or the Prospectus, no Issuer Free Writing Prospectus, as of its date of first use and at the Closing Date, has, does or will include (1) any untrue statement of a material fact or omission of any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading, or (2) information that conflicted, conflicts or will conflict with the information contained in the Registration Statement or the Prospectus. The representations and warranties set forth in the immediately preceding sentence shall not apply to statements in or omissions from the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus in reliance upon, and in conformity with, written information furnished to the Company by the Representative by or on behalf of any Underwriter specifically for use in the preparation thereof. As used in this paragraph and elsewhere in this Agreement:

(1) "Time of Sale Disclosure Package" means each Issuer Free Writing Prospectus, the most recent preliminary prospectus that is distributed to investors prior to the time of effectiveness and any description of the transaction provided by the Representative included in Schedule II.

(2) "Issuer Free Writing Prospectus" means any "issuer free writing prospectus," as defined in Rule 433 under the Securities Act, relating to the Securities that (A) is required to be filed with the Commission by the Company, or (B) is exempt from filing pursuant to Rule 433(d)(5)(i) or (d)(8) under the Securities Act, in each case in the form filed or required to be filed with the Commission or, if not required to be filed, in the form retained in the Company's records pursuant to Rule 433(g) under the Securities Act. For the

4

avoidance of doubt, the term "Issuer Free Writing Prospectus" shall not include any "free writing prospectus" (as defined in Rule 405 under the Securities Act) that was prepared by the Underwriters or provided to any person by the Underwriters without the knowledge and consent of the Company.

(B) At the time of filing of the Registration Statement and at the date hereof, the Company was not and is not an "ineligible issuer," as defined in Rule 405 under the Securities Act or an "excluded issuer" as defined in Rule 164 under the Securities Act.

(C) Each Issuer Free Writing Prospectus satisfied, as of its issue date and at all subsequent times through the Prospectus Delivery Period (defined below), all other conditions as may be applicable to its use as set forth in Rules 164 and 433 under the Securities Act, including any legend, record-keeping or other requirements.

(iv) The financial statements of the Company, together with the related notes, included or incorporated by reference in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus comply in all material respects with the applicable requirements of the Securities Act and the Exchange Act and fairly present the financial condition of the Company as of the dates indicated and the results of

operations and changes in cash flows for the periods therein specified in conformity with United States generally accepted accounting principles (“GAAP”) consistently applied throughout the periods involved; and the supporting schedules included in or incorporated by reference into the Registration Statement present fairly the information required to be stated therein. The pro forma and pro forma as adjusted financial information, if any, included in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus has been properly compiled and prepared in all material respects in accordance with the applicable requirements of the Securities Act and the Rules and Regulations and includes all adjustments necessary to present fairly in accordance with GAAP the pro forma and as adjusted financial position of the respective entity or entities presented therein at the respective dates indicated and their cash flows and the results of operations for the respective periods specified. The assumptions used in preparing the pro forma and pro forma as adjusted financial information included in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus provide a reasonable basis for presenting the significant effects directly attributable to the transactions or events described therein. The related pro forma and pro forma as adjusted adjustments give appropriate effect to those assumptions; and the pro forma and pro forma as adjusted financial information reflect the proper application of those adjustments to the corresponding historical financial statement amounts. No other financial statements, pro forma financial information or schedules are required under the Securities Act and the Rules and Regulations to be included or incorporated by reference in the Registration Statement, the Time of Sale Disclosure Package or the Prospectus. To the Company’s knowledge, Ernst & Young, LLP, which has expressed its opinion with respect to the audited financial statements and schedules filed as a part of the Registration Statement and included in or incorporated by reference into the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, is an independent public

5

accounting firm with respect to the Company within the meaning of the Securities Act and the Rules and Regulations.

(v) The Company had a reasonable basis for, and made in good faith, each “forward-looking statement” (within the meaning of Section 27A of the Securities Act or Section 21E of the Exchange Act) contained in or incorporated by reference into the Registration Statement, the Time of Sale Disclosure Package, the Prospectus or the Marketing Materials.

(vi) All statistical or market-related data included in or incorporated by reference into the Registration Statement, the Time of Sale Disclosure Package or the Prospectus, or included in the Marketing Materials, are based on or derived from sources that the Company reasonably believes to be reliable and accurate, and the Company has obtained the written consent for the use of such data from such sources, to the extent required.

(vii) The Common Stock is registered pursuant to Section 12(b) of the Exchange Act and is listed or approved for listing on the Nasdaq Global Market (“Nasdaq”). Except as disclosed in the Registration Statement or Time of Sale Disclosure Package, there is no action pending by the Company or, to the Company’s knowledge, no action pending by Nasdaq to delist the Common Stock from Nasdaq, nor has the Company received any notification that Nasdaq is contemplating terminating such listing. As of the Closing Date, the Shares, the Pre-Funded Warrant Shares and the Warrant Shares will have been authorized for listing, subject to official notice of issuance, on Nasdaq. The Company has no securities that are rated by any “nationally recognized statistical organization” as that term is defined by the Commission for purposes of Rule 436(g) (2) under the Securities Act.

(viii) Neither the Company nor any of its officers, directors or controlled affiliates has taken or will take, directly or indirectly, any action that is designed or intended to or that has constituted or that would reasonably be expected to cause or result in the unlawful stabilization or manipulation of the price of any security of the Company.

(ix) No material relationship, direct or indirect, exists between or among the Company on the one hand, and the directors, officers, stockholders (or analogous interest holders), customers or suppliers of the Company or any of its affiliates on the other hand, which is required to be described in the Time of Sale Disclosure Package and the Prospectus and which is not so described.

(x) The Registration Statement (and any further documents to be filed with the Commission in connection with the offering) contains all exhibits and schedules as required by the Securities Act. Each of the Registration Statement and any post-effective amendment thereto, if any, at the time it became effective, complied in all material respects with the Securities Act and the applicable rules and regulations under the Securities Act and did not and, as amended or supplemented, if applicable, will not, contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The

6

Prospectus complies in all material respects with the Securities Act and the applicable rules and regulations, and does not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, misleading. The SEC Reports (as defined below), when they respectively were filed with the Commission, conformed in all material respects to the requirements of the Securities Act and the Exchange Act, as applicable, and the applicable rules and regulations, and none of such documents, when they respectively were filed with the Commission, contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein (with respect to the SEC Reports incorporated by reference in the Prospectus), in the light of the circumstances under which they were made not misleading; and any further documents so filed and incorporated by reference in the Prospectus when such documents are filed with the Commission, will conform in all material respects to the requirements of the Exchange Act and the applicable rules and regulations, as applicable, and will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made not misleading. As of the date hereof and through the Closing Date, no post-effective amendment to the Registration Statement reflecting any facts or events arising after the date thereof which represent, individually or in the aggregate, a fundamental change in the information set forth therein is required to be filed with the Commission. There are no documents required to be filed with the Commission in connection with the transaction contemplated hereby that (x) have not been filed as required pursuant to the Securities Act or (y) will not be filed within the requisite time period. There are no contracts or other documents required to be described in the Prospectus, or to be filed as exhibits or schedules to the Registration Statement, which have not been described or filed as required.

(xi) The Company has not, directly or indirectly, made any offers or sales of any security or solicited any offers to buy any security, under circumstances that would cause this offering of the Securities to be integrated with prior offerings by the Company for purposes of

any applicable shareholder approval provisions of any trading market on which any of the securities of the Company are listed or designated.

(b) Any certificate that is signed by any officer of the Company and delivered to the Representative or to the Representative's counsel shall be deemed a representation and warranty by the Company to the Underwriters as to the matters covered thereby.

3. Representations and Warranties of the Company Regarding the Company.

(a) The Company represents and warrants to and agrees with, the Underwriters, except as set forth in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, as of the date hereof and as of the Closing Date, as follows:

(i) The Company has been duly organized and validly exists as a corporation in good standing under the laws of the State of Delaware, and each of the Company's subsidiaries has been duly organized and validly exists as a corporation or other entity in good standing under the laws of its jurisdiction of incorporation. Each of

7

the Company and its subsidiaries has the corporate power and authority to own its properties and conduct its business as currently being carried on and as described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, and is duly qualified to do business as a foreign corporation or other entity in good standing in each jurisdiction in which it owns or leases real property or in which the conduct of its business makes such qualification necessary and in which the failure to so qualify would have or is reasonably likely to result in a material adverse effect upon the business, prospects, properties, assets, operations, condition (financial or otherwise) or results of operations of the Company and its subsidiaries, taken as a whole, or in its ability to perform its obligations under this Agreement ("Material Adverse Effect").

(ii) The Company has the power and authority to enter into this Agreement, the Pre-Funded Warrants and the Warrants and to authorize, issue and sell the Securities as contemplated by this Agreement. Each of this Agreement, the Pre-Funded Warrants and the Warrants have been duly authorized, executed and delivered by the Company, and constitutes a valid, legal and binding obligation of the Company, enforceable against the Company in accordance with its terms, except as rights to indemnity hereunder may be limited by federal or state securities laws and except as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting the rights of creditors generally and subject to general principles of equity.

(iii) The Securities have been duly authorized for issuance and sale and, when issued and paid for, will be validly issued, fully paid and non-assessable.

(iv) The execution, delivery and performance of this Agreement, the Pre-Funded Warrants and the Warrants by the Company and the consummation by the Company of the transactions contemplated herein and therein will not (A) result in a breach or violation of any of the terms and provisions of, or constitute a default under, any law, order, rule or regulation to which the Company or any subsidiary is subject, or by which any property or asset of the Company or any subsidiary is bound or affected, (B) conflict with, result in any violation or breach of, or constitute a default (or an event that with notice or lapse of time or both would become a default) under, or give to others any right of termination, amendment, acceleration or cancellation (with or without notice, lapse of time or both) of, any agreement, lease, credit facility, debt, note, bond, mortgage, indenture or other instrument (the "Contracts") or obligation or other understanding to which the Company or any subsidiary is a party or by which any property or asset of the Company or any subsidiary is bound or affected, or (C) result in a breach or violation of any of the terms and provisions of, or constitute a default under, the Company's certificate of incorporation or by-laws, except in the case of clauses (A) and (B), to the extent not reasonably likely to have a Material Adverse Effect.

(v) Neither the Company nor any of its subsidiaries is in violation, breach or default under its certificate of incorporation, by-laws or other equivalent organizational or governing documents, each as amended and currently in effect, except where the violation, breach or default in the case of a subsidiary of the Company is not reasonably likely to result in a Material Adverse Effect.

8

(vi) Neither the Company, its subsidiaries nor, to its knowledge, any other party is in violation, breach or default of any Contract that is reasonably likely to result in a Material Adverse Effect.

(vii) All consents, approvals, orders, authorizations and filings required on the part of the Company and its subsidiaries in connection with the execution, delivery or performance of this Agreement, the Pre-Funded Warrants and the Warrants, and the transactions herein contemplated, have been obtained or made, other than (A) any such consents, approvals, orders, authorizations and required filings that will be obtained or made after the date of this Agreement under the Securities Act, the Exchange Act, the Rules and Regulations and applicable state and foreign securities laws and the rules of FINRA in connection with the offer and sale of the Securities, and (B) such consents, approvals, orders, authorizations and required filings, the failure of which to make or obtain is not reasonably likely to result in a Material Adverse Effect.

(viii) The Company is subject to and in compliance in all material respects with the reporting requirements of Section 13 or Section 15(d) of the Exchange Act, and has timely filed all reports required to be filed pursuant to Sections 13(a), 13(e), 14 and 15(d) of the Exchange Act during the preceding twelve (12) months (the "SEC Reports").

(ix) The Company has an authorized capitalization as set forth in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus. All of the issued and outstanding shares of capital stock of the Company are duly authorized and validly issued, fully paid and nonassessable, and have been issued in compliance with all applicable securities laws, and conform in all material respects to the description thereof in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus. The Shares, when issued and paid for as provided herein, will be duly authorized and validly issued, fully paid and nonassessable, will be issued in compliance with all applicable securities laws, and, except as otherwise stated in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, the issuance of such Shares is not subject to any preemptive or similar rights. The Pre-Funded Warrant Shares, when issued, paid for and delivered upon due exercise of the Pre-Funded Warrants, will be duly authorized and validly issued, fully paid and nonassessable, and will be issued in compliance with

applicable securities laws. The Warrant Shares, when issued, paid for and delivered upon due exercise of the Warrants, will be duly authorized and validly issued, fully paid and nonassessable, and will be issued in compliance with all applicable securities laws. The Company has reserved and kept available for the exercise of the Pre-Funded Warrants and the Warrants such number of authorized but unissued shares as are sufficient to permit the exercise in full of such Pre-Funded Warrants and the Warrants. The Securities, when issued, will conform in all material respects to the descriptions thereof set forth in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus.

(x) Except as set forth in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, no person or entity has the right to require registration of shares of Common Stock or other securities of the Company or any of its

9

subsidiaries because of the filing or effectiveness of the Registration Statement, except for persons and entities who have expressly waived such right in writing or who have been given timely and proper written notice and have failed to exercise such right within the time or times required under the terms and conditions of such right. Except as set forth in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, there are no persons with registration rights or similar rights to have any securities registered by the Company or any of its subsidiaries under the Securities Act.

(xi) The exercise price of each option issued under the Company's stock option or other employee benefit plans has been no less than the fair market value of a share of common stock as determined on the date of grant of such option. All grants of options were validly issued and properly approved by the board of directors of the Company (or pursuant to duly delegated authority therefrom) in material compliance with all applicable laws and regulations and recorded in the Company's financial statements in accordance with GAAP and, to the Company's knowledge, no such grants involved "back dating," "forward dating" or similar practice with respect to the effective date of grant.

(xii) The financial statements of the Company included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the Commission with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with GAAP applied on a consistent basis during the periods involved, except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of the Company and its consolidated subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial, year-end audit adjustments.

(xiii) Since the date of the latest audited financial statements included within the SEC Reports, except as specifically disclosed in a subsequent SEC Report filed prior to the date hereof, (i) there has been no event, occurrence or development that has had or is reasonably likely to result in a Material Adverse Effect, (ii) the Company has not incurred any liabilities (contingent or otherwise) other than (A) trade payables and accrued expenses incurred in the ordinary course of business consistent with past practice and (B) liabilities not required to be reflected in the Company's financial statements pursuant to GAAP or disclosed in filings made with the Commission, (iii) the Company has not altered its method of accounting, (iv) the Company has not declared or made any dividend or distribution of cash or other property to its stockholders or purchased, redeemed or made any agreements to purchase or redeem any shares of its capital stock, (v) the Company has not issued any equity securities to any officer, director or affiliate, except pursuant to Company equity incentive plans or the Company's employee stock purchase plan described in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus (collectively, the "Equity Plans"), (vi) no executive officer or director of the Company has resigned from any position with the Company and (vii) there has not been any change in the capital stock of the Company or

10

any of its subsidiaries (other than changes resulting from exercises, issuances, repurchases, expirations, terminations or forfeitures (A) of warrants outstanding as of the date hereof in accordance with their terms or (B) with respect to awards outstanding under the Equity Plans as of date hereof in accordance with their terms or any new grants of awards under the Equity Plans in the ordinary course of business). The Company does not have pending before the Commission any request for confidential treatment of information. Except for the issuance of the Securities contemplated by this Agreement, no event, liability, fact, circumstance, occurrence or development has occurred or exists or is reasonably expected to occur or exist with respect to the Company or its subsidiaries or their respective businesses, prospects, properties, operations, assets or financial condition that would be required to be disclosed by the Company under applicable securities laws at the time this representation is made or deemed made that has not been publicly disclosed at least one trading day prior to the date that this representation is made.

(xiv) Except as otherwise stated in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, there are no preemptive rights or other rights to subscribe for or to purchase, or any restriction upon the voting or transfer of, any shares of Common Stock pursuant to the Company's certificate of incorporation, by-laws or any agreement or other instrument to which the Company or any of its subsidiaries is a party or by which the Company or any of its subsidiaries is bound.

(xv) Except as otherwise stated in the Registration Statement, in the Time of Sale Disclosure Package and in the Prospectus, the Company does not own, directly or indirectly, any capital stock or other ownership interest in any partnership, corporation, business trust, limited liability company, limited liability partnership, joint stock company, trust, unincorporated association, joint venture or other entity.

(xvi) Each of the Company and its subsidiaries has filed all foreign, federal, state and local returns (as hereinafter defined) required to be filed with taxing authorities prior to the date hereof or has duly obtained extensions of time for the filing thereof and paid all taxes (as hereinafter defined) shown as due on such returns that were filed and has paid all taxes imposed on or assessed against the Company or such respective subsidiary, except, in all cases, for any such amounts that the Company or any subsidiary is contesting in good faith and except in any case in which the failure to so file or pay would not reasonably be expected to have a Material Adverse Effect. The provisions for taxes payable, if any, shown on the financial statements filed with or as part of the Registration Statement are sufficient for all accrued and unpaid taxes, whether or not disputed, and for all periods to and including the dates of such consolidated financial statements. Except as disclosed in writing to the Representative, (i) no issues have been raised (and are currently pending) by any taxing authority in connection with any of the returns or taxes asserted as due from the Company or its subsidiaries, and (ii) no waivers of statutes of limitation with respect to the returns or collection of taxes have been given by or requested from the Company or its subsidiaries, in either case to the extent material to the Company and its subsidiaries taken

Revenue Service or any other taxing authority to which the Company or such subsidiary reports or by which it is governed. The term “taxes” mean all federal, state, local, foreign, and other net income, gross income, gross receipts, sales, use, ad valorem, transfer, franchise, profits, license, lease, service, service use, withholding, payroll, employment, excise, severance, stamp, occupation, premium, property, windfall profits, customs, duties or other taxes, fees, assessments, or charges of any kind whatever, together with any interest and any penalties, additions to tax, or additional amounts with respect thereto. The term “returns” means all returns, declarations, reports, statements, and other documents required to be filed in respect to taxes.

(xvii) The Company maintains a system of internal control over financial reporting (as such term is defined in Rule 13a-15 of the General Rules and Regulations under the Exchange Act (the “Exchange Act Rules”)) that, except as disclosed in the Company’s SEC Reports, complies in all material respects with the requirements of the Exchange Act and has been designed by the Company’s principal executive officer and principal financial officer, or under their supervision, to provide reasonable assurances that (i) transactions are executed in accordance with management’s general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management’s general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Except as described in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, the Company’s internal control over financial reporting was effective as of the end of the Company’s most recent audited fiscal year. Except as described in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, since the end of the Company’s most recent audited fiscal year, there has been (A) no material weakness in the Company’s internal control over financial reporting (whether or not remediated) and (B) no change in the Company’s internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company’s internal control over financial reporting. The Company maintains disclosure controls and procedures (as such is defined in Rule 13a-15 of the Exchange Act Rules) that comply in all material respects with the requirements of the Exchange Act; such disclosure controls and procedures have been reasonably designed to ensure that information required to be disclosed by the Company and its subsidiaries is accumulated and communicated to the Company’s management, including the Company’s principal executive officer and principal financial officer by others within those entities, and such disclosure controls and procedures are effective.

(xviii) Since the respective dates as of which information is given in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, (a) neither the Company nor any of its subsidiaries has incurred any material liabilities or obligations, direct or contingent, or entered into any material transactions other than in the ordinary course of business, and (b) there has not been any material change in the Company’s long-term or short-term debt. Except as described in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, there is not pending or, to the knowledge of the Company, threatened, any action, suit or proceeding to which the

Company or any of its subsidiaries is a party or of which any property or assets of the Company or any of its subsidiaries is the subject before or by any court or governmental agency, authority or body, or any arbitrator or mediator, which is reasonably likely to result in a Material Adverse Effect.

(xix) The Company and each of its subsidiaries holds, and is in compliance with, all franchises, grants, authorizations, licenses, permits, easements, consents, certificates and orders (“Permits”) of any governmental or self-regulatory agency, authority or body required for the conduct of its business, and all such Permits are in full force and effect, in each case except where the failure to hold, or comply with, any of them is not reasonably likely to result in a Material Adverse Effect. All such Permits are free and clear of any material restriction or condition that are in addition to, or materially different from, those normally applicable to similar licenses, certificates, authorizations and permits. The Company has not received notification of any material revocation, modification, suspension, termination or invalidation (or proceedings related thereto) of any such Permit.

(xx) The Company and its subsidiaries have good and marketable title to all property (whether real or personal, and other than intellectual property which is subject to clause (xxi) below) described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus as being owned by them that are material to the business of the Company, in each case free and clear of all liens, claims, security interests, other encumbrances or defects, except those that are not reasonably likely to result in a Material Adverse Effect. To the Company’s knowledge, the property held under lease by the Company and its subsidiaries is held by them under valid, subsisting and enforceable leases with only such exceptions with respect to any particular lease as do not interfere in any material respect with the conduct of the business of the Company and its subsidiaries.

(xxi) The Company and each of its subsidiaries owns or possesses or has valid right to use all patents, patent applications, trademarks, service marks, trade names, trademark registrations, service mark registrations, copyrights, licenses, inventions, trade secrets and similar rights (collectively, “Intellectual Property Rights”) necessary for the conduct of the business of the Company and its subsidiaries as currently carried on and as described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, except where the failure to own, possess or have such right is not reasonably likely to result in a Material Adverse Effect. There is no pending or, to the Company’s knowledge, threatened action, suit, proceeding or claim by others that the Company or any of its subsidiaries infringes, misappropriates or otherwise violates, or would, upon the commercialization of any product or service described in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus infringe, misappropriate or otherwise violate any patent, trademark, copyright, trade secret or other proprietary rights of others, and, except as would not reasonably be expected to result in a Material Adverse Effect, the Company is not aware of any factual basis for any such action, suit, proceeding or claim.

(xxii) The Company and each of its subsidiaries has complied with, is not in violation of, and has not received any notice of violation relating to any law, rule or regulation relating to the conduct of its business, or the ownership or operation of its property and assets, including, without limitation, (A) any laws, rules or regulations related to health, safety or the environment, including those relating to the regulation of hazardous or toxic substances or waste and protection of health and safety or the environment which are applicable to its business (“Environmental Laws”), (B) the Sarbanes-Oxley Act and the rules and regulations of the Commission thereunder, (C) the Foreign Corrupt Practices Act of 1977 and the rules and regulations thereunder, (D) the Employment Retirement Income Security Act of 1974 and the rules and regulations thereunder, and (E) the Currency and Foreign Transactions Reporting Act of 1970, as amended, and the money laundering statutes of all applicable jurisdictions and the rules and regulations thereunder, in each case except where the failure to be in compliance is not reasonably likely to result in a Material Adverse Effect.

(xxiii) The operations of the Company and its subsidiaries are and have been conducted at all times in compliance in all material respects with all applicable financial recordkeeping and reporting requirements and the money laundering statutes and the rules and regulations thereunder, including but not limited to the Bank Secrecy Act, as amended by the USA PATRIOT Act, and any related or similar rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the “Money Laundering Laws”) and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Money Laundering Laws is pending or, to the best knowledge of the Company, threatened.

(xxiv) Neither the Company nor any of its subsidiaries nor, to the knowledge of the Company, any director, officer, employee, representative, agent or affiliate of the Company or any of its subsidiaries is, or is 50% or more owned or otherwise controlled by a person (a “Sanctioned Person”) that is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department (“OFAC”) or located, organized or resident in a country or territory that is, or whose government is, the subject of Sanctions that broadly prohibit dealings with that country or territory (collectively, “Sanctioned Countries” and each, a “Sanctioned Country”); and the Company will not directly or indirectly use the proceeds of the offering of the Securities contemplated hereby, or lend, contribute or otherwise make available such proceeds to any person or entity, for the purpose of financing the activities of any person currently subject to any U.S. sanctions administered by OFAC.

(xxv) Except as has been disclosed to the Representative or is not material to the analysis under any Sanctions, neither the Company nor any of its subsidiaries has engaged in any dealings or transactions with or for the benefit of a Sanctioned Person, or with or in a Sanctioned Country, in the preceding five years, nor does the Company or any of its subsidiaries have any plans to increase its dealings or transactions with Sanctioned Persons, or with or in Sanctioned Countries.

14

(xxvi) Neither the Company nor, to the Company’s knowledge, any employee or agent of the Company, has (i) used any corporate funds for unlawful contributions, gifts, entertainment or other unlawful expenses relating to political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to foreign or domestic political parties or campaigns from corporate funds, (iii) violated any provision of the Foreign Corrupt Practices Act of 1977, as amended, or (iv) made any other unlawful payment.

(xxvii) There are no transactions, arrangements or other relationships between and/or among the Company, any of its affiliates (as such term is defined in Rule 405 of the Rules and Regulations) and any unconsolidated entity, including, but not limited to, any structured finance, special purpose or limited purpose entity that would reasonably be expected to materially affect the Company’s liquidity or the availability of or requirements for its capital resources required to be described in the Time of Sale Disclosure Package and the Prospectus which have not been described as required.

(xxviii) There are no outstanding loans, advances (except normal advances for business expenses in the ordinary course of business) or guarantees of indebtedness by the Company to or for the benefit of any of the officers or directors of the Company or any of their respective family members, except as disclosed in the Registration Statement or the Time of Sale Disclosure Package and the Prospectus. All transactions by the Company with office holders or control persons of the Company have been duly approved by the board of directors of the Company, or duly appointed committees or officers thereof, if and to the extent required under U.S. law.

(xxix) The Company and each of its subsidiaries carries, or is covered by, insurance covering the Company’s or any of its subsidiaries’, respective businesses, assets, employees, officers and directors in such amounts and covering such risks as, in the Company’s reasonable judgment, is adequate for the conduct of its business and the value of its properties and as is customary for similarly sized companies engaged in similar businesses in similar industries. The Company has no reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not have a Material Adverse Effect. All policies of insurance owned by the Company are, to the Company’s knowledge, in full force and effect and the Company is in compliance with the terms of such policies. There are no material claims by the Company or any of its subsidiaries under any such policy as to which any insurer is denying liability or defending under a reservation of rights clause. The Company has not received written notice from any insurer, agent of such insurer or the broker of the Company that any material capital improvements or any other material expenditures (other than premium payments) are required or necessary to be made in order to continue such insurance. The Company does not insure risk of loss through any captive insurance, risk retention group, reciprocal group or by means of any fund or pool of assets specifically set aside for contingent liabilities other than as described in the Time of Sale Disclosure Package.

15

(xxx) Except as would not reasonably be expected, singularly or in the aggregate, to have a Material Adverse Effect, there is (A) no significant unfair labor practice complaint pending against the Company, nor to the knowledge of the Company, threatened against it, before the National Labor Relations Board, any state or local labor relation board or any foreign labor relations board applicable to or with jurisdiction over the Company, and no significant grievance or significant arbitration proceeding arising out of or under any collective bargaining agreement is so pending against the Company, or, to the knowledge of the Company, threatened against it and (B) no labor disturbance by the employees of the Company that exists or, to the Company’s knowledge, is imminent, and the Company is not aware of any existing or imminent labor disturbance by

the employees of any of its principal suppliers, manufacturers, customers or contractors. The Company is not aware that any key employee or significant group of employees of the Company plans to terminate employment with the Company.

(xxxi) No “prohibited transaction” (as defined in Section 406 of the Employee Retirement Income Security Act of 1974, as amended, including the regulations and published interpretations thereunder (“ERISA”), or Section 4975 of the Internal Revenue Code of 1986, as amended from time to time (the “Code”)) or “accumulated funding deficiency” (as defined in Section 302 of ERISA) or any of the events set forth in Section 4043(b) of ERISA (other than events with respect to which the thirty (30)-day notice requirement under Section 4043 of ERISA has been waived) has occurred or would reasonably be expected to occur with respect to any employee benefit plan of the Company which would, singularly or in the aggregate, have a Material Adverse Effect. Each employee benefit plan of the Company is in compliance in all material respects with applicable law, including ERISA and the Code. The Company has not incurred any material liability under Title IV of ERISA with respect to the termination of, or withdrawal from, any pension plan (as defined in ERISA). Each pension plan for which the Company would have any liability that is intended to be qualified under Section 401(a) of the Code is so qualified, and nothing has occurred, whether by action or by failure to act, which would reasonably be expected to, singularly or in the aggregate, cause the loss of such qualification.

(xxxii) No supplier, customer, distributor or sales agent of the Company has notified the Company that it intends to discontinue or decrease the rate of business done with the Company, except where such decrease is not reasonably likely to result in a Material Adverse Effect.

(xxxiii) The Company and its board of directors have taken all necessary action, if any, in order to render inapplicable any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or other similar anti-takeover provision under the Company’s certificate of incorporation (or similar charter documents) or the laws of its state of incorporation that is or would reasonably be expected to become applicable as a result of the Representative and the Company fulfilling their obligations or exercising their rights under this Agreement and the Warrants.

16

(xxxiv) The Company is not, and, after giving effect to the offering and sale of the Securities and the application of the net proceeds thereof, including the proceeds received upon exercise of the Pre-Funded Warrants and the Warrants, will not be an “investment company,” as such term is defined in the Investment Company Act of 1940, as amended.

(xxxv) Except as described under the headings “Risk Factors — Risks Related to Our Financial Position and Need for Additional Capital” in the Time of Sale Disclosure Package and the Prospectus, the Company has no knowledge of any facts or circumstances which lead it to believe that it will file for reorganization or liquidation under the bankruptcy or reorganization laws of any jurisdiction within one year from the Closing Date. The SEC Reports set forth as of the date hereof all outstanding secured and unsecured indebtedness of the Company or any subsidiary, or for which the Company or any subsidiary has material commitments.

(xxxvi) Except as described in the Time of Sale Disclosure Package and the Prospectus, the Company and its subsidiaries: (A) are and at all times have been in compliance with all statutes, rules, and regulations applicable to Company and its subsidiaries related to the ownership, testing, development, manufacture, packaging, processing, use, distribution, marketing, labeling, promotion, sale, offer for sale, storage, import, export or disposal of any product manufactured or distributed by the Company (“Applicable Laws”), except as would not, individually or in the aggregate, reasonably be expected to result in a Material Adverse Effect; (B) have not received any U.S. Food and Drug Administration (“FDA”) Form 483, notice of adverse finding, warning letter, untitled letter or other correspondence or notice from any governmental authority alleging or asserting noncompliance with any Applicable Laws or any licenses, certificates, approvals, clearances, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws (“Authorizations”); (C) possess all material Authorizations and such Authorizations are valid and in full force and effect and are not in material violation of any term of any such Authorizations; (D) have not received notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from any governmental authority or third party alleging that any product operation or activity is in violation of any Applicable Laws or Authorizations and have no knowledge that any such governmental authority or third party is considering any such claim, litigation, arbitration, action, suit, investigation or proceeding; (E) have not received notice that any governmental authority has taken, is taking or intends to take action to limit, suspend, modify or revoke any Authorizations and the Company has no knowledge that any such governmental authority is considering such action; (F) have not, either voluntarily or involuntarily, initiated, conducted, or issued or caused to be initiated, conducted or issued, any recall, market withdrawal or replacement, safety alert, post-sale warning, “dear doctor” letter, or other notice or action relating to the alleged lack of safety, efficacy or regulatory compliance of any product or any alleged product defect or violation and, to the Company’s knowledge, no third party has initiated or conducted any such notice or action and there are no facts which are reasonably likely to cause, and the Company has not received any written notice from the FDA or any other regulatory agency regarding, a material recall, market withdrawal or replacement of any Company product sold or intended to be sold by the Company, a

17

material change in the marketing classification or a material adverse change in the labeling of any such Company products, or a termination or suspension of the manufacturing, marketing, or distribution of such Company products; and (G) have filed, obtained, maintained or submitted all material reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Applicable Laws or Authorizations and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were complete and correct in all material respects on the date filed (or were corrected or supplemented by a subsequent submission).

(xxxvii) The studies, tests and preclinical and clinical investigations conducted by or on behalf of the Company and its subsidiaries were and, if still pending, are, in all material respects, being conducted in accordance with established protocols, procedures and controls pursuant to accepted professional scientific standards and all Applicable Laws and Authorizations, including, without limitation, the Federal Food, Drug, and Cosmetic Act and implementing regulations including good laboratory practice (“GLP”) regulations (21 C.F.R. Part 58) if any such studies, tests or preclinical and clinical investigations are being conducted pursuant to GLP, and good clinical practice and IND requirements (21 C.F.R. Parts 50, 54, 56, and 312) if any such studies, tests or preclinical and clinical investigations were or are subject to good clinical practice regulations or were or are being conducted under an IND; the descriptions of the results of such studies, tests and trials contained in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus are accurate in all material respects and fairly present the data derived from such studies, tests and trials; except to the extent disclosed in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, the

Company is not aware of any studies, tests or trials the results of which the Company believes reasonably call into question the study, test, or trial results described or referred to in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus when viewed in the context in which such results are described and the clinical state of development; and neither the Company nor any of its subsidiaries have received any notices or correspondence from any governmental authority requiring the termination, suspension or material modification of any studies, tests or preclinical or clinical investigations conducted by or on behalf of the Company or any of its subsidiaries.

(xxxviii) Except as described in the Time of Sale Disclosure Package, the Registration Statement or the Prospectus, there are no claims, payments, issuances, arrangements or understandings for services in the nature of a finder's, consulting or origination fee with respect to the introduction of the Company to the Underwriters or the sale of the Securities hereunder or any other arrangements, agreements, understandings, payments or issuances with respect to the Company that may affect the Underwriters' compensation, as determined by FINRA.

(xxxix) Except as set forth in or incorporated by reference into the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, the Company has not made any direct or indirect payments (in cash, securities or otherwise) to (i) any person, as a finder's fee, investing fee or otherwise, in consideration of such person raising capital for the Company or introducing to the Company persons who

18

provided capital to the Company, (ii) any FINRA member, or (iii) to the Company's knowledge, any person or entity that has any direct or indirect affiliation or association with any FINRA member, in each case within the 12-month period prior to the date on which the Registration Statement was filed with the Commission ("Filing Date") or thereafter.

(xl) None of the net proceeds of the offering will be paid by the Company to any participating FINRA member or any affiliate or associate of any participating FINRA member, except as specifically authorized herein.

(xli) Except as set forth in or incorporated by reference into the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, no (i) officer or director of the Company or its subsidiaries, (ii) to the Company's knowledge, owner of 5% or more of the Company's unregistered securities or that of its subsidiaries or (iii) to the Company's knowledge, owner of any amount of the Company's unregistered securities acquired within the 180-day period prior to the Filing Date, has any direct or indirect affiliation or association with any FINRA member. The Company will advise the Representative and its counsel if it becomes aware that any officer, director or stockholder of the Company or its subsidiaries is or becomes an affiliate or associated person of a FINRA member participating in the offering.

(xlii) The Company has not entered into any arrangements, nor has the Company granted any rights, pursuant to which anyone other than the Underwriters has the right to act as an underwriter or as a financial advisor to the Company in connection with the transactions contemplated hereby.

(xliii) The Company is not a party to any contract, agreement or understanding with any person that would give rise to a valid claim against the Company or the Underwriters for a brokerage commission, finder's fee or like payment in connection with the offering and sale of the Securities or any transaction contemplated by this Agreement, the Registration Statement, the Time of Sale Disclosure Package or the Prospectus.

(xliv) All of the information provided to the Representative or to counsel for the Underwriters by the Company, its officers and directors in connection with letters, filings or other supplemental information provided to FINRA pursuant to NASD Conduct rule 2710 or 2720 is true, correct and complete in all material respects.

(xlv) Except as set forth in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus and as preapproved in accordance with the requirements set forth in Section 10A of the Exchange Act, Ernst & Young, LLP has not been engaged by the Company to perform any "prohibited activities" (as defined in Section 10A of the Exchange Act).

(xlvi) Except as set forth in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, there are no material off-balance sheet arrangements (as defined in Item 303 of Regulation S-K) that have or are reasonably

19

likely to have a material current or future effect on the Company's financial condition, revenues or expenses, changes in financial condition, results of operations, liquidity, capital expenditures or capital resources.

(xlvii) Since the date of the preliminary prospectus included in the Registration Statement filed with the Commission on [·], 2018 (or, if earlier, the first date on which the Company engaged directly or through any Person authorized to act on its behalf in any Testing-the-Waters Communication (as defined herein)) through the date hereof, the Company has been and is an "emerging growth company," as defined in Section 2(a) of the Securities Act (an "Emerging Growth Company"). "Testing-the-Waters Communication" means any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act.

(xlviii) The Company (a) has not alone engaged in any Testing-the-Waters Communication other than Testing-the-Waters Communications with the consent of the Representative with entities that are qualified institutional buyers within the meaning of Rule 144A under the Securities Act or institutions that are accredited investors within the meaning of Rule 501 under the Securities Act, and (b) has not authorized anyone other than the Representative to engage in Testing-the-Waters Communications. The Company reconfirms that the Representative has been authorized to act on its behalf in undertaking Testing-the-Waters Communications. The Company has not distributed any Written Testing-the-Waters Communications (as defined herein) other than those listed on Schedule III hereto. "Written Testing-the-Waters Communication" means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Securities Act.

4. Purchase, Sale and Delivery of Securities.

(a) On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company agrees to issue and sell the Common Units and Pre-Funded Units to the Underwriters, and the Underwriters, severally and not jointly, agree to purchase the Common Units and Pre-Funded Units, as set forth on Schedule I hereto. The purchase price to the Underwriters for one Common Unit shall be \$[·] (the “Common Unit Purchase Price”) and the purchase price for one Pre-Funded Unit shall be \$[·] (the “Pre-Funded Unit Purchase Price”).

(b) The Shares and Warrants underlying the Common Units and the Pre-Funded Warrants and Warrants underlying the Pre-Funded Units will be delivered by the Company to the Underwriters (or, if an investor purchasing Pre-Funded Units is required to purchase such Pre-Funded Units directly from the Company, to such investor) against payment of the Common Unit Purchase Price or Pre-Funded Unit Purchase Price, as applicable, therefor by wire transfer of same day funds payable to the order of the Company at the offices of Oppenheimer & Co. Inc., 85 Broad Street, New York, New York 10004 (or, if an investor purchasing Pre-Funded Units is required to purchase such Pre-Funded Units directly from the Company, at the office of such investor for such Pre-Funded Units), or such other location as may be mutually acceptable, at 10:00 a.m. Eastern Time, on the second (or if the Units are priced, as contemplated by Rule 15c6-1(c) under the Exchange Act, after 4:30 p.m. Eastern time,

20

the third) full business day following the date hereof, or at such other time and date as the Representative and the Company determine pursuant to Rule 15c6-1(a) under the Exchange Act. The time and date of delivery of the Shares, Pre-Funded Warrants and Warrants, as applicable, is referred to herein as the “Closing Date.” Delivery of the Shares shall be made through the facilities of the Depositary Trust Company designated by the Representative. Delivery of the Pre-Funded Warrants and Warrants shall be made by physical delivery to be received or directed by the Underwriters (or by an applicable investor purchasing Pre-Funded Units) no later than one (1) business day following the Closing Date. In the event that an investor purchasing Pre-Funded Warrants delivers an Exercise Notice (as defined in the Pre-Funded Warrants) prior to the Closing Date, to exercise any Pre-Funded Warrants between the date hereof and the Closing Date, the Company shall deliver the Pre-Funded Warrant Shares with respect to any exercise to such investor on the Closing Date as specified in such Exercise Notice.

5. **Covenants.**

(a) The Company covenants and agrees with the Representative as follows:

(i) During the period beginning on the date hereof and ending on the earlier of (i) such date as determined by the Representative that the Prospectus is no longer required by law to be delivered in connection with sales by an underwriter or dealer or (ii) the completion of the distribution of the Securities by the Underwriters (the “Prospectus Delivery Period”), prior to amending or supplementing the Registration Statement, including any Rule 462 Registration Statement, the Time of Sale Disclosure Package or the Prospectus, the Company shall furnish to the Representative for review and comment a copy of each such proposed amendment or supplement, and the Company shall not file any such proposed amendment or supplement to which the Representative reasonably objects.

(ii) From the date of this Agreement until the end of the Prospectus Delivery Period, the Company shall promptly advise the Representative in writing (A) of the receipt of any comments of, or requests for additional or supplemental information from, the Commission, (B) of the time and date of any filing of any post-effective amendment to the Registration Statement or any amendment or supplement to the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, (C) of the time and date that any post-effective amendment to the Registration Statement becomes effective and (D) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or of any order preventing or suspending its use or the use of the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Stock from any securities exchange upon which it is listed for trading or included or designated for quotation, or of the threatening or initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time during the Prospectus Delivery Period, the Company will use its reasonable efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees during the Prospectus Delivery Period that it shall comply with the provisions of Rules 424(b) and 430A, as applicable, under the Securities Act and will use its reasonable efforts to confirm that any filings made by the

21

Company under Rule 424(b) or Rule 433 were received in a timely manner by the Commission (without reliance on Rules 424(b)(8) or 164(b) under the Securities Act).

(iii) (A) During the Prospectus Delivery Period, the Company will comply with all requirements imposed upon it by the Securities Act, as now and hereafter amended, and by the Rules and Regulations, as from time to time in force, and by the Exchange Act, as now and hereafter amended, so far as necessary to permit the continuance of sales of or dealings in the Securities as contemplated by the provisions hereof, the Time of Sale Disclosure Package, the Registration Statement and the Prospectus. If during the Prospectus Delivery Period any event occurs as the result of which would cause the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the Time of Sale Disclosure Package) to include an untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which such statement was made, not misleading, or if during such period it is necessary or appropriate in the opinion of the Company or its counsel or the Underwriters or their counsel to amend the Registration Statement or supplement the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the Time of Sale Disclosure Package) to comply with the Securities Act or to file under the Exchange Act any document that would be deemed to be incorporated by reference in the Prospectus in order to comply with the Securities Act or the Exchange Act, the Company will promptly notify the Underwriters, allow the Underwriters the opportunity to provide reasonable comments on such amendment, Prospectus or document, and will amend the Registration Statement or supplement the Prospectus (or if the Prospectus is not yet available to prospective purchasers, the Time of Sale Disclosure Package) or file such document (at the expense of the Company) so as to correct such statement or omission or effect such compliance.

(B) During the Prospectus Delivery Period, if at any time following the issuance of an Issuer Free Writing Prospectus there occurred or occurs an event or development the result of which is that such Issuer Free Writing Prospectus conflicted or would conflict with the information contained in the Registration Statement or any Prospectus or included or would include, when taken together with the Time of Sale Disclosure Package, an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances prevailing at that subsequent time, not misleading, the Company has promptly notified or promptly will

notify the Underwriters and has promptly amended or will promptly amend or supplement, at its own expense, such Issuer Free Writing Prospectus to eliminate or correct such conflict, untrue statement or omission.

(iv) The Company shall take or cause to be taken all necessary action to qualify the Securities for sale under the securities laws of such jurisdictions as the Underwriters reasonably designate and to continue such qualifications in effect so long as required for the distribution of the Securities, except that the Company shall not be required in connection therewith to qualify as a foreign corporation or as a dealer in securities in any jurisdiction in which it is not so qualified, to execute a general consent to service of process in any state or to subject itself to taxation in respect of doing business in any jurisdiction in which it is not otherwise subject.

22

(v) The Company shall deliver to the Underwriters and counsel for the Underwriters copies, without charge, of the Registration Statement, the Prospectus, any Issuer Free Writing Prospectus, and all amendments and supplements to such documents, and signed copies of all consents and certificates of experts, in each case as soon as available and in such quantities as the Underwriters may from time to time reasonably request.

(vi) The Company will make generally available to its security holders as soon as practicable, but in any event not later than 15 months after the end of the Company's current fiscal quarter, an earnings statement (which need not be audited) covering a 12-month period that shall satisfy the provisions of Section 11(a) of the Securities Act and Rule 158 of the Rules and Regulations, provided that the Company will be deemed to have satisfied this obligation to the extent it files such documents on the EDGAR system of the Commission.

(vii) The Company shall use commercially reasonable efforts to maintain the listing of the shares of Common Stock on Nasdaq, the Nasdaq Global Select Market or the Nasdaq Capital Market for at least three years from the date of this Agreement unless the Company is acquired or goes private under Exchange Act Rule 13e-3 prior to such time.

(viii) For a period of three years from the Closing Date, the Company shall use its commercially reasonable efforts to maintain the registration of the Shares, and, when issued, the Pre-Funded Warrant Shares and Warrant Shares under the Exchange Act unless the Company is acquired or goes private under Exchange Act Rule 13e-3 prior to such time.

(ix) For so long as any Pre-Funded Warrants or Warrants remain outstanding, the Company shall continue to reserve and keep available at all times, free of preemptive rights, a sufficient number of shares of Common Stock for the purpose of enabling the Company to effect the issuance of the Pre-Funded Warrant Shares and Warrant Shares.

(x) The Company, whether or not the transactions contemplated hereunder are consummated or this Agreement is terminated, will pay or cause to be paid (A) all expenses (including transfer taxes allocated to the respective transferees) incurred in connection with the delivery to the Underwriters of the Securities, (B) all expenses and fees (including, without limitation, fees and expenses of the Company's counsel) in connection with the preparation, printing, filing, delivery, and shipping of the Registration Statement (including the financial statements therein and all amendments, schedules, and exhibits thereto), the Securities, the Time of Sale Disclosure Package, any Prospectus, any Issuer Free Writing Prospectus and any amendment thereof or supplement thereto, (C) all reasonable filing fees (including those incurred in connection with blue sky filings) and, subject to the Expense Cap (as defined below), reasonable fees and disbursements of the Underwriters' counsel incurred in connection with the qualification of the Securities for offering and sale by the Underwriters or by dealers under the securities or blue sky laws of the states and other jurisdictions that the

23

Underwriters shall designate, (D) the fees and expenses of any transfer agent or registrar, (E) all reasonable filing fees and, subject to the Expense Cap, reasonable fees and disbursements of Representative's counsel incident to any required review and approval by FINRA, of the terms of the sale of the Securities, (F) listing fees, if any, and (G) all other costs and expenses incident to the performance of its obligations hereunder that are not otherwise specifically provided for herein. In addition to the foregoing, the Company will reimburse the Representative for its reasonable, documented out-of-pocket legal fees, costs and other expenses incurred in connection with the purchase and sale of the Securities contemplated hereby, provided that such out of pocket legal fees, costs and other expenses, including the fees described in clauses (C) and (D) of the prior sentence as subject to the Expense Cap, and including costs and expenses associated with travel and lodging in connection with the Company's road show, shall not exceed \$125,000 in the aggregate (the "Expense Cap").

(xi) The Company intends to apply the net proceeds from the sale of the Securities to be sold by it hereunder for the purposes set forth in the Time of Sale Disclosure Package and in the Prospectus.

(xii) The Company has not taken and will not take, directly or indirectly, during the Prospectus Delivery Period, any action designed to or which might reasonably be expected to cause or result in, or that has constituted, the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Securities.

(xiii) The Company represents and agrees that, unless it obtains the prior written consent of the Representative, and the Representative represents and agrees that, unless it obtains the prior written consent of the Company, it will not make any offer relating to the Securities that would constitute an Issuer Free Writing Prospectus; provided that the prior written consent of the parties hereto shall be deemed to have been given in respect of the free writing prospectuses included in Schedule IV. Any such free writing prospectus consented to by the Company and the Representative is hereinafter referred to as a "Permitted Free Writing Prospectus." The Company represents that it has treated or agrees that it will treat each Permitted Free Writing Prospectus as an "issuer free writing prospectus," as defined in Rule 433, and has complied or will comply with the requirements of Rule 433 applicable to any Permitted Free Writing Prospectus, including timely Commission filing where required, legending and record-keeping.

(xiv) The Company hereby agrees that, without the prior written consent of the Representative, it will not, during the period ending 90 days after the date hereof ("Lock-Up Period"), (i) sell, offer to sell, contract or agree to sell, hypothecate, pledge, grant any option to

purchase or otherwise dispose of or agree to dispose of, directly or indirectly, or file (or participate in the filing of) a registration statement with the Commission in respect of, or establish or increase a put equivalent position or liquidate or decrease a call equivalent position within the meaning of Section 16 of the Exchange Act with respect to, any Common Stock or any other securities of the Company that are substantially similar to Common Stock, or any securities convertible into or exchangeable or exercisable for, or any warrants or other rights to purchase, the foregoing, (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 Common Stock or any other securities of the Company that are substantially similar to Common Stock, or any securities convertible into or exchangeable or exercisable for, or any warrants or other rights to purchase, the foregoing, whether any such transaction is to be settled by delivery of Common Stock or such other securities, in cash or otherwise or (iii) publicly announce an intention to effect any transaction specified in clause (i) or (ii). The restrictions contained in the preceding sentence shall not apply to (1) the Securities to be sold hereunder, (2) the issuance, grant or sale of Common Stock, or any securities convertible into or exercisable or exchangeable for Common Stock not exercisable during the Lock-Up Period, pursuant to any Equity Plan, (3) the issuance of Common Stock upon the conversion of securities or the exercise of warrants disclosed outstanding as of the date hereof in the Registration Statement (excluding exhibits thereto), the Time of Sale Disclosure Package or the Prospectus, provided that such securities or warrants have not been amended since the date of this Agreement to increase the number of such securities or warrants or to decrease the exercise price, exchange price or conversion price of such securities or warrants (other than in connection with stock splits or combinations) or to extend the term of such securities (4) the filing of one or more registration statements on Form S-8 with respect to one or more Equity Plans or (5) the offer, issuance and sale of shares of Common Stock, or any securities convertible into or exercisable or exchangeable for Common Stock, in connection with any acquisition or strategic investment (including any joint venture, strategic alliance or partnership), provided that (x) the aggregate number of shares of Common Stock issued or issuable pursuant to clause (5) does not exceed 5% of the number of shares of Common Stock outstanding after giving effect to the sale of the Units contemplated by this Agreement and (y) each recipient of any such shares or other securities pursuant to clause (5) agrees to restrictions on the resale of securities that are consistent with the provisions set forth in the lock-up agreements described in Section 6(k) for the remainder of the 90-day restricted period.

(xv) Prior to the Closing Date, the Company will issue no press release or other communications directly or indirectly and hold no press conference with respect to the Company, the condition, financial or otherwise, or the earnings, business affairs or business prospects of any of them, or the offering of the Securities without the prior written consent of the Representatives (such consent not to be unreasonably withheld, conditioned or delayed) unless in the judgment of the Company and its counsel, and after notification to the Representatives, such press release or communication is required by law.

(xvi) If at any time following the distribution of any Written Testing-the-Waters Communication there occurred or occurs an event or development as a result of which such Written Testing-the-Waters Communication included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing at that subsequent time, not misleading, the Company will promptly notify the Representative and will promptly amend or supplement, at its own expense, such Written Testing-the-Waters Communication to eliminate or correct such untrue statement or omission.

6. Conditions of the Underwriters' Obligations. The obligations of each Underwriter hereunder to purchase the Securities are subject to the accuracy, as of the date hereof and at the Closing Date (as if made at the Closing Date), of and compliance with all representations, warranties and agreements of the Company contained herein, the performance by the Company of its obligations hereunder and the following additional conditions:

(a) If filing of the Prospectus, or any amendment or supplement thereto, or any Issuer Free Writing Prospectus, is required under the Securities Act or the Rules and Regulations, the Company shall have filed the Prospectus (or such amendment or supplement) or such Issuer Free Writing Prospectus with the Commission in the manner and within the time period so required (without reliance on Rules 424(b)(8) or 164(b) under the Securities Act); the Registration Statement shall remain effective; no stop order suspending the effectiveness of the Registration Statement or any part thereof, any Rule 462 Registration Statement, or any amendment thereof, nor suspending or preventing the use of the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus shall have been issued; no proceedings for the issuance of such an order shall have been initiated or threatened by the Commission; any request of the Commission or the Representative for additional information (to be included in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus, any Issuer Free Writing Prospectus or otherwise) shall have been complied with to the Underwriters' satisfaction.

(b) The Shares, the Warrant Shares and the Pre-Funded Warrant Shares shall be qualified and approved for listing on Nasdaq, subject to official notice of issuance.

(c) FINRA shall have raised no objection to the fairness and reasonableness of the underwriting terms and arrangements.

(d) The Representative shall not have reasonably determined, and advised the Company, that the Registration Statement, the Time of Sale Disclosure Package or the Prospectus, or any amendment thereof or supplement thereto, or any Issuer Free Writing Prospectus, contains an untrue statement of fact which, in the Representative's reasonable opinion, is material, or omits to state a fact which, in the Representative's reasonable opinion, is material and is required to be stated therein or necessary to make the statements therein not misleading

(e) Between the date hereof and the Closing Date, (i) no downgrading shall have occurred in the rating accorded any of the Company's securities by any "nationally recognized statistical organization," as that term is defined by the Commission for purposes of Rule 436(g)(2) under the Securities Act, and (ii) no such organization shall have publicly announced that it has under surveillance or review, with possible negative implications, its rating of any of the Company's securities.

(f) On the Closing Date, there shall have been furnished to the Representative the opinion of Wilmer Cutler Pickering Hale and Dorr LLP, corporate counsel for the Company, dated as of the Closing Date and addressed to the Representative, in form and substance reasonably satisfactory to the Representative.

(g) On the Closing Date, there shall have been furnished to the Representative an opinion and negative assurance letter from Goodwin Procter LLP, the Company's intellectual property counsel, dated as of the Closing Date and addressed to the Representative, in form and substance reasonably satisfactory to the Representative.

(h) On the Closing Date, there shall be furnished to the Representative a negative assurance letter from Lowenstein Sandler LLP, counsel to the Underwriters, dated as of the Closing Date and addressed to the Representative, in form and substance reasonable satisfactory to the Representative.

(i) The Representative shall have received a letter from Ernst & Young LLP, on the date hereof and on the Closing Date addressed to the Representative, confirming that they are independent public accountants within the meaning of the Securities Act and are in compliance with the applicable requirements relating to the qualifications of accountants under Rule 2-01 of Regulation S-X of the Commission, and confirming, as of the date of each such letter (or, with respect to matters involving changes or developments since the respective dates as of which specified financial information is given in the Time of Sale Disclosure Package, as of a date not prior to the date hereof or more than five days prior to the date of such letter), the conclusions and findings of said firm, of the type ordinarily included in accountants' "comfort letters" to underwriters, with respect to the financial information, including any financial information contained in Exchange Act Reports filed by the Company or incorporated by reference in the Registration Statement, the Time of Sale Disclosure Package and the Prospectus, and other matters required by the Representative.

(j) On the Closing Date, there shall have been furnished to the Representative a certificate, dated as of the Closing Date and addressed to the Representative, signed by the chief executive officer and the principal financial officer of the Company, in their capacity as officers of the Company, to the effect that:

(i) The representations and warranties of the Company in this Agreement that are qualified by materiality or by reference to any Material Adverse Effect are true and correct in all respects, and all other representations and warranties of the Company in this Agreement are true and correct, in all material respects, as if made at and as of the Closing Date, and the Company has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to the Closing Date;

(ii) No stop order or other order (A) suspending the effectiveness of the Registration Statement or any part thereof or any amendment thereof, (B) suspending the qualification of the Securities for offering or sale, or (C) suspending or preventing the use of the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, has been issued, and no proceeding for that purpose has been instituted or, to their knowledge, is contemplated by the Commission or any state or regulatory body; and

(iii) There has been no occurrence of any event resulting or reasonably likely to result in a Material Adverse Effect during the period from and after the date of this Agreement and prior to the Closing Date.

27

(k) On or before the date hereof, the Representative shall have received duly executed "lock-up" agreements, in the form attached hereto as Schedule V, between the Representative and each of the parties set forth on Schedule V hereto.

(l) The Representative shall have received electronic copies of the Pre-Funded Warrants and/or Warrants executed by the Company.

(m) The Common Stock shall be registered under the Exchange Act and shall be listed on Nasdaq, and the Company shall not have taken any action designed to terminate, or likely to have the effect of terminating, the registration of the Common Stock under the Exchange Act or delisting or suspending from trading the Common Stock from Nasdaq, nor shall the Company have received any information suggesting that the Commission is contemplated terminating such registration or listing.

(n) The Company shall have furnished to the Representative and its counsel such additional documents, certificates and evidence as the Representative or its counsel may have reasonably requested.

(o) On the Closing Date, the Shares shall have been delivered via the Depository Trust Company system to the accounts of the Underwriters.

If any condition specified in this Section 6 shall not have been fulfilled when and as required to be fulfilled, this Agreement may be terminated by the Representative by notice to the Company at any time at or prior to the Closing Date and such termination shall be without liability of any party to any other party, except that Section 5(a)(x), Section 7 and Section 8 shall survive any such termination and remain in full force and effect.

7. Indemnification and Contribution.

(a) The Company agrees to indemnify, defend and hold harmless the Underwriters, their affiliates, directors and officers and employees, and each person, if any, who controls an Underwriter within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, from and against any losses, claims, damages or liabilities to which the Underwriters or such person may become subject, under the Securities Act or otherwise (including in settlement of any litigation if such settlement is effected with the written consent of the Company), insofar as such losses, claims, damages or liabilities (or actions in respect thereof) arise out of or are based upon (i) an untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, including the information deemed to be a part of the Registration Statement at the time of effectiveness and at any subsequent time pursuant to Rule 430A of the Rules and Regulations, or arise out of or are based upon the omission from the Registration Statement, or alleged omission to state therein, a material fact required to be stated therein or necessary to make the statements therein not misleading (ii) an untrue statement or alleged untrue statement of a material fact contained in the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto (including any documents filed under the Exchange Act and deemed to be incorporated by reference into the Registration Statement or the Prospectus), or any Issuer Free Writing Prospectus or any Written Testing-the-Waters Communication or the Marketing Materials, or arise out of or are based upon the omission or

alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading, (iii) in whole or in part, any inaccuracy in the representations and warranties of the Company contained herein, or (iv) in whole or in part, any failure of the Company to perform its obligations hereunder or under law, and will reimburse the Underwriters for any legal or other expenses reasonably incurred by it in connection with evaluating, investigating or defending against such loss, claim, damage, liability or action (or any legal or other expense reasonably incurred in connection with the evaluation, investigation or defense thereof); *provided, however*, that the Company shall not be liable in any such case to the extent that any such loss, claim, damage, liability or action arises out of or is based upon an untrue statement or alleged untrue statement or omission or alleged omission made in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto or any Issuer Free Writing Prospectus or Written Testing-the-Waters Communication, in reliance upon and in conformity with written information furnished to the Company by the Underwriters specifically for use in the preparation thereof, which written information is described in Section 7(f).

(b) The Underwriters will indemnify, defend and hold harmless the Company, its affiliates, directors, officers and employees, and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, from and against any losses, claims, damages or liabilities to which the Company may become subject, under the Securities Act or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of such Underwriter), insofar as such losses, claims, damages or liabilities (or actions in respect thereof) arise out of or are based upon an untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto, any Issuer Free Writing Prospectus or any "issuer information" filed or required to be filed pursuant to Rule 433(d) under the Act, or arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus, or any amendment or supplement thereto or any Issuer Free Writing Prospectus or any "issuer information" filed or required to be filed pursuant to Rule 433(d) under the Act in reliance upon and in conformity with written information furnished to the Company by the Representative by or behalf of any Underwriters specifically for use in the preparation thereof, and will reimburse the Company for any legal or other expenses reasonably incurred by the Company in connection with defending against any such loss, claim, damage, liability or action.

(c) Promptly after receipt by an indemnified party under subsection (a) or (b) above of notice of the commencement of any action, such indemnified party shall, if a claim in respect thereof is to be made against the indemnifying party under such subsection, notify the indemnifying party in writing of the commencement thereof; but the failure to notify the indemnifying party shall not relieve the indemnifying party from any liability that it may have to any indemnified party except to the extent such indemnifying party has been materially prejudiced by such failure. In case any such action shall be brought against any indemnified party, it shall notify the indemnifying party of the commencement thereof, and the indemnifying party shall be entitled to participate in, and, to the extent that it shall wish, jointly with any other

indemnifying party similarly notified, to assume the defense thereof, with counsel reasonably satisfactory to such indemnified party, and after notice from the indemnifying party to such indemnified party of the indemnifying party's election so to assume the defense thereof, the indemnifying party shall not be liable to such indemnified party under such subsection for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof; *provided, however*, that if (i) the indemnified party has reasonably concluded (based on advice of counsel) that there may be legal defenses available to it or other indemnified parties that are different from or in addition to those available to the indemnifying party, (ii) a conflict or potential conflict exists (based on advice of counsel to the indemnified party) between the indemnified party and the indemnifying party (in which case the indemnifying party will not have the right to direct the defense of such action on behalf of the indemnified party), or (iii) the indemnifying party has not in fact employed counsel reasonably satisfactory to the indemnified party to assume the defense of such action within a reasonable time after receiving notice of the commencement of the action, the indemnified party shall have the right to employ a single counsel to represent it in any claim in respect of which indemnity may be sought under subsection (a) or (b) of this Section 7, in which event the reasonable fees and expenses of such separate counsel shall be borne by the indemnifying party or parties and reimbursed to the indemnified party as incurred.

The indemnifying party under this Section 7 shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party against any loss, claim, damage, liability or expense by reason of such settlement or judgment. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement, compromise or consent to the entry of judgment in any pending or threatened action, suit or proceeding in respect of which any indemnified party is a party or could be named and indemnity was or would be sought hereunder by such indemnified party, unless such settlement, compromise or consent (a) includes an unconditional release of such indemnified party from all liability for claims that are the subject matter of such action, suit or proceeding and (b) does not include a statement as to or an admission of fault, culpability or a failure to act by or on behalf of any indemnified party.

(d) If the indemnification provided for in this Section 7 is unavailable or insufficient to hold harmless an indemnified party under subsection (a) or (b) above, then each indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of the losses, claims, damages or liabilities referred to in subsection (a) or (b) above, (i) in such proportion as is appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriters on the other from the offering and sale of the Securities or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company on the one hand and the Underwriters on the other in connection with the statements or omissions that resulted in such losses, claims, damages or liabilities, as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriters on the other shall be deemed to be in the same proportion as the total net proceeds from the offering (before deducting expenses) received by the Company bear to the total underwriting discounts and commissions received by the Underwriters, in each case as set forth in the table on the cover page of the Prospectus. The

relative fault shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company or the Underwriters and the parties' relevant intent, knowledge, access to information and opportunity to correct or prevent such untrue statement or omission. The Company and the Underwriters agree that it would not be just and equitable if contributions pursuant to this subsection (d) were to be determined by pro rata allocation or by any other method of allocation that does not take account of the equitable considerations referred to in the first sentence of this subsection (d). The amount paid by an indemnified party as a result of the losses, claims, damages or liabilities referred to in the first sentence of this subsection (d) shall be deemed to include any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending against any action or claim that is the subject of this subsection (d). Notwithstanding the provisions of this subsection (d), the Underwriters shall not be required to contribute any amount in excess of the amount of the Underwriters' discounts commissions set forth in the table on the cover of the Prospectus. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation.

(e) The obligations of the Company under this Section 7 shall be in addition to any liability that the Company may otherwise have and the benefits of such obligations shall extend, upon the same terms and conditions, to each person, if any, who controls the Underwriters within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act; and the obligations of the Underwriters under this Section 7 shall be in addition to any liability that the Underwriters may otherwise have and the benefits of such obligations shall extend, upon the same terms and conditions, to the Company, and officers, directors and each person who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act.

(f) For purposes of this Agreement, the Underwriters confirm, and the Company acknowledges, that there is no information concerning the Underwriters furnished in writing to the Company by the Underwriters specifically for preparation of or inclusion in the Registration Statement, the Time of Sale Disclosure Package, the Prospectus or any Issuer Free Writing Prospectus, other than the statements set forth in the fourth and tenth paragraphs of the "Underwriting" section of the Prospectus and Time of Sale Disclosure Package.

8. Representations and Agreements to Survive Delivery. All representations, warranties, and agreements of the Company herein or in certificates delivered pursuant hereto, including, but not limited to, the agreements of the Underwriters and the Company contained in Section 5(a)(x) and Section 7 hereof, shall remain operative and in full force and effect regardless of any investigation made by or on behalf of the Underwriters or any controlling person thereof, or the Company or any of its officers, directors, or controlling persons, and shall survive delivery of, and payment for, the Securities to and by the Underwriters hereunder.

9. Termination of this Agreement.

(a) The Representative shall have the right to terminate this Agreement by giving notice to the Company as hereinafter specified at any time at or prior to the Closing Date,

31

if in the discretion of the Representative, (i) there has occurred any material adverse change in the securities markets or any event, act or occurrence that has materially disrupted, or in the opinion of the Representative, will in the future materially disrupt, the securities markets or there shall be such a material adverse change in general financial, political or economic conditions or the effect of international conditions on the financial markets in the United States is such as to make it, in the judgment of the Representative, inadvisable or impracticable to market the Units or enforce contracts for the sale of the Units, (ii) trading in the Company's Common Stock shall have been suspended by the Commission or Nasdaq or trading in securities generally on the Nasdaq Stock Market, the New York Stock Exchange ("NYSE"), or the NYSE American shall have been suspended, (iii) minimum or maximum prices for trading shall have been fixed, or maximum ranges for prices for securities shall have been required, on the Nasdaq Stock Market, NYSE or NYSE American, by such exchange or by order of the Commission or any other governmental authority having jurisdiction, (iv) a banking moratorium shall have been declared by federal or state authorities, (v) there shall have occurred any attack on, outbreak or escalation of hostilities or act of terrorism involving the United States, any declaration by the United States of a national emergency or war, any substantial change or development involving a prospective substantial change in United States or international political, financial or economic conditions or any other calamity or crisis, (vi) the Company suffers any loss by strike, fire, flood, earthquake, accident or other calamity, whether or not covered by insurance, or (vii) in the judgment of the Representative, there has been, since the time of execution of this Agreement or since the respective dates as of which information is given in the Prospectus, any material adverse change in the assets, properties, condition, financial or otherwise, or in the results of operations, business affairs or business prospects of the Company and its subsidiaries considered as a whole, whether or not arising in the ordinary course of business. Any such termination shall be without liability of any party to any other party except that the provisions of Section 5(a)(x) and Section 7 hereof shall at all times be effective and shall survive such termination.

(b) If the Representative elects to terminate this Agreement as provided in this Section, the Company shall be notified promptly by the Representative by telephone, confirmed by letter.

10. Substitution of Underwriters. If any Underwriter shall default in its obligation to purchase on the Closing Date the Securities agreed to be purchased hereunder on the Closing Date, the Representative shall have the right, within 36 hours thereafter, to make arrangements for one or more of the non-defaulting Underwriters, or any other underwriters, to purchase such Securities on the terms contained herein. If, however, the Representative shall not have completed such arrangements within such 36-hour period, then the Company shall be entitled to a further period of thirty-six hours within which to procure another party or other parties satisfactory to the Underwriters to purchase such Securities on such terms. If, after giving effect to any arrangements for the purchase of the Securities of a defaulting Underwriter or Underwriters by the Representative and the Company as provided above, the aggregate number of Securities which remains unpurchased on the Closing Date does not exceed one-eleventh of the aggregate number of all the Securities that all the Underwriters are obligated to purchase on the Closing Date, then the Company shall have the right to require each non-defaulting Underwriter to purchase the number of Securities which such Underwriter agreed to purchase hereunder at the Closing Date and, in addition, to require each non-defaulting Underwriter to purchase its pro rata share (based on the number of Securities which such Underwriter agreed to

32

purchase hereunder) of the Securities of such defaulting Underwriter or Underwriters for which such arrangements have not been made; but nothing herein shall relieve a defaulting Underwriter from liability for its default. In any such case, either the Representatives or the Company shall have the right to postpone the Closing Date for a period of not more than seven days in order to effect any necessary changes and arrangements (including any necessary

amendments or supplements to the Registration Statement or Prospectus or any other documents), and the Company agrees to file promptly any amendments to the Registration Statement or the Prospectus which in the opinion of the Company and the Underwriters and their counsel may thereby be made necessary.

If, after giving effect to any arrangements for the purchase of the Securities of a defaulting Underwriter or Underwriters by the Representative and the Company as provided above, the aggregate number of such Securities which remains unpurchased exceeds 10% of the aggregate number of all the Securities to be purchased at such date, then this Agreement shall terminate, without liability on the part of any non-defaulting Underwriter to the Company, and without liability on the part of the Company, except as provided in Sections 5(a)(x), 7 and 9. The provisions of this Section 10 shall not in any way affect the liability of any defaulting Underwriter to the Company or the nondefaulting Underwriters arising out of such default. The term "Underwriter" as used in this Agreement shall include any person substituted under this Section 10 with like effect as if such person had originally been a party to this Agreement with respect to such Shares.

11. Notices. Except as otherwise provided herein, all communications hereunder shall be in writing and, if to Representative, shall be mailed, delivered or telecopied to Oppenheimer & Co. Inc., 85 Broad Street, New York, NY 10004, Attention: Managing Director, with a copy to Lowenstein Sandler LLP, 1251 Avenue of the Americas, New York, NY 10020, teletype number: (212) 262-7402, Attention: John D. Hogoboom; and if to the Company, shall be mailed, delivered or telecopied to it at One Kendall Square, Bldg. 1400E, Suite B14202, Cambridge, MA 02421, teletype number: (617) 273-2637, Attention: Jill C. Milne, Ph.D., President and Chief Executive Officer, with a copy to WilmerHale, 60 State Street, Boston, MA 02109, teletype number: (617) 526-5000, Attention: Rosemary G. Reilly; or in each case to such other address as the person to be notified may have requested in writing. Any party to this Agreement may change such address for notices by sending to the parties to this Agreement written notice of a new address for such purpose.

12. Persons Entitled to Benefit of Agreement. This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns and the controlling persons, officers and directors referred to in Section 7. Nothing in this Agreement is intended or shall be construed to give to any other person, firm or corporation any legal or equitable remedy or claim under or in respect of this Agreement or any provision herein contained. The term "successors and assigns" as herein used shall not include any purchaser, as such purchaser, of any of the Securities from the Underwriter.

13. Absence of Fiduciary Relationship. The Company acknowledges and agrees that: (a) the Underwriters have been retained solely to act as underwriter in connection with the sale of the Securities and that no fiduciary, advisory or agency relationship between the

33

Company and the Underwriters has been created in respect of any of the transactions contemplated by this Agreement, irrespective of whether the Underwriters have advised or are advising the Company on other matters; (b) the price and other terms of the Securities set forth in this Agreement were established by the Company following discussions and arms-length negotiations with the Underwriters and the Company is capable of evaluating and understanding and understands and accepts the terms, risks and conditions of the transactions contemplated by this Agreement; (c) it has been advised that the Underwriters and their affiliates are engaged in a broad range of transactions that may involve interests that differ from those of the Company and that the Underwriters have no obligation to disclose such interest and transactions to the Company by virtue of any fiduciary, advisory or agency relationship; (d) it has been advised that the Underwriters are acting, in respect of the transactions contemplated by this Agreement, solely for the benefit of the Underwriters, and not on behalf of the Company.

14. Amendments and Waivers. No supplement, modification or waiver of this Agreement shall be binding unless executed in writing by the party to be bound thereby. The failure of a party to exercise any right or remedy shall not be deemed or constitute a waiver of such right or remedy in the future. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provision hereof (regardless of whether similar), nor shall any such waiver be deemed or constitute a continuing waiver unless otherwise expressly provided.

15. Partial Unenforceability. The invalidity or unenforceability of any section, paragraph, clause or provision of this Agreement shall not affect the validity or enforceability of any other section, paragraph, clause or provision.

16. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of New York.

17. Submission to Jurisdiction. The Company irrevocably (a) submits to the jurisdiction of any court of the State of New York for the purpose of any suit, action, or other proceeding arising out of this Agreement, or any of the agreements or transactions contemplated by this Agreement, the Registration Statement and the Prospectus (each a "Proceeding"), (b) agrees that all claims in respect of any Proceeding may be heard and determined in any such court, (c) waives, to the fullest extent permitted by law, any immunity from jurisdiction of any such court or from any legal process therein, (d) agrees not to commence any Proceeding other than in such courts, and (e) waives, to the fullest extent permitted by law, any claim that such Proceeding is brought in an inconvenient forum. THE COMPANY (ON BEHALF OF ITSELF AND, TO THE FULLEST EXTENT PERMITTED BY LAW, ON BEHALF OF ITS RESPECTIVE EQUITY HOLDERS AND CREDITORS) HEREBY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY CLAIM BASED UPON, ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT AND THE TRANSACTIONS CONTEMPLATED BY THIS AGREEMENT, THE REGISTRATION STATEMENT, AND THE PROSPECTUS.

18. Counterparts. This Agreement may be executed and delivered (including by facsimile transmission and electronic mail attaching a portable document file (.pdf)) in one or more counterparts and, if executed in more than one counterpart, the executed counterparts shall

34

each be deemed to be an original and all such counterparts shall together constitute one and the same instrument.

35

Please sign and return to the Company the enclosed duplicates of this Agreement whereupon this Agreement will become a binding agreement between the Company and the Representative in accordance with its terms.

Very truly yours,

CATABASIS PHARMACEUTICALS, INC.

By: _____
Name: _____
Title: _____

Confirmed as of the date first above-mentioned by the Representative.

OPPENHEIMER & CO. INC.
as the Representative of the several
Underwriters listed on Schedule I

By: _____
Name: _____
Title: _____

[Signature page to Underwriting Agreement]

SCHEDULE I

	Number of Common Units	Number of Pre-Funded Units
Oppenheimer & Co. Inc.		
[Participating Underwriters]		
Total		

SCHEDULE II

SCHEDULE III

SCHEDULE IV

Free Writing Prospectus

SCHEDULE V

FORM OF LOCK-UP AGREEMENT

SCHEDULE VI

List of Lock-Up Parties

Exhibit A

Form of Warrant

Form of Pre-Funded Warrant

[FORM OF PRE-FUNDED WARRANT]

CATABASIS PHARMACEUTICALS, INC.

PRE-FUNDED WARRANT TO PURCHASE COMMON STOCK

Warrant No.:

Number of Shares of Common Stock:

Date of Issuance: [], 20[] (“**Issuance Date**”)

Catabasis Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, [HOLDER], the registered holder hereof or its permitted assigns (the “**Holder**”), is entitled, subject to the terms set forth below, to purchase from the Company, at the Exercise Price (as defined below) then in effect, at any time or times on or after [] (the “**Initial Exercisability Date**”), until exercised in full (the “**Termination Date**”), () fully paid non-assessable shares of Common Stock (as defined below), subject to adjustment as provided herein (the “**Warrant Shares**”). Except as otherwise defined herein, capitalized terms in this Pre-Funded Warrant to Purchase Common Stock (including any Pre-Funded Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, this “**Warrant**”), shall have the meanings set forth in Section 16. This Warrant is one of the Warrants to Purchase Common Stock (the “**Warrants**”) issued pursuant to (i) that certain Underwriting Agreement (the “**Underwriting Agreement**”), dated as of [], 20[] (the “**Subscription Date**”) by and between the Company and Oppenheimer & Co. Inc., as the representative of the several underwriters named therein, (ii) the Company’s Registration Statement on Form S-1 (File number 333-[] (the “**Registration Statement**”) and (iii) the Company’s prospectus dated as of [], 20[].

1. EXERCISE OF WARRANT.

(a) Mechanics of Exercise. Subject to the terms and conditions hereof (including, without limitation, the limitations set forth in Section 1(f)), this Warrant may be exercised by the Holder at any time or times on or after the Initial Exercisability Date, in whole or in part, by delivery (whether via facsimile, electronic mail or otherwise) of a written notice, in the form attached hereto as Exhibit A (the “**Exercise Notice**”), of the Holder’s election to exercise this Warrant. Notwithstanding the foregoing, with respect to any Exercise Notice(s) delivered on or prior to the Initial Exercisability Date, which may be delivered at any time after the execution of the Underwriting Agreement, the Company agrees to deliver the Warrant Shares subject to such Exercise Notice(s) by 5 p.m. (New York time) on the Initial Exercisability Date. Within one (1) Trading Day following the delivery of the Exercise Notice, the Holder shall make payment to the Company of an amount equal to the Exercise Price in effect on the date of such exercise multiplied by the number of Warrant Shares as to which this Warrant is being exercised (the “**Aggregate Exercise Price**”) in cash by wire transfer of immediately available funds or, if the provisions of Section 1(d) are applicable, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as defined in Section 1(d)). The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder (until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been

exercised in full), nor shall any ink-original signature or medallion guarantee (or other type of guarantee or notarization) with respect to any Exercise Notice be required. Execution and delivery of the Exercise Notice with respect to less than all of the Warrant Shares shall have the same effect as cancellation of the original Warrant and issuance of a new Warrant evidencing the right to purchase the remaining number of Warrant Shares and the Holder shall not be required to physically surrender this Warrant to the Company until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full, in which case, the Holder shall surrender this Warrant to the Company for cancellation within three (3) Trading Days of the date on which the final Notice of Exercise is delivered to the Company. On or before the first (1st) Trading Day following the date on which the Holder has delivered the applicable Exercise Notice, the Company shall transmit by facsimile or electronic mail an acknowledgment of confirmation of receipt of the Exercise Notice, in the form attached to the Exercise Notice, to the Holder and the Company’s transfer agent (the “**Transfer Agent**”). So long as the Holder delivers the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) on or prior to the first (1st) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the earlier of (i) the second (2nd) Trading Day and (ii) the number of Trading Days comprising the Standard Settlement Period, in each case following the date on which the Exercise Notice has been delivered to the Company, or, if the Holder does not deliver the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) on or prior to the first (1st) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the first (1st) Trading Day following the date on which the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) is delivered (such earlier date, or if later, the earliest day on which the Company is required to deliver Warrant Shares pursuant to this Section 1(a), the “**Share Delivery Date**”), the Company shall (X) provided that the Transfer Agent is participating in The Depository Trust Company (“**DTC**”) Fast Automated Securities Transfer Program, credit such aggregate number of Warrant Shares to which the Holder is entitled pursuant to such exercise to the Holder’s or its designee’s balance account with DTC through its Deposit / Withdrawal At Custodian system, or (Y) if the Transfer Agent is not participating in the DTC Fast Automated Securities Transfer Program, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the name of the Holder or its designee, for the number of Warrant Shares to which the Holder is entitled pursuant to such exercise. The Company shall be responsible for all fees and expenses of the Transfer Agent and all fees and expenses with respect to the issuance of Warrant Shares via DTC, if any, including without limitation for same day processing. Upon delivery of the Exercise Notice, the Holder shall be deemed for all corporate purposes to have become the holder of record and beneficial owner of the Warrant Shares with respect to which this Warrant has been exercised, irrespective of the date such Warrant Shares are credited to the Holder’s DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be. If this Warrant is physically delivered to the Company in connection with any exercise pursuant to this Section 1(a) and the number of Warrant Shares represented by this Warrant submitted for exercise is greater than the number of Warrant Shares being acquired upon an exercise, then the Company shall as soon as practicable and in no event later than three (3) Trading Days after any exercise and at its own expense, issue and deliver to the Holder (or its designee) a new Warrant (in accordance with Section 7(d)) representing the right to purchase the number of Warrant Shares issuable immediately prior to such exercise under this Warrant, less the number of Warrant Shares with respect to which this Warrant is

exercised. No fractional Warrant Shares are to be issued upon the exercise of this Warrant, but rather the number of Warrant Shares to be issued shall be rounded to the nearest whole number. The Company shall pay any and all transfer, stamp, issuance and similar taxes, costs and expenses (including, without limitation, fees and expenses of the Transfer Agent) which may be payable with respect to the issuance and delivery of Warrant Shares upon exercise of this Warrant. The Company's obligations to issue and deliver Warrant Shares in accordance with the terms and subject to the conditions hereof are absolute and unconditional, irrespective of any action or inaction by the Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination; provided, however, that the Company shall not be required to deliver Warrant Shares with respect to an exercise prior to the Holder's delivery of the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) with respect to such exercise.

(b) Exercise Price. The aggregate exercise price of this Warrant, except for a nominal exercise price of \$0.01 per Warrant Share, was pre-funded to the Company on or prior to the Initial Exercisability Date and, consequently, no additional consideration (other than the nominal exercise price of \$0.01 per Warrant Share) shall be required to be paid by the Holder to any Person to effect any exercise of this Warrant. The Holder shall not be entitled to the return or refund of all, or any portion, of such pre-paid aggregate Exercise Price under any circumstance or for any reason whatsoever, including in the event this Warrant shall not have been exercised prior to the Termination Date. The remaining unpaid exercise price per share of Common Stock under this Warrant shall be \$0.01, subject to adjustment hereunder (the "**Exercise Price**").

(c) Company's Failure to Timely Deliver Securities. In addition to any other rights available to the Holder, if the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares in accordance with the provisions of Section 1(a) above pursuant to an exercise on or before the Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a "**Buy-In**"), then the Company shall (A) pay in cash to the Holder the amount, if any, by which (x) the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased exceeds (y) the amount obtained by multiplying (1) the number of Warrant Shares that the Company was required to deliver to the Holder in connection with the exercise at issue times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the Holder, either reinstate the portion of the Warrant and equivalent number of Warrant Shares for which such exercise was not honored (in which case such exercise shall be deemed rescinded) or deliver to the Holder the number of shares of Common Stock that would have been issued had the Company timely complied with its exercise and delivery obligations hereunder. For example, if the Holder purchases Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted exercise of shares of Common Stock with an aggregate sale price giving rise to such purchase obligation of \$10,000, under clause (A) of the immediately preceding sentence the Company shall be required to pay the Holder \$1,000. The Holder shall provide the Company written notice indicating the amounts payable to the Holder in respect of the Buy-In and, upon request of the Company, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies

3

available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

(d) Cashless Exercise. Notwithstanding anything contained herein to the contrary, if a registration statement (which may be the Registration Statement) covering the issuance of the Warrant Shares is not available for the issuance of such Warrant Shares, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash payment otherwise contemplated to be made to the Company upon such exercise in payment of the Aggregate Exercise Price, elect instead to receive upon such exercise the "Net Number" of shares of Common Stock determined according to the following formula (a "**Cashless Exercise**"):

$$\text{Net Number} = \frac{(A \times B) - (A \times C)}{B}$$

For purposes of the foregoing formula:

A= the total number of shares with respect to which this Warrant is then being exercised.

B= as applicable: (i) the Closing Sale Price of the Common Stock on the Trading Day immediately preceding the date of the applicable Exercise Notice if such Exercise Notice is (1) both executed and delivered pursuant to Section 1(a) hereof on a day that is not a Trading Day or (2) both executed and delivered pursuant to Section 1(a) hereof on a Trading Day prior to the opening of "regular trading hours" (as defined in Rule 600(b)(64) of Regulation NMS promulgated under the federal securities laws) on such Trading Day, (ii) at the option of the Holder, either (y) the Weighted Average Price on the Trading Day immediately preceding the date of the applicable Notice of Exercise or (z) the Bid Price of the Common Stock as of the time of the Holder's execution of the applicable Exercise Notice if such Exercise Notice is executed during "regular trading hours" on a Trading Day and is delivered within two (2) hours thereafter (including until two (2) hours after the close of "regular trading hours" on a Trading Day) pursuant to Section 1(a) hereof or (iii) the Closing Sale Price of the Common Stock on the date of the applicable Exercise Notice if the date of such Exercise Notice is a Trading Day and such Exercise Notice is both executed and delivered pursuant to Section 1(a) hereof after the close of "regular trading hours" on such Trading Day.

C= \$0.01, as adjusted hereunder.

If Warrant Shares are issued in such a cashless exercise, the Company acknowledges and agrees that in accordance with Section 3(a)(9) of the Securities Act of 1933, as amended, the Warrant Shares shall take on the registered characteristics of the Warrants being exercised, and the holding period of the Warrants being exercised may be tacked on to the holding period of the Warrant Shares. The Company agrees not to take any position contrary to this Section 1(d).

4

(e) Disputes. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall promptly issue to the Holder the number of Warrant Shares that are not disputed and resolve such dispute in accordance with Section 11.

(f) Beneficial Ownership. Notwithstanding anything to the contrary contained herein, the Company shall not effect the exercise of any portion of this Warrant, and the Holder shall not have the right to exercise any portion of this Warrant, pursuant to the terms and conditions of this Warrant and any such exercise shall be null and void and treated as if never made, to the extent that after giving effect to such exercise, the Holder together with the other Attribution Parties collectively would beneficially own in excess of [4.99][9.99]% (the “**Maximum Percentage**”) of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. For purposes of the foregoing sentence, the aggregate number of shares of Common Stock beneficially owned by the Holder and the other Attribution Parties shall include the number of shares of Common Stock held by the Holder and all other Attribution Parties plus the number of shares of Common Stock issuable upon exercise of this Warrant with respect to which the determination of such sentence is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (A) exercise of the remaining, unexercised portion of this Warrant beneficially owned by the Holder or any of the other Attribution Parties and (B) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company (including, without limitation, any convertible notes or convertible preferred stock or warrants, including the other Warrants) beneficially owned by the Holder or any other Attribution Party subject to a limitation on conversion or exercise analogous to the limitation contained in this Section 1(f). For purposes of this Section 1(f), beneficial ownership shall be calculated in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended (the “**1934 Act**”), it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 1(f) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Warrant, in determining the number of outstanding shares of Common Stock the Holder may acquire upon the exercise of this Warrant without exceeding the Maximum Percentage, the Holder may rely on the number of outstanding shares of Common Stock as reflected in (x) the Company’s most recent Annual Report on Form 10-K, Quarterly Report on Form 10-Q and Current Reports on Form 8-K or other public filing with the Securities and Exchange Commission (the “**SEC**”), as the case may be, (y) a more recent public announcement by the Company or (z) any other written notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding (the “**Reported Outstanding Share Number**”). If the Company receives an Exercise Notice from the Holder at a time when the actual number of outstanding shares of Common Stock is less than the Reported Outstanding Share Number, the Company shall (i) notify the Holder in

5

writing of the number of shares of Common Stock then outstanding and, to the extent that such Exercise Notice would otherwise cause the Holder’s beneficial ownership, as determined pursuant to this Section 1(f), to exceed the Maximum Percentage, the Holder must notify the Company of a reduced number of Warrant Shares to be purchased pursuant to such Exercise Notice (the number of shares by which such purchase is reduced, the “**Reduction Shares**”) and (ii) as soon as reasonably practicable, the Company shall return to the Holder any exercise price paid by the Holder for the Reduction Shares. For any reason at any time, upon the written or oral request of the Holder, the Company shall within one (1) Business Day confirm orally and in writing or by electronic mail to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder and any other Attribution Party since the date as of which the Reported Outstanding Share Number was reported. In the event that the issuance of Common Stock to the Holder upon exercise of this Warrant results in the Holder and the other Attribution Parties being deemed to beneficially own, in the aggregate, more than the Maximum Percentage of the number of outstanding shares of Common Stock (as determined under Section 13(d) of the 1934 Act), the number of shares so issued by which the Holder’s and the other Attribution Parties’ aggregate beneficial ownership exceeds the Maximum Percentage (the “**Excess Shares**”) shall be deemed null and void and shall be cancelled ab initio, and the Holder shall not have the power to vote or to transfer the Excess Shares. As soon as reasonably practicable after the issuance of the Excess Shares has been deemed null and void, the Company shall return to the Holder the exercise price paid by the Holder for the Excess Shares. Upon delivery of a written notice to the Company, the Holder may from time to time increase or decrease the Maximum Percentage to any other percentage not in excess of [4.99][9.99]% as specified in such notice; provided that (i) any such increase in the Maximum Percentage will not be effective until the sixty-first (61st) day after such notice is delivered to the Company and (ii) any such increase or decrease will apply only to the Holder and the other Attribution Parties and not to any other holder of Warrants that is not an Attribution Party of the Holder. For purposes of clarity, the shares of Common Stock issuable pursuant to the terms of this Warrant in excess of the Maximum Percentage shall not be deemed to be beneficially owned by the Holder for any purpose including for purposes of Section 13(d) or Rule 16a-1(a)(1) of the 1934 Act. No prior inability to exercise this Warrant pursuant to this paragraph shall have any effect on the applicability of the provisions of this paragraph with respect to any subsequent determination of exercisability. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 1(f) to the extent necessary to correct this paragraph or any portion of this paragraph which may be defective or inconsistent with the intended beneficial ownership limitation contained in this Section 1(f) or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitation contained in this paragraph may not be waived and shall apply to a successor holder of this Warrant.

(g) Required Reserve Amount. So long as this Warrant remains outstanding, the Company shall at all times keep reserved for issuance under this Warrant a number of shares of Common Stock at least equal to 100% of the maximum number of shares of Common Stock as shall be necessary to satisfy the Company’s obligation to issue shares of Common Stock under the Warrants then outstanding (without regard to any limitations on exercise) (the “**Required Reserve Amount**”); provided that at no time shall the number of shares of Common Stock reserved pursuant to this Section 1(g) be reduced other than in connection with any exercise

6

of Warrants or such other event covered by Section 2 below. The Required Reserve Amount (including, without limitation, each increase in the number of shares so reserved) shall be allocated pro rata among the holders of the Warrants based on the number of shares of Common Stock issuable upon exercise of Warrants held by each holder thereof on the Issuance Date (without regard to any limitations on exercise) (the “**Authorized Share Allocation**”). In the event that a holder shall sell or otherwise transfer any of such holder’s Warrants, each transferee shall be allocated a pro rata portion of such holder’s Authorized Share Allocation. Any shares of Common Stock reserved and allocated to any Person which ceases to hold any Warrants shall be allocated to the remaining holders of Warrants, pro rata based on the number of shares of Common Stock issuable upon exercise of the Warrants then held by such holders thereof (without regard to any limitations on exercise).

(h) Insufficient Authorized Shares. If at any time while this Warrant remains outstanding the Company does not have a sufficient number of authorized and unreserved shares of Common Stock to satisfy its obligation to reserve for issuance the Required Reserve Amount (an “**Authorized Share Failure**”), then the Company shall promptly take all action reasonably necessary to increase the Company’s authorized shares of Common Stock to an amount sufficient to allow the Company to reserve the Required Reserve Amount for this Warrant then outstanding. Without limiting the generality of the foregoing sentence, as soon as practicable after the date of the occurrence of an Authorized Share Failure, but in no event later than ninety (90) days after the occurrence of such Authorized Share Failure, the Company shall hold a meeting of its stockholders for the approval of an increase in the number of authorized shares of Common Stock. In connection with such meeting, the Company shall provide each stockholder with a proxy statement and shall use its reasonable best efforts to solicit its stockholders’ approval of such increase in authorized shares of Common Stock and to cause its board of directors to recommend to the stockholders that they approve such proposal. Notwithstanding the foregoing, if any such time of an Authorized Share Failure, the Company is able to obtain the written consent of a majority of the shares of its issued and outstanding shares of Common Stock to approve the increase in the number of authorized shares of Common Stock, the Company may satisfy this obligation by obtaining such consent and submitting for filing with the SEC an Information Statement on Schedule 14C.

2. ADJUSTMENT OF EXERCISE PRICE AND NUMBER OF WARRANT SHARES UPON SUBDIVISION OR COMBINATION OF COMMON STOCK. If the Company at any time on or after the Subscription Date subdivides (by any stock split, stock dividend, recapitalization or otherwise) one or more classes of its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision will be proportionately reduced and the number of Warrant Shares will be proportionately increased. If the Company at any time on or after the Subscription Date combines (by combination, reverse stock split or otherwise) one or more classes of its outstanding shares of Common Stock into a smaller number of shares, the Exercise Price in effect immediately prior to such combination will be proportionately increased and the number of Warrant Shares will be proportionately decreased. Any adjustment under this Section 2 shall become effective at the close of business on the date the subdivision or combination becomes effective.

3. RIGHTS UPON DISTRIBUTION OF ASSETS. In addition to any adjustments pursuant to Section 2 above, if, on or after the Subscription Date and on or prior to

7

the Termination Date, the Company shall declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property, options, evidence of indebtedness or any other assets by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a “**Distribution**”), at any time after the issuance of this Warrant, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) immediately before the date on which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, that to the extent that the Holder’s right to participate in any such Distribution would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Distribution to such extent (and shall not be entitled to beneficial ownership of such shares of Common Stock as a result of such Distribution (and beneficial ownership) to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such Distribution (and any Distributions declared or made on such initial Distribution or on any subsequent Distribution held similarly in abeyance) to the same extent as if there had been no such limitation).

4. PURCHASE RIGHTS; FUNDAMENTAL TRANSACTIONS.

(a) Purchase Rights. In addition to any adjustments pursuant to Section 2 above, if at any time on or after the Subscription Date and on or prior to the Termination Date the Company grants, issues or sells any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of Common Stock (the “**Purchase Rights**”), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of Common Stock are to be determined for the grant, issuance or sale of such Purchase Rights (provided, however, that to the extent that the Holder’s right to participate in any such Purchase Right would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Purchase Right to such extent (and shall not be entitled to beneficial ownership of such Common Stock as a result of such Purchase Right (and beneficial ownership) to such extent) and such Purchase Right to such extent shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such right (and any Purchase Right granted, issued or sold on such initial Purchase Right or on any

8

subsequent Purchase Right to be held similarly in abeyance) to the same extent as if there had been no such limitation).

(b) Fundamental Transaction. The Company shall not enter into or be party to a Fundamental Transaction unless the Successor Entity assumes in writing all of the obligations of the Company under this Warrant in accordance with the provisions of this Section 4(b), including agreements to deliver to the Holder in exchange for this Warrant a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant, including, without limitation, which is exercisable for a corresponding number of shares of capital stock equivalent to the shares of Common Stock acquirable and receivable upon exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) prior to such Fundamental Transaction, and with an exercise price which applies the exercise price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such adjustments to the number of shares of capital stock and such exercise price being for the purpose of protecting the economic value of this Warrant immediately prior to the consummation of such Fundamental Transaction). Upon the consummation of each Fundamental Transaction, the Successor Entity shall succeed to, and be

substituted for the Company (so that from and after the date of the applicable Fundamental Transaction, the provisions of this Warrant and the other Transaction Documents referring to the “Company” shall refer instead to the Successor Entity), and may exercise every right and power of the Company and shall assume all of the obligations of the Company under this Warrant with the same effect as if such Successor Entity had been named as the Company herein. Notwithstanding the foregoing, and without limiting Section 1(f) hereof, the Holder may elect, at its sole option, by delivery of written notice to the Company to waive this Section 4(b) to permit the Fundamental Transaction without the assumption of this Warrant. In addition to and not in substitution for any other rights hereunder, prior to the consummation of each Fundamental Transaction pursuant to which holders of shares of Common Stock are entitled to receive securities or other assets with respect to or in exchange for shares of Common Stock (a “**Corporate Event**”), the Company shall make appropriate provision to insure that the Holder will thereafter have the right to receive upon an exercise of this Warrant at any time after the consummation of the applicable Fundamental Transaction but prior to the Termination Date, in lieu of the shares of the Common Stock (or other securities, cash, assets or other property (except such items still issuable under Sections 3 and 4(a) above, which shall continue to be receivable thereafter)) issuable upon the exercise of the Warrant prior to such Fundamental Transaction, such shares of stock, securities, cash, assets or any other property whatsoever (including warrants or other purchase or subscription rights) (collectively, the “**Corporate Event Consideration**”) which the Holder would have been entitled to receive upon the happening of the applicable Fundamental Transaction had this Warrant been exercised immediately prior to the applicable Fundamental Transaction (without regard to any limitations on the exercise of this Warrant). The provision made pursuant to the preceding sentence shall be in a form and substance reasonably satisfactory to the Holder. The provisions of this Section 4(b) shall apply similarly and equally to successive Fundamental Transactions and Corporate Events.

5. **NONCIRCUMVENTION.** The Company hereby covenants and agrees that the Company will not, by amendment of its Certificate of Incorporation or Bylaws, or through any reorganization, transfer of assets, consolidation, merger, scheme, arrangement, dissolution, issuance or sale of securities, or any other voluntary action, avoid or seek to avoid the observance

9

or performance of any of the terms of this Warrant, and will at all times in good faith carry out all of the provisions of this Warrant and take all action as may be required to protect the rights of the Holder. Without limiting the generality of the foregoing, the Company (i) shall not increase the par value of any shares of Common Stock receivable upon the exercise of this Warrant above the Exercise Price then in effect, (ii) shall take all such actions as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable shares of Common Stock upon the exercise of this Warrant, and (iii) shall, so long as any of the Warrants are outstanding, take all action necessary to reserve and keep available out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the exercise of the Warrants, the number of shares of Common Stock as shall from time to time be necessary to effect the exercise of the Warrants then outstanding (without regard to any limitations on exercise).

6. **WARRANT HOLDER NOT DEEMED A STOCKHOLDER.** Except as otherwise specifically provided herein, the Holder, solely in such Person’s capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of capital stock of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person’s capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company. Notwithstanding this Section 6, the Company shall provide the Holder with copies of the same notices and other information given to the stockholders of the Company generally, contemporaneously with the giving thereof to the stockholders; provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of any corporate action required to be specified in such notice.

7. **REISSUANCE OF WARRANTS.**

(c) **Transfer of Warrant.** If this Warrant is to be transferred, the Holder shall surrender this Warrant to the Company, whereupon the Company will forthwith issue and deliver upon the order of the Holder a new Warrant (in accordance with Section 7(d)), registered as the Holder may request, representing the right to purchase the number of Warrant Shares being transferred by the Holder and, if less than the total number of Warrant Shares then underlying this Warrant is being transferred, a new Warrant (in accordance with Section 7(d)) to the Holder representing the right to purchase the number of Warrant Shares not being transferred.

(d) **Lost, Stolen or Mutilated Warrant.** Upon receipt by the Company of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant, and, in the case of loss, theft or destruction, of any indemnification undertaking by the Holder to the Company in customary form (but without the obligation to post a bond) and, in the case of mutilation, upon surrender and cancellation of this Warrant, the Company shall execute

10

and deliver to the Holder a new Warrant (in accordance with Section 7(d)) representing the right to purchase the Warrant Shares then underlying this Warrant.

(e) **Exchangeable for Multiple Warrants.** This Warrant is exchangeable, upon the surrender hereof by the Holder at the principal office of the Company, for a new Warrant or Warrants (in accordance with Section 7(d)) representing in the aggregate the right to purchase the number of Warrant Shares then underlying this Warrant, and each such new Warrant will represent the right to purchase such portion of such Warrant Shares as is designated by the Holder at the time of such surrender.

(f) **Issuance of New Warrants.** Whenever the Company is required to issue a new Warrant pursuant to the terms of this Warrant, such new Warrant (i) shall be of like tenor with this Warrant, (ii) shall represent, as indicated on the face of such new Warrant, the right to purchase the Warrant Shares then underlying this Warrant (or in the case of a new Warrant being issued pursuant to Section 7(a) or Section 7(c), the Warrant Shares designated by the Holder which, when added to the number of shares of Common Stock underlying the other new Warrants issued in connection with such issuance, does not exceed the number of Warrant Shares then underlying this Warrant), (iii) shall have an issuance date, as indicated on the face of such new Warrant which is the same as the Issuance Date, and (iv) shall have the same rights and conditions as this Warrant.

8. **NOTICES.** Whenever notice is required to be given under this Warrant, including, without limitation, an Exercise Notice, unless otherwise provided herein, such notice shall be given in writing, (i) if delivered (a) from within the domestic United States, by first-class registered or

certified airmail, or nationally recognized overnight express courier, postage prepaid, electronic mail or by facsimile or (b) from outside the United States, by International Federal Express, electronic mail or facsimile, and (ii) will be deemed given (A) if delivered by first-class registered or certified mail domestic, three (3) Business Days after so mailed, (B) if delivered by nationally recognized overnight carrier, one (1) Business Day after so mailed, (C) if delivered by International Federal Express, two (2) Business Days after so mailed and (D) on the date of transmission, if delivered by electronic mail to each of the email addresses specified in this Section 8 prior to 5:00 p.m. (New York time) on a Trading Day, (E) the next Trading Day after the date of transmission, if delivered by electronic mail to each of the email addresses specified in this Section 8 on a day that is not a Trading Day or later than 5:00 p.m. (New York time) on any Trading Day and (F) if delivered by facsimile, upon electronic confirmation of delivery of such facsimile, and will be delivered and addressed as follows:

- (i) if to the Company, to:

Catabasis Pharmaceuticals, Inc.
One Kendall Square
Building 1400E, Suite B14202
Cambridge, MA 02139
Attention: []]
Facsimile: []]
Email: []]

11

- (ii) if to the Holder, at such address or other contact information delivered by the Holder to Company or as is on the books and records of the Company.

The Company shall provide the Holder with prompt written notice of all actions taken pursuant to this Warrant, including in reasonable detail a description of such action and the reason therefor. Without limiting the generality of the foregoing, the Company will give written notice to the Holder (i) immediately upon any adjustment of the Exercise Price, setting forth in reasonable detail, and certifying, the calculation of such adjustment and (ii) at least fifteen (15) days prior to the date on which the Company closes its books or takes a record (A) with respect to any dividend or distribution upon the shares of Common Stock, (B) with respect to any grants, issuances or sales of any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of Common Stock or (C) for determining rights to vote with respect to any Fundamental Transaction, dissolution or liquidation; provided in each case that such information shall be made known to the public prior to or in conjunction with such notice being provided to the Holder; provided, further, that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. It is expressly understood and agreed that the time of exercise specified by the Holder in each Exercise Notice shall be definitive and may not be disputed or challenged by the Company.

9. AMENDMENT AND WAIVER. Except as otherwise provided herein, the provisions of this Warrant may be amended or waived and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holder.

10. GOVERNING LAW; JURISDICTION; JURY TRIAL. This Warrant shall be governed by and construed and enforced in accordance with, and all questions concerning the construction, validity, interpretation and performance of this Warrant shall be governed by, the internal laws of the State of New York, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of New York or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of New York. The Company hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in The City of New York, Borough of Manhattan, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. The Company hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof to the Company at the address set forth in Section 8(i) above or such other address as the Company subsequently delivers to the Holder and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. Nothing contained herein shall be deemed or operate to preclude the Holder from bringing suit or taking other legal action against the Company in any other jurisdiction to collect on the Company's obligations to the Holder, to realize on any collateral or any other security for such obligations, or to enforce a judgment or other court ruling in favor of the Holder. If either party shall commence an action,

12

suit or proceeding to enforce any provisions of this Warrant, the prevailing party in such action, suit or proceeding shall be reimbursed by the other party for their reasonable attorneys' fees and other costs and expenses incurred with the investigation, preparation and prosecution of such action or proceeding. **THE COMPANY HEREBY IRREVOCABLY WAIVES ANY RIGHT IT MAY HAVE, AND AGREES NOT TO REQUEST, A JURY TRIAL FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION WITH OR ARISING OUT OF THIS WARRANT OR ANY TRANSACTION CONTEMPLATED HEREBY.**

11. DISPUTE RESOLUTION. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall submit the disputed determinations or arithmetic calculations via facsimile or electronic mail within two (2) Business Days of receipt of the Exercise Notice or other event giving rise to such dispute, as the case may be, to the Holder. If the Holder and the Company are unable to agree upon such determination or calculation of the Exercise Price or the Warrant Shares within three (3) Business Days of such disputed determination or arithmetic calculation being submitted to the Holder, then the Company shall, within two (2) Business Days submit via facsimile or electronic mail (a) the disputed determination of the Exercise Price to an independent, reputable investment bank selected by the Company and approved by the Holder or (b) the disputed arithmetic calculation of the Warrant Shares to the Company's independent, outside accountant. The Company shall cause at its expense the investment bank or the accountant, as the case may be, to perform the determinations or calculations and notify the Company and the Holder of the results no later than ten (10) Business Days from the time it receives the disputed determinations or calculations. Such investment bank's or accountant's determination or calculation, as the case may be, shall be binding upon all parties absent demonstrable error.

12. REMEDIES, OTHER OBLIGATIONS, BREACHES AND INJUNCTIVE RELIEF. The remedies provided in this Warrant shall be cumulative and in addition to all other remedies available under this Warrant and any other Transaction Documents, at law or in equity (including a decree of specific performance and/or other injunctive relief), and nothing herein shall limit the right of the Holder to pursue actual damages for any failure by the Company to comply with the terms of this Warrant. The Company acknowledges that a breach by it of its obligations hereunder will cause irreparable harm to the Holder and that the remedy at law for any such breach may be inadequate. The Company therefore agrees that, in the event of any such breach or threatened breach, the holder of this Warrant shall be entitled, in addition to all other available remedies, to an injunction restraining any breach, without the necessity of showing economic loss and without any bond or other security being required.

13. TRANSFER. This Warrant and the Warrant Shares may be offered for sale, sold, transferred, pledged or assigned without the consent of the Company.

14. SEVERABILITY; CONSTRUCTION; HEADINGS. If any provision of this Warrant is prohibited by law or otherwise determined to be invalid or unenforceable by a court of competent jurisdiction, the provision that would otherwise be prohibited, invalid or unenforceable shall be deemed amended to apply to the broadest extent that it would be valid and enforceable, and the invalidity or unenforceability of such provision shall not affect the validity of the remaining provisions of this Warrant so long as this Warrant as so

13

modified continues to express, without material change, the original intentions of the parties as to the subject matter hereof and the prohibited nature, invalidity or unenforceability of the provision(s) in question does not substantially impair the respective expectations or reciprocal obligations of the parties or the practical realization of the benefits that would otherwise be conferred upon the parties. The parties will endeavor in good faith negotiations to replace the prohibited, invalid or unenforceable provision(s) with a valid provision(s), the effect of which comes as close as possible to that of the prohibited, invalid or unenforceable provision(s). This Warrant shall be deemed to be jointly drafted by the Company and the Holder and shall not be construed against any Person as the drafter hereof. The headings of this Warrant are for convenience of reference and shall not form part of, or affect the interpretation of, this Warrant.

15. DISCLOSURE. Upon receipt or delivery by the Company of any notice in accordance with the terms of this Warrant, unless the Company has in good faith determined that the matters relating to such notice do not constitute material, nonpublic information relating to the Company or its subsidiaries, the Company shall contemporaneously with any such receipt or delivery publicly disclose such material, nonpublic information on a Current Report on Form 8-K or otherwise. In the event that the Company believes that a notice contains material, nonpublic information relating to the Company or its subsidiaries, the Company so shall indicate to such Holder contemporaneously with delivery of such notice, and in the absence of any such indication, the Holder shall be allowed to presume that all matters relating to such notice do not constitute material, nonpublic information relating to the Company or its subsidiaries.

16. CERTAIN DEFINITIONS. For purposes of this Warrant, the following terms shall have the following meanings:

(g) **“Affiliate”** means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 under the Securities Act of 1933, as amended.

(h) **“Attribution Parties”** means, collectively, the following Persons and entities: (i) any investment vehicle, including, any funds, feeder funds or managed accounts, currently, or from time to time after the Subscription Date, directly or indirectly managed or advised by the Holder’s investment manager or any of its Affiliates or principals, (ii) any direct or indirect Affiliates of the Holder or any of the foregoing, (iii) any Person acting or who could be deemed to be acting as a Group together with the Holder or any of the foregoing and (iv) any other Persons whose beneficial ownership of the Company’s Common Stock would or could be aggregated with the Holder’s and the other Attribution Parties for purposes of Section 13(d) of the 1934 Act. For clarity, the purpose of the foregoing is to subject collectively the Holder and all other Attribution Parties to the Maximum Percentage.

(i) **“Bid Price”** means, for any security as of the particular time of determination, the bid price for such security on the Principal Market as reported by Bloomberg as of such time of determination, or, if the Principal Market is not the principal securities exchange or trading market for such security, the bid price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg as of such time of determination, or if the foregoing does not apply, the bid price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by

14

Bloomberg as of such time of determination, or, if no bid price is reported for such security by Bloomberg as of such time of determination, the average of the bid prices of any market makers for such security as reported in the “pink sheets” by OTC Markets Group Inc. (formerly Pink Sheets LLC) as of such time of determination. If the Bid Price cannot be calculated for a security as of the particular time of determination on any of the foregoing bases, the Bid Price of such security as of such time of determination shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved in accordance with the procedures in Section 11. All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during such period.

(j) **“Bloomberg”** means Bloomberg Financial Markets.

(k) **“Business Day”** means any day other than Saturday, Sunday or other day on which commercial banks in The City of New York are authorized or required by law to remain closed.

(l) **“Closing Bid Price”** and **“Closing Sale Price”** means, for any security as of any date, the last closing bid price and last closing trade price, respectively, for such security on the Principal Market, as reported by Bloomberg, or, if the Principal Market begins to operate on an extended hours basis and does not designate the closing bid price or the closing trade price, as the case may be, then the last bid price or the last trade price, respectively, of such security prior to 4:00:00 p.m., New York time, as reported by Bloomberg, or, if the Principal Market is not the principal securities exchange or trading market for such security, the last closing bid price or last trade price, respectively, of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the last closing bid price or last trade price,

respectively, of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price or last trade price, respectively, is reported for such security by Bloomberg, the average of the bid prices, or the ask prices, respectively, of any market makers for such security as reported in the OTC Link or “pink sheets” by OTC Markets Group Inc. (formerly Pink OTC Markets Inc.). If the Closing Bid Price or the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Bid Price or the Closing Sale Price, as the case may be, of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 11. All such determinations to be appropriately adjusted for any stock dividend, stock split, stock combination, reclassification or other similar transaction during the applicable calculation period.

(m) “**Common Stock**” means (i) the Company’s Common Stock, par value \$0.001 per share, and (ii) any capital stock into which such Common Stock shall have been changed or any capital stock resulting from a reclassification of such Common Stock.

(n) “**Convertible Securities**” means any stock or securities (other than Options) directly or indirectly convertible into or exercisable or exchangeable for shares of Common Stock.

15

(o) “**Eligible Market**” means The Nasdaq Capital Market, the NYSE American LLC, The Nasdaq Global Select Market, The Nasdaq Global Market or The New York Stock Exchange, Inc.

(p) “**Fundamental Transaction**” means (A) that the Company shall, directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, (i) consolidate or merge with or into (whether or not the Company is the surviving corporation) another Subject Entity, or (ii) sell, assign, transfer, convey or otherwise dispose of all or substantially all of the properties or assets of the Company or any of its “significant subsidiaries” (as defined in Rule 1-02 of Regulation S-X) to one or more Subject Entities, or (iii) make, or allow one or more Subject Entities to make, or allow the Company to be subject to or have its shares of Common Stock be subject to or party to one or more Subject Entities making, a purchase, tender or exchange offer that is accepted by the holders of at least either (x) 50% of the outstanding shares of Common Stock, (y) 50% of the outstanding shares of Common Stock calculated as if any shares of Common Stock held by all Subject Entities making or party to, or Affiliated with any Subject Entities making or party to, such purchase, tender or exchange offer were not outstanding; or (z) such number of shares of Common Stock such that all Subject Entities making or party to, or Affiliated with any Subject Entity making or party to, such purchase, tender or exchange offer, become collectively the beneficial owners (as defined in Rule 13d-3 under the 1934 Act) of at least 50% of the outstanding shares of Common Stock, or (iv) consummate a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with one or more Subject Entities whereby all such Subject Entities, individually or in the aggregate, acquire, either (x) at least 50% of the outstanding shares of Common Stock, (y) at least 50% of the outstanding shares of Common Stock calculated as if any shares of Common Stock held by all the Subject Entities making or party to, or Affiliated with any Subject Entity making or party to, such stock purchase agreement or other business combination were not outstanding; or (z) such number of shares of Common Stock such that the Subject Entities become collectively the beneficial owners (as defined in Rule 13d-3 under the 1934 Act) of at least 50% of the outstanding shares of Common Stock, or (v) reorganize, recapitalize or reclassify its shares of Common Stock, (B) that the Company shall, directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, allow any Subject Entity individually or the Subject Entities in the aggregate to be or become the “beneficial owner” (as defined in Rule 13d-3 under the 1934 Act), directly or indirectly, whether through acquisition, purchase, assignment, conveyance, tender, tender offer, exchange, reduction in outstanding shares of Common Stock, merger, consolidation, business combination, reorganization, recapitalization, spin-off, scheme of arrangement, reorganization, recapitalization or reclassification or otherwise in any manner whatsoever, of either (x) at least 50% of the aggregate ordinary voting power represented by issued and outstanding shares of Common Stock, (y) at least 50% of the aggregate ordinary voting power represented by issued and outstanding shares of Common Stock not held by all such Subject Entities as of the Subscription Date calculated as if any shares of Common Stock held by all such Subject Entities were not outstanding, or (z) a percentage of the aggregate ordinary voting power represented by issued and outstanding shares of Common Stock or other equity securities of the Company sufficient to allow such Subject Entities to effect a statutory short form merger or other transaction requiring other stockholders of the Company to surrender their Common Stock without approval of the stockholders of the Company or (C) directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, the issuance of or the entering into any

16

other instrument or transaction structured in a manner to circumvent, or that circumvents, the intent of this definition in which case this definition shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this definition to the extent necessary to correct this definition or any portion of this definition which may be defective or inconsistent with the intended treatment of such instrument or transaction.

(q) “**Group**” means a “group” as that term is used in Section 13(d) of the 1934 Act and as defined in Rule 13d-5 thereunder.

(r) “**Options**” means any rights, warrants or options to subscribe for or purchase shares of Common Stock or Convertible Securities.

(s) “**Parent Entity**” of a Person means an entity that, directly or indirectly, controls the applicable Person, including such entity whose common stock or equivalent equity security is quoted or listed on an Eligible Market (or, if so elected by the Holder, any other market, exchange or quotation system), or, if there is more than one such Person or such entity, the Person or such entity designated by the Holder or in the absence of such designation, such Person or entity with the largest public market capitalization as of the date of consummation of the Fundamental Transaction.

(t) “**Person**” means an individual, a limited liability company, a partnership, a joint venture, a corporation, a trust, an unincorporated organization, any other entity and a government or any department or agency thereof.

(u) “**Principal Market**” means The Nasdaq Global Market.

(v) “**Standard Settlement Period**” means the standard settlement period, expressed in a number of Trading Days, for the Company’s primary trading market or quotation system with respect to the Common Stock that is in effect on the date of delivery of an applicable Exercise Notice.

(w) “**Subject Entity**” means any Person, Persons or Group or any Affiliate or associate of any such Person, Persons or Group.

(x) “**Successor Entity**” means one or more Person or Persons (or, if so elected by the Holder, the Company or Parent Entity) formed by, resulting from or surviving any Fundamental Transaction or one or more Person or Persons (or, if so elected by the Holder, the Company or the Parent Entity) with which such Fundamental Transaction shall have been entered into.

(y) “**Trading Day**” means any day on which the Common Stock is traded on the Principal Market, or, if the Principal Market is not the principal trading market for the Common Stock, then on the principal securities exchange or securities market on which the Common Stock is then traded.

(z) “**Transaction Documents**” means any agreement entered into by and between the Company and the Holder, as applicable.

17

(aa) “**Weighted Average Price**” means, for any security as of any date, the dollar volume-weighted average price for such security on the Principal Market during the period beginning at 9:30:01 a.m., New York time (or such other time as the Principal Market publicly announces is the official open of trading), and ending at 4:00:00 p.m., New York time (or such other time as the Principal Market publicly announces is the official close of trading), as reported by Bloomberg through its “Volume at Price” function or, if the foregoing does not apply, the dollar volume-weighted average price of such security in the over-the-counter market on the electronic bulletin board for such security during the period beginning at 9:30:01 a.m., New York time (or such other time as such market publicly announces is the official open of trading), and ending at 4:00:00 p.m., New York time (or such other time as such market publicly announces is the official close of trading), as reported by Bloomberg, or, if no dollar volume-weighted average price is reported for such security by Bloomberg for such hours, the average of the highest Closing Bid Price and the lowest closing ask price of any of the market makers for such security as reported in the OTC Link or “pink sheets” by OTC Markets Group Inc. (formerly Pink OTC Markets Inc.). If the Weighted Average Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Weighted Average Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 11, but with the term “Weighted Average Price” being substituted for the term “Exercise Price.” All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination, reclassification or other similar transaction during the applicable calculation period.

[Signature Page Follows]

18

IN WITNESS WHEREOF, the Company has caused this Pre-Funded Warrant to Purchase Common Stock to be duly executed as of the Issuance Date set out above.

CATABASIS PHARMACEUTICALS, INC.

By: _____
Name: _____
Title: _____

EXHIBIT A

EXERCISE NOTICE

TO BE EXECUTED BY THE REGISTERED HOLDER TO EXERCISE THIS
PRE-FUNDED WARRANT TO PURCHASE COMMON STOCK

CATABASIS PHARMACEUTICALS, INC.

The undersigned holder hereby exercises the right to purchase _____ shares of Common Stock (“**Warrant Shares**”) of Catabasis Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), evidenced by the attached Pre-Funded Warrant to Purchase Common Stock (the “**Warrant**”). Capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Warrant.

1. Form of Exercise Price. The Holder intends that payment of the Exercise Price shall be made as:

a “Cash Exercise” with respect to _____ Warrant Shares; and/or

a “Cashless Exercise” with respect to _____ Warrant Shares.

2. Payment of Exercise Price. In the event that the holder has elected a Cash Exercise with respect to some or all of the Warrant Shares to be issued pursuant hereto, the holder shall pay the Aggregate Exercise Price in the sum of \$ _____ to the Company in accordance with the terms of the Warrant.

3. Delivery of Warrant Shares. The Company shall deliver to the holder _____ Warrant Shares in accordance with the terms of the Warrant.

Date: _____ ,

Name of Registered Holder

By: _____
Name:
Title:

ACKNOWLEDGMENT

The Company hereby acknowledges this Exercise Notice and hereby directs American Stock Transfer & Trust Company, LLC to issue the above indicated number of shares of Common Stock on or prior to the applicable Share Delivery Date.

CATABASIS PHARMACEUTICALS, INC.

By: _____
Name:
Title:

[FORM OF WARRANT]

CATABASIS PHARMACEUTICALS, INC.

WARRANT TO PURCHASE COMMON STOCK

Warrant No.:
 Number of Shares of Common Stock:
 Date of Issuance: [], 20[] (“**Issuance Date**”)

Catabasis Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), hereby certifies that, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, [HOLDER], the registered holder hereof or its permitted assigns (the “**Holder**”), is entitled, subject to the terms set forth below, to purchase from the Company, at the Exercise Price (as defined below) then in effect, at any time or times on or after [] (the “**Initial Exercisability Date**”), but not after 11:59 p.m., New York time, on the Expiration Date, (as defined below), () (1) fully paid non-assessable shares of Common Stock (as defined below), subject to adjustment as provided herein (the “**Warrant Shares**”). Except as otherwise defined herein, capitalized terms in this Warrant to Purchase Common Stock (including any Warrants to Purchase Common Stock issued in exchange, transfer or replacement hereof, this “**Warrant**”), shall have the meanings set forth in Section 16. This Warrant is one of the Warrants to Purchase Common Stock (the “**Warrants**”) issued pursuant to (i) that certain Underwriting Agreement, dated as of [], 20[] (the “**Subscription Date**”) by and between the Company and Oppenheimer & Co. Inc., as the representative of the several underwriters named therein, (ii) the Company’s Registration Statement on Form S-1 (File number 333-[] (the “**Registration Statement**”) and (iii) the Company’s prospectus dated as of [], 20[].

1. EXERCISE OF WARRANT.

(a) Mechanics of Exercise. Subject to the terms and conditions hereof (including, without limitation, the limitations set forth in Section 1(f)), this Warrant may be exercised by the Holder at any time or times on or after the Initial Exercisability Date, in whole or in part, by delivery (whether via facsimile, electronic mail or otherwise) of a written notice, in the form attached hereto as Exhibit A (the “**Exercise Notice**”), of the Holder’s election to exercise this Warrant. Within one (1) Trading Day following the delivery of the Exercise Notice, the Holder shall make payment to the Company of an amount equal to the Exercise Price in effect on the date of such exercise multiplied by the number of Warrant Shares as to which this Warrant is being exercised (the “**Aggregate Exercise Price**”) in cash by wire transfer of immediately available funds or, if the provisions of Section 1(d) are applicable, by notifying the Company that this Warrant is being exercised pursuant to a Cashless Exercise (as defined in Section 1(d)). The Holder shall not be required to deliver the original Warrant in order to effect an exercise hereunder (until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full), nor shall any ink-original signature or

(1) Insert 100% of the number of shares of Common Stock or Pre-Funded Warrants purchased.

medallion guarantee (or other type of guarantee or notarization) with respect to any Exercise Notice be required. Execution and delivery of the Exercise Notice with respect to less than all of the Warrant Shares shall have the same effect as cancellation of the original Warrant and issuance of a new Warrant evidencing the right to purchase the remaining number of Warrant Shares and the Holder shall not be required to physically surrender this Warrant to the Company until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full, in which case, the Holder shall surrender this Warrant to the Company for cancellation within three (3) Trading Days of the date on which the final Notice of Exercise is delivered to the Company. On or before the first (1st) Trading Day following the date on which the Holder has delivered the applicable Exercise Notice, the Company shall transmit by facsimile or electronic mail an acknowledgment of confirmation of receipt of the Exercise Notice, in the form attached to the Exercise Notice, to the Holder and the Company’s transfer agent (the “**Transfer Agent**”). So long as the Holder delivers the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) on or prior to the first (1st) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the earlier of (i) the second (2nd) Trading Day and (ii) the number of Trading Days comprising the Standard Settlement Period, in each case following the date on which the Exercise Notice has been delivered to the Company, or, if the Holder does not deliver the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) on or prior to the first (1st) Trading Day following the date on which the Exercise Notice has been delivered to the Company, then on or prior to the first (1st) Trading Day following the date on which the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) is delivered (such earlier date, or if later, the earliest day on which the Company is required to deliver Warrant Shares pursuant to this Section 1(a), the “**Share Delivery Date**”), the Company shall (X) provided that the Transfer Agent is participating in The Depository Trust Company (“**DTC**”) Fast Automated Securities Transfer Program, credit such aggregate number of Warrant Shares to which the Holder is entitled pursuant to such exercise to the Holder’s or its designee’s balance account with DTC through its Deposit / Withdrawal At Custodian system, or (Y) if the Transfer Agent is not participating in the DTC Fast Automated Securities Transfer Program, issue and dispatch by overnight courier to the address as specified in the Exercise Notice, a certificate, registered in the name of the Holder or its designee, for the number of Warrant Shares to which the Holder is entitled pursuant to such exercise. The Company shall be responsible for all fees and expenses of the Transfer Agent and all fees and expenses with respect to the issuance of Warrant Shares via DTC, if any, including without limitation for same day processing. Upon delivery of the Exercise Notice, the Holder shall be deemed for all corporate purposes to have become the holder of record and beneficial owner of the Warrant Shares with respect to which this Warrant has been exercised, irrespective of the date such Warrant Shares are credited to the Holder’s DTC account or the date of delivery of the certificates evidencing such Warrant Shares, as the case may be. If this Warrant is physically delivered to the Company in connection with any exercise pursuant to this Section 1(a) and the number of Warrant Shares represented by this Warrant submitted for exercise is greater than the number of Warrant Shares being acquired upon an exercise, then the Company shall as soon as practicable and in no event later than three (3) Trading Days after any exercise and at its own expense, issue and deliver to the Holder (or its designee) a new Warrant (in accordance with Section 7(d)) representing the right to purchase the number of Warrant Shares issuable immediately prior to such exercise under this Warrant, less the number of Warrant Shares with respect to which this Warrant is exercised. No fractional Warrant Shares are to be

issued upon the exercise of this Warrant, but rather the number of Warrant Shares to be issued shall be rounded to the nearest whole number. The Company shall pay any and all transfer, stamp, issuance and similar taxes, costs and expenses (including, without limitation, fees and expenses of the Transfer Agent) which may be payable with respect to the issuance and delivery of Warrant Shares upon exercise of this Warrant. The Company's obligations to issue and deliver Warrant Shares in accordance with the terms and subject to the conditions hereof are absolute and unconditional, irrespective of any action or inaction by the Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination; provided, however, that the Company shall not be required to deliver Warrant Shares with respect to an exercise prior to the Holder's delivery of the Aggregate Exercise Price (or notice of a Cashless Exercise, if applicable) with respect to such exercise.

(b) Exercise Price. For purposes of this Warrant, "**Exercise Price**" means \$[] per share, subject to adjustment as provided herein.

(c) Company's Failure to Timely Deliver Securities. In addition to any other rights available to the Holder, if the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares in accordance with the provisions of Section 1(a) above pursuant to an exercise on or before the Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a "**Buy-In**"), then the Company shall (A) pay in cash to the Holder the amount, if any, by which (x) the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased exceeds (y) the amount obtained by multiplying (1) the number of Warrant Shares that the Company was required to deliver to the Holder in connection with the exercise at issue times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the Holder, either reinstate the portion of the Warrant and equivalent number of Warrant Shares for which such exercise was not honored (in which case such exercise shall be deemed rescinded) or deliver to the Holder the number of shares of Common Stock that would have been issued had the Company timely complied with its exercise and delivery obligations hereunder. For example, if the Holder purchases Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted exercise of shares of Common Stock with an aggregate sale price giving rise to such purchase obligation of \$10,000, under clause (A) of the immediately preceding sentence the Company shall be required to pay the Holder \$1,000. The Holder shall provide the Company written notice indicating the amounts payable to the Holder in respect of the Buy-In and, upon request of the Company, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

(d) Cashless Exercise. Notwithstanding anything contained herein to the contrary, if a registration statement (which may be the Registration Statement) covering the issuance of the Warrant Shares is not available for the issuance of such Warrant Shares, the Holder may, in its sole discretion, exercise this Warrant in whole or in part and, in lieu of making the cash

3

payment otherwise contemplated to be made to the Company upon such exercise in payment of the Aggregate Exercise Price, elect instead to receive upon such exercise the "Net Number" of shares of Common Stock determined according to the following formula (a "**Cashless Exercise**"):

$$\text{Net Number} = \frac{(A \times B) - (A \times C)}{B}$$

For purposes of the foregoing formula:

A= the total number of shares with respect to which this Warrant is then being exercised.

B= as applicable: (i) the Closing Sale Price of the Common Stock on the Trading Day immediately preceding the date of the applicable Exercise Notice if such Exercise Notice is (1) both executed and delivered pursuant to Section 1(a) hereof on a day that is not a Trading Day or (2) both executed and delivered pursuant to Section 1(a) hereof on a Trading Day prior to the opening of "regular trading hours" (as defined in Rule 600(b)(64) of Regulation NMS promulgated under the federal securities laws) on such Trading Day, (ii) at the option of the Holder, either (y) the Weighted Average Price on the Trading Day immediately preceding the date of the applicable Notice of Exercise or (z) the Bid Price of the Common Stock as of the time of the Holder's execution of the applicable Exercise Notice if such Exercise Notice is executed during "regular trading hours" on a Trading Day and is delivered within two (2) hours thereafter (including until two (2) hours after the close of "regular trading hours" on a Trading Day) pursuant to Section 1(a) hereof or (iii) the Closing Sale Price of the Common Stock on the date of the applicable Exercise Notice if the date of such Exercise Notice is a Trading Day and such Exercise Notice is both executed and delivered pursuant to Section 1(a) hereof after the close of "regular trading hours" on such Trading Day.

C= the Exercise Price then in effect for the applicable Warrant Shares at the time of such exercise.

If Warrant Shares are issued in such a cashless exercise, the Company acknowledges and agrees that in accordance with Section 3(a)(9) of the Securities Act of 1933, as amended, the Warrant Shares shall take on the registered characteristics of the Warrants being exercised, and the holding period of the Warrants being exercised may be tacked on to the holding period of the Warrant Shares. The Company agrees not to take any position contrary to this Section 1(d). Except as expressly set forth in Section 4(b) herein, nothing in this Warrant shall require the Company to effect cash settlement of this Warrant.

(e) Disputes. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall promptly issue to the Holder the number of Warrant Shares that are not disputed and resolve such dispute in accordance with Section 11.

4

(f) **Beneficial Ownership.** Notwithstanding anything to the contrary contained herein, the Company shall not effect the exercise of any portion of this Warrant, and the Holder shall not have the right to exercise any portion of this Warrant, pursuant to the terms and conditions of this Warrant and any such exercise shall be null and void and treated as if never made, to the extent that after giving effect to such exercise, the Holder together with the other Attribution Parties collectively would beneficially own in excess of [4.99][9.99]% (the “**Maximum Percentage**”) of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. For purposes of the foregoing sentence, the aggregate number of shares of Common Stock beneficially owned by the Holder and the other Attribution Parties shall include the number of shares of Common Stock held by the Holder and all other Attribution Parties plus the number of shares of Common Stock issuable upon exercise of this Warrant with respect to which the determination of such sentence is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (A) exercise of the remaining, unexercised portion of this Warrant beneficially owned by the Holder or any of the other Attribution Parties and (B) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company (including, without limitation, any convertible notes or convertible preferred stock or warrants, including the other Warrants) beneficially owned by the Holder or any other Attribution Party subject to a limitation on conversion or exercise analogous to the limitation contained in this Section 1(f). For purposes of this Section 1(f), beneficial ownership shall be calculated in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended (the “**1934 Act**”), it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 1(f) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Warrant, in determining the number of outstanding shares of Common Stock the Holder may acquire upon the exercise of this Warrant without exceeding the Maximum Percentage, the Holder may rely on the number of outstanding shares of Common Stock as reflected in (x) the Company’s most recent Annual Report on Form 10-K, Quarterly Report on Form 10-Q and Current Reports on Form 8-K or other public filing with the Securities and Exchange Commission (the “**SEC**”), as the case may be, (y) a more recent public announcement by the Company or (z) any other written notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding (the “**Reported Outstanding Share Number**”). If the Company receives an Exercise Notice from the Holder at a time when the actual number of outstanding shares of Common Stock is less than the Reported Outstanding Share Number, the Company shall (i) notify the Holder in writing of the number of shares of Common Stock then outstanding and, to the extent that such Exercise Notice would otherwise cause the Holder’s beneficial ownership, as determined pursuant to this Section 1(f), to exceed the Maximum Percentage, the Holder must notify the Company of a reduced number of Warrant Shares to be purchased pursuant to such Exercise Notice (the number of shares by which such purchase is reduced, the “**Reduction Shares**”) and (ii) as soon as reasonably practicable, the Company shall return to the Holder any exercise price paid by the

5

Holder for the Reduction Shares. For any reason at any time, upon the written or oral request of the Holder, the Company shall within one (1) Business Day confirm orally and in writing or by electronic mail to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder and any other Attribution Party since the date as of which the Reported Outstanding Share Number was reported. In the event that the issuance of Common Stock to the Holder upon exercise of this Warrant results in the Holder and the other Attribution Parties being deemed to beneficially own, in the aggregate, more than the Maximum Percentage of the number of outstanding shares of Common Stock (as determined under Section 13(d) of the 1934 Act), the number of shares so issued by which the Holder’s and the other Attribution Parties’ aggregate beneficial ownership exceeds the Maximum Percentage (the “**Excess Shares**”) shall be deemed null and void and shall be cancelled ab initio, and the Holder shall not have the power to vote or to transfer the Excess Shares. As soon as reasonably practicable after the issuance of the Excess Shares has been deemed null and void, the Company shall return to the Holder the exercise price paid by the Holder for the Excess Shares. Upon delivery of a written notice to the Company, the Holder may from time to time increase or decrease the Maximum Percentage to any other percentage not in excess of [4.99][9.99]% as specified in such notice; provided that (i) any such increase in the Maximum Percentage will not be effective until the sixty-first (61st) day after such notice is delivered to the Company and (ii) any such increase or decrease will apply only to the Holder and the other Attribution Parties and not to any other holder of Warrants that is not an Attribution Party of the Holder. For purposes of clarity, the shares of Common Stock issuable pursuant to the terms of this Warrant in excess of the Maximum Percentage shall not be deemed to be beneficially owned by the Holder for any purpose including for purposes of Section 13(d) or Rule 16a-1(a)(1) of the 1934 Act. No prior inability to exercise this Warrant pursuant to this paragraph shall have any effect on the applicability of the provisions of this paragraph with respect to any subsequent determination of exercisability. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 1(f) to the extent necessary to correct this paragraph or any portion of this paragraph which may be defective or inconsistent with the intended beneficial ownership limitation contained in this Section 1(f) or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitation contained in this paragraph may not be waived and shall apply to a successor holder of this Warrant.

(g) **Required Reserve Amount.** So long as this Warrant remains outstanding, the Company shall at all times keep reserved for issuance under this Warrant a number of shares of Common Stock at least equal to 100% of the maximum number of shares of Common Stock as shall be necessary to satisfy the Company’s obligation to issue shares of Common Stock under the Warrants then outstanding (without regard to any limitations on exercise) (the “**Required Reserve Amount**”); provided that at no time shall the number of shares of Common Stock reserved pursuant to this Section 1(g) be reduced other than in connection with any exercise of Warrants or such other event covered by Section 2 below. The Required Reserve Amount (including, without limitation, each increase in the number of shares so reserved) shall be allocated pro rata among the holders of the Warrants based on the number of shares of Common Stock issuable upon exercise of Warrants held by each holder thereof on the Issuance Date (without regard to any limitations on exercise) (the “**Authorized Share Allocation**”). In the event that a holder shall sell or otherwise transfer any of such holder’s Warrants, each transferee shall be

6

allocated a pro rata portion of such holder’s Authorized Share Allocation. Any shares of Common Stock reserved and allocated to any Person which ceases to hold any Warrants shall be allocated to the remaining holders of Warrants, pro rata based on the number of shares of Common Stock issuable upon exercise of the Warrants then held by such holders thereof (without regard to any limitations on exercise).

(h) Insufficient Authorized Shares. If at any time while this Warrant remains outstanding the Company does not have a sufficient number of authorized and unreserved shares of Common Stock to satisfy its obligation to reserve for issuance the Required Reserve Amount (an “**Authorized Share Failure**”), then the Company shall promptly take all action reasonably necessary to increase the Company’s authorized shares of Common Stock to an amount sufficient to allow the Company to reserve the Required Reserve Amount for this Warrant then outstanding. Without limiting the generality of the foregoing sentence, as soon as practicable after the date of the occurrence of an Authorized Share Failure, but in no event later than ninety (90) days after the occurrence of such Authorized Share Failure, the Company shall hold a meeting of its stockholders for the approval of an increase in the number of authorized shares of Common Stock. In connection with such meeting, the Company shall provide each stockholder with a proxy statement and shall use its reasonable best efforts to solicit its stockholders’ approval of such increase in authorized shares of Common Stock and to cause its board of directors to recommend to the stockholders that they approve such proposal. Notwithstanding the foregoing, if any such time of an Authorized Share Failure, the Company is able to obtain the written consent of a majority of the shares of its issued and outstanding shares of Common Stock to approve the increase in the number of authorized shares of Common Stock, the Company may satisfy this obligation by obtaining such consent and submitting for filing with the SEC an Information Statement on Schedule 14C.

2. ADJUSTMENT OF EXERCISE PRICE AND NUMBER OF WARRANT SHARES UPON SUBDIVISION OR COMBINATION OF COMMON STOCK. If the Company at any time on or after the Subscription Date subdivides (by any stock split, stock dividend, recapitalization or otherwise) one or more classes of its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision will be proportionately reduced and the number of Warrant Shares will be proportionately increased. If the Company at any time on or after the Subscription Date combines (by combination, reverse stock split or otherwise) one or more classes of its outstanding shares of Common Stock into a smaller number of shares, the Exercise Price in effect immediately prior to such combination will be proportionately increased and the number of Warrant Shares will be proportionately decreased. Any adjustment under this Section 2(c) shall become effective at the close of business on the date the subdivision or combination becomes effective.

3. RIGHTS UPON DISTRIBUTION OF ASSETS. In addition to any adjustments pursuant to Section 2 above, if, on or after the Subscription Date and on or prior to the Expiration Date, the Company shall declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property, options, evidence of indebtedness or any other assets by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar

7

transaction) (a “**Distribution**”), at any time after the issuance of this Warrant, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) immediately before the date on which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, that to the extent that the Holder’s right to participate in any such Distribution would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Distribution to such extent (and shall not be entitled to beneficial ownership of such shares of Common Stock as a result of such Distribution (and beneficial ownership) to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such Distribution (and any Distributions declared or made on such initial Distribution or on any subsequent Distribution held similarly in abeyance) to the same extent as if there had been no such limitation).

4. PURCHASE RIGHTS; FUNDAMENTAL TRANSACTIONS.

(a) Purchase Rights. In addition to any adjustments pursuant to Section 2 above, if at any time on or after the Subscription Date and on or prior to the Expiration Date the Company grants, issues or sells any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of Common Stock (the “**Purchase Rights**”), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations or restrictions on exercise of this Warrant, including without limitation, the Maximum Percentage) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of Common Stock are to be determined for the grant, issuance or sale of such Purchase Rights (provided, however, that to the extent that the Holder’s right to participate in any such Purchase Right would result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, then the Holder shall not be entitled to participate in such Purchase Right to such extent (and shall not be entitled to beneficial ownership of such Common Stock as a result of such Purchase Right (and beneficial ownership) to such extent) and such Purchase Right to such extent shall be held in abeyance for the benefit of the Holder until such time or times as its right thereto would not result in the Holder and the other Attribution Parties exceeding the Maximum Percentage, at which time or times the Holder shall be granted such right (and any Purchase Right granted, issued or sold on such initial Purchase Right or on any subsequent Purchase Right to be held similarly in abeyance) to the same extent as if there had been no such limitation).

(b) Fundamental Transaction. The Company shall not enter into or be party to a Fundamental Transaction unless the Successor Entity assumes in writing all of the obligations of the Company under this Warrant in accordance with the provisions of this Section

8

4(b), including agreements to deliver to the Holder in exchange for this Warrant a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant, including, without limitation, which is exercisable for a corresponding number of shares of capital stock equivalent to the shares of Common Stock acquirable and receivable upon exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) prior to such Fundamental Transaction, and with an exercise price which applies the exercise price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such adjustments to the number of shares of capital stock and such exercise price being for the purpose of protecting the economic value of this Warrant immediately prior to the consummation of such Fundamental Transaction). Upon the consummation of each Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for the Company (so that from and after the date of the applicable Fundamental Transaction, the provisions of this Warrant

and the other Transaction Documents referring to the “Company” shall refer instead to the Successor Entity), and may exercise every right and power of the Company and shall assume all of the obligations of the Company under this Warrant with the same effect as if such Successor Entity had been named as the Company herein. Notwithstanding the foregoing, and without limiting Section 1(f) hereof, the Holder may elect, at its sole option, by delivery of written notice to the Company to waive this Section 4(b) to permit the Fundamental Transaction without the assumption of this Warrant. In addition to and not in substitution for any other rights hereunder, prior to the consummation of each Fundamental Transaction pursuant to which holders of shares of Common Stock are entitled to receive securities or other assets with respect to or in exchange for shares of Common Stock (a “**Corporate Event**”), the Company shall make appropriate provision to insure that the Holder will thereafter have the right to receive upon an exercise of this Warrant at any time after the consummation of the applicable Fundamental Transaction but prior to the Expiration Date, in lieu of the shares of the Common Stock (or other securities, cash, assets or other property (except such items still issuable under Sections 3 and 4(a) above, which shall continue to be receivable thereafter)) issuable upon the exercise of the Warrant prior to such Fundamental Transaction, such shares of stock, securities, cash, assets or any other property whatsoever (including warrants or other purchase or subscription rights) (collectively, the “**Corporate Event Consideration**”) which the Holder would have been entitled to receive upon the happening of the applicable Fundamental Transaction had this Warrant been exercised immediately prior to the applicable Fundamental Transaction (without regard to any limitations on the exercise of this Warrant). The provision made pursuant to the preceding sentence shall be in a form and substance reasonably satisfactory to the Holder. The provisions of this Section 4(b) shall apply similarly and equally to successive Fundamental Transactions and Corporate Events. Notwithstanding the foregoing, in the event of a Change of Control (other than a Change of Control which was not approved by the Board of Directors, as to which this right shall not apply), at the request of the Holder delivered before the 30th day after such Change of Control, the Company (or the Successor Entity) shall purchase this Warrant from the Holder by paying to the Holder, within five (5) Business Days after such request (or, if later, on the effective date of the Change of Control), an amount equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the effective date of such Change of Control, payable in cash; provided, that if the applicable Change of Control was not approved by the Company’s Board of Directors, such amount shall be payable at the option of the Company in either (x) Common Stock (or corresponding

Corporate Event Consideration, as applicable) valued at the value of the consideration received by the shareholders in such Change of Control or (y) cash.

5. NONCIRCUMVENTION. The Company hereby covenants and agrees that the Company will not, by amendment of its Certificate of Incorporation or Bylaws, or through any reorganization, transfer of assets, consolidation, merger, scheme, arrangement, dissolution, issuance or sale of securities, or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, and will at all times in good faith carry out all of the provisions of this Warrant and take all action as may be required to protect the rights of the Holder. Without limiting the generality of the foregoing, the Company (i) shall not increase the par value of any shares of Common Stock receivable upon the exercise of this Warrant above the Exercise Price then in effect, (ii) shall take all such actions as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable shares of Common Stock upon the exercise of this Warrant, and (iii) shall, so long as any of the Warrants are outstanding, take all action necessary to reserve and keep available out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the exercise of the Warrants, the number of shares of Common Stock as shall from time to time be necessary to effect the exercise of the Warrants then outstanding (without regard to any limitations on exercise).

6. WARRANT HOLDER NOT DEEMED A STOCKHOLDER. Except as otherwise specifically provided herein, the Holder, solely in such Person’s capacity as a holder of this Warrant, shall not be entitled to vote or receive dividends or be deemed the holder of capital stock of the Company for any purpose, nor shall anything contained in this Warrant be construed to confer upon the Holder, solely in such Person’s capacity as the Holder of this Warrant, any of the rights of a stockholder of the Company or any right to vote, give or withhold consent to any corporate action (whether any reorganization, issue of stock, reclassification of stock, consolidation, merger, conveyance or otherwise), receive notice of meetings, receive dividends or subscription rights, or otherwise, prior to the issuance to the Holder of the Warrant Shares which such Person is then entitled to receive upon the due exercise of this Warrant. In addition, nothing contained in this Warrant shall be construed as imposing any liabilities on the Holder to purchase any securities (upon exercise of this Warrant or otherwise) or as a stockholder of the Company, whether such liabilities are asserted by the Company or by creditors of the Company. Notwithstanding this Section 6, the Company shall provide the Holder with copies of the same notices and other information given to the stockholders of the Company generally, contemporaneously with the giving thereof to the stockholders; provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of any corporate action required to be specified in such notice.

7. REISSUANCE OF WARRANTS.

(c) Transfer of Warrant. If this Warrant is to be transferred, the Holder shall surrender this Warrant to the Company, whereupon the Company will forthwith issue and deliver upon the order of the Holder a new Warrant (in accordance with Section 7(d)), registered as the Holder may request, representing the right to purchase the number of Warrant Shares being transferred by the Holder and, if less than the total number of Warrant Shares then underlying this

Warrant is being transferred, a new Warrant (in accordance with Section 7(d)) to the Holder representing the right to purchase the number of Warrant Shares not being transferred.

(d) Lost, Stolen or Mutilated Warrant. Upon receipt by the Company of evidence reasonably satisfactory to the Company of the loss, theft, destruction or mutilation of this Warrant, and, in the case of loss, theft or destruction, of any indemnification undertaking by the Holder to the Company in customary form (but without the obligation to post a bond) and, in the case of mutilation, upon surrender and cancellation of this Warrant, the Company shall execute and deliver to the Holder a new Warrant (in accordance with Section 7(d)) representing the right to purchase the Warrant Shares then underlying this Warrant.

(e) Exchangeable for Multiple Warrants. This Warrant is exchangeable, upon the surrender hereof by the Holder at the principal office of the Company, for a new Warrant or Warrants (in accordance with Section 7(d)) representing in the aggregate the right to purchase the number of Warrant Shares then underlying this Warrant, and each such new Warrant will represent the right to purchase such portion of such Warrant Shares as is designated by the Holder at the time of such surrender.

(f) Issuance of New Warrants. Whenever the Company is required to issue a new Warrant pursuant to the terms of this Warrant, such new Warrant (i) shall be of like tenor with this Warrant, (ii) shall represent, as indicated on the face of such new Warrant, the right to purchase the

Warrant Shares then underlying this Warrant (or in the case of a new Warrant being issued pursuant to Section 7(a) or Section 7(c), the Warrant Shares designated by the Holder which, when added to the number of shares of Common Stock underlying the other new Warrants issued in connection with such issuance, does not exceed the number of Warrant Shares then underlying this Warrant), (iii) shall have an issuance date, as indicated on the face of such new Warrant which is the same as the Issuance Date, and (iv) shall have the same rights and conditions as this Warrant.

8. NOTICES. Whenever notice is required to be given under this Warrant, including, without limitation, an Exercise Notice, unless otherwise provided herein, such notice shall be given in writing, (i) if delivered (a) from within the domestic United States, by first-class registered or certified airmail, or nationally recognized overnight express courier, postage prepaid, electronic mail or by facsimile or (b) from outside the United States, by International Federal Express, electronic mail or facsimile, and (ii) will be deemed given (A) if delivered by first-class registered or certified mail domestic, three (3) Business Days after so mailed, (B) if delivered by nationally recognized overnight carrier, one (1) Business Day after so mailed, (C) if delivered by International Federal Express, two (2) Business Days after so mailed and (D) on the date of transmission, if delivered by electronic mail to each of the email addresses specified in this Section 8 prior to 5:00 p.m. (New York time) on a Trading Day, (E) the next Trading Day after the date of transmission, if delivered by electronic mail to each of the email addresses specified in this Section 8 on a day that is not a Trading Day or later than 5:00 p.m. (New York time) on any Trading Day and (F) if delivered by facsimile, upon electronic confirmation of delivery of such facsimile, and will be delivered and addressed as follows:

(i) if to the Company, to:

11

Catabasis Pharmaceuticals, Inc.
One Kendall Square
Building 1400E, Suite B14202
Cambridge, MA 02139
Attention: []]
Facsimile: []]
Email: []]

(ii) if to the Holder, at such address or other contact information delivered by the Holder to Company or as is on the books and records of the Company.

The Company shall provide the Holder with prompt written notice of all actions taken pursuant to this Warrant, including in reasonable detail a description of such action and the reason therefor. Without limiting the generality of the foregoing, the Company will give written notice to the Holder (i) immediately upon any adjustment of the Exercise Price, setting forth in reasonable detail, and certifying, the calculation of such adjustment and (ii) at least fifteen (15) days prior to the date on which the Company closes its books or takes a record (A) with respect to any dividend or distribution upon the shares of Common Stock, (B) with respect to any grants, issuances or sales of any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of Common Stock or (C) for determining rights to vote with respect to any Fundamental Transaction, dissolution or liquidation; provided in each case that such information shall be made known to the public prior to or in conjunction with such notice being provided to the Holder; provided, further, that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. It is expressly understood and agreed that the time of exercise specified by the Holder in each Exercise Notice shall be definitive and may not be disputed or challenged by the Company.

9. AMENDMENT AND WAIVER. Except as otherwise provided herein, the provisions of this Warrant may be amended or waived and the Company may take any action herein prohibited, or omit to perform any act herein required to be performed by it, only if the Company has obtained the written consent of the Holder.

10. GOVERNING LAW; JURISDICTION; JURY TRIAL. This Warrant shall be governed by and construed and enforced in accordance with, and all questions concerning the construction, validity, interpretation and performance of this Warrant shall be governed by, the internal laws of the State of New York, without giving effect to any choice of law or conflict of law provision or rule (whether of the State of New York or any other jurisdictions) that would cause the application of the laws of any jurisdictions other than the State of New York. The Company hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in The City of New York, Borough of Manhattan, for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is brought in an inconvenient forum or that the venue of such suit, action or proceeding is improper. The Company hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a

12

copy thereof to the Company at the address set forth in Section 8(i) above or such other address as the Company subsequently delivers to the Holder and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any manner permitted by law. Nothing contained herein shall be deemed or operate to preclude the Holder from bringing suit or taking other legal action against the Company in any other jurisdiction to collect on the Company's obligations to the Holder, to realize on any collateral or any other security for such obligations, or to enforce a judgment or other court ruling in favor of the Holder. If either party shall commence an action, suit or proceeding to enforce any provisions of this Warrant, the prevailing party in such action, suit or proceeding shall be reimbursed by the other party for their reasonable attorneys' fees and other costs and expenses incurred with the investigation, preparation and prosecution of such action or proceeding. **THE COMPANY HEREBY IRREVOCABLY WAIVES ANY RIGHT IT MAY HAVE, AND AGREES NOT TO REQUEST, A JURY TRIAL FOR THE ADJUDICATION OF ANY DISPUTE HEREUNDER OR IN CONNECTION WITH OR ARISING OUT OF THIS WARRANT OR ANY TRANSACTION CONTEMPLATED HEREBY.**

11. DISPUTE RESOLUTION. In the case of a dispute as to the determination of the Exercise Price or the arithmetic calculation of the Warrant Shares, the Company shall submit the disputed determinations or arithmetic calculations via facsimile or electronic mail within two (2) Business Days of receipt of the Exercise Notice or other event giving rise to such dispute, as the case may be, to the Holder. If the Holder and the Company are unable to agree upon such determination or calculation of the Exercise Price or the Warrant Shares within three (3) Business Days of such disputed determination or

arithmetic calculation being submitted to the Holder, then the Company shall, within two (2) Business Days submit via facsimile or electronic mail (a) the disputed determination of the Exercise Price to an independent, reputable investment bank selected by the Company and approved by the Holder or (b) the disputed arithmetic calculation of the Warrant Shares to the Company's independent, outside accountant. The Company shall cause at its expense the investment bank or the accountant, as the case may be, to perform the determinations or calculations and notify the Company and the Holder of the results no later than ten (10) Business Days from the time it receives the disputed determinations or calculations. Such investment bank's or accountant's determination or calculation, as the case may be, shall be binding upon all parties absent demonstrable error.

12. REMEDIES, OTHER OBLIGATIONS, BREACHES AND INJUNCTIVE RELIEF. The remedies provided in this Warrant shall be cumulative and in addition to all other remedies available under this Warrant and any other Transaction Documents, at law or in equity (including a decree of specific performance and/or other injunctive relief), and nothing herein shall limit the right of the Holder to pursue actual damages for any failure by the Company to comply with the terms of this Warrant. The Company acknowledges that a breach by it of its obligations hereunder will cause irreparable harm to the Holder and that the remedy at law for any such breach may be inadequate. The Company therefore agrees that, in the event of any such breach or threatened breach, the holder of this Warrant shall be entitled, in addition to all other available remedies, to an injunction restraining any breach, without the necessity of showing economic loss and without any bond or other security being required.

13

13. TRANSFER. This Warrant and the Warrant Shares may be offered for sale, sold, transferred, pledged or assigned without the consent of the Company.

14. SEVERABILITY; CONSTRUCTION; HEADINGS. If any provision of this Warrant is prohibited by law or otherwise determined to be invalid or unenforceable by a court of competent jurisdiction, the provision that would otherwise be prohibited, invalid or unenforceable shall be deemed amended to apply to the broadest extent that it would be valid and enforceable, and the invalidity or unenforceability of such provision shall not affect the validity of the remaining provisions of this Warrant so long as this Warrant as so modified continues to express, without material change, the original intentions of the parties as to the subject matter hereof and the prohibited nature, invalidity or unenforceability of the provision(s) in question does not substantially impair the respective expectations or reciprocal obligations of the parties or the practical realization of the benefits that would otherwise be conferred upon the parties. The parties will endeavor in good faith negotiations to replace the prohibited, invalid or unenforceable provision(s) with a valid provision(s), the effect of which comes as close as possible to that of the prohibited, invalid or unenforceable provision(s). This Warrant shall be deemed to be jointly drafted by the Company and the Holder and shall not be construed against any Person as the drafter hereof. The headings of this Warrant are for convenience of reference and shall not form part of, or affect the interpretation of, this Warrant.

15. DISCLOSURE. Upon receipt or delivery by the Company of any notice in accordance with the terms of this Warrant, unless the Company has in good faith determined that the matters relating to such notice do not constitute material, nonpublic information relating to the Company or its subsidiaries, the Company shall contemporaneously with any such receipt or delivery publicly disclose such material, nonpublic information on a Current Report on Form 8-K or otherwise. In the event that the Company believes that a notice contains material, nonpublic information relating to the Company or its subsidiaries, the Company shall so indicate to such Holder contemporaneously with delivery of such notice, and in the absence of any such indication, the Holder shall be allowed to presume that all matters relating to such notice do not constitute material, nonpublic information relating to the Company or its subsidiaries.

16. CERTAIN DEFINITIONS. For purposes of this Warrant, the following terms shall have the following meanings:

(g) "**Affiliate**" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 under the Securities Act of 1933, as amended.

(h) "**Attribution Parties**" means, collectively, the following Persons and entities: (i) any investment vehicle, including, any funds, feeder funds or managed accounts, currently, or from time to time after the Subscription Date, directly or indirectly managed or advised by the Holder's investment manager or any of its Affiliates or principals, (ii) any direct or indirect Affiliates of the Holder or any of the foregoing, (iii) any Person acting or who could be deemed to be acting as a Group together with the Holder or any of the foregoing and (iv) any other Persons whose beneficial ownership of the Company's Common Stock would or could be aggregated with the Holder's and the other Attribution Parties for purposes of Section 13(d) of the

14

1934 Act. For clarity, the purpose of the foregoing is to subject collectively the Holder and all other Attribution Parties to the Maximum Percentage.

(i) "**Bid Price**" means, for any security as of the particular time of determination, the bid price for such security on the Principal Market as reported by Bloomberg as of such time of determination, or, if the Principal Market is not the principal securities exchange or trading market for such security, the bid price of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg as of such time of determination, or if the foregoing does not apply, the bid price of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg as of such time of determination, or, if no bid price is reported for such security by Bloomberg as of such time of determination, the average of the bid prices of any market makers for such security as reported in the "pink sheets" by OTC Markets Group Inc. (formerly Pink Sheets LLC) as of such time of determination. If the Bid Price cannot be calculated for a security as of the particular time of determination on any of the foregoing bases, the Bid Price of such security as of such time of determination shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved in accordance with the procedures in Section 11. All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination or other similar transaction during such period.

(j) "**Black Scholes Value**" means the value of this Warrant based on the Black-Scholes Option Pricing Model obtained from the "OV" function on Bloomberg determined as of the day immediately following the first public announcement of the applicable Change of Control, or, if the Change of Control is not publicly announced, the date the Change of Control is consummated, for pricing purposes and reflecting (i) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the remaining term of this Warrant as of such date of request, (ii) an expected volatility equal to

60%, (iii) the underlying price per share used in such calculation shall be the sum of the price per share being offered in cash, if any, plus the per share value of any non-cash consideration, if any, being offered in such Change of Control, (iv) a zero cost of borrow and (v) a 360 day annualization factor.

(k) “**Bloomberg**” means Bloomberg Financial Markets.

(l) “**Business Day**” means any day other than Saturday, Sunday or other day on which commercial banks in The City of New York are authorized or required by law to remain closed.

(m) “**Change of Control**” means any Fundamental Transaction other than (i) any reorganization, recapitalization or reclassification of the Common Stock in which holders of the Company’s voting power immediately prior to such reorganization, recapitalization or reclassification continue after such reorganization, recapitalization or reclassification to hold publicly traded securities and, directly or indirectly, are, in all material respect, the holders of the voting power of the surviving entity (or entities with the authority or voting power to elect the members of the board of directors (or their equivalent if other than a corporation) of such entity or entities) after such reorganization, recapitalization or reclassification, (ii) pursuant to a migratory merger effected solely for the purpose of changing the jurisdiction of incorporation of the

15

Company or (iii) a merger in connection with a bona fide acquisition by the Company of any Person in which (x) the gross consideration paid, directly or indirectly, by the Company in such acquisition is not greater than 20% of the Company’s market capitalization as calculated on the date of the consummation of such merger and (y) such merger does not contemplate a change to the identity of a majority of the board of directors of the Company. Notwithstanding anything herein to the contrary, any transaction or series of transactions that, directly or indirectly, results in the Company or the Successor Entity not having Common Stock or common stock, as applicable, registered under the 1934 Act and listed on an Eligible Market shall be deemed a Change of Control.

(n) “**Closing Bid Price**” and “**Closing Sale Price**” means, for any security as of any date, the last closing bid price and last closing trade price, respectively, for such security on the Principal Market, as reported by Bloomberg, or, if the Principal Market begins to operate on an extended hours basis and does not designate the closing bid price or the closing trade price, as the case may be, then the last bid price or the last trade price, respectively, of such security prior to 4:00:00 p.m., New York time, as reported by Bloomberg, or, if the Principal Market is not the principal securities exchange or trading market for such security, the last closing bid price or last trade price, respectively, of such security on the principal securities exchange or trading market where such security is listed or traded as reported by Bloomberg, or if the foregoing do not apply, the last closing bid price or last trade price, respectively, of such security in the over-the-counter market on the electronic bulletin board for such security as reported by Bloomberg, or, if no closing bid price or last trade price, respectively, is reported for such security by Bloomberg, the average of the bid prices, or the ask prices, respectively, of any market makers for such security as reported in the OTC Link or “pink sheets” by OTC Markets Group Inc. (formerly Pink OTC Markets Inc.). If the Closing Bid Price or the Closing Sale Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Closing Bid Price or the Closing Sale Price, as the case may be, of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 11. All such determinations to be appropriately adjusted for any stock dividend, stock split, stock combination, reclassification or other similar transaction during the applicable calculation period.

(o) “**Common Stock**” means (i) the Company’s Common Stock, par value \$0.001 per share, and (ii) any capital stock into which such Common Stock shall have been changed or any capital stock resulting from a reclassification of such Common Stock.

(p) “**Convertible Securities**” means any stock or securities (other than Options) directly or indirectly convertible into or exercisable or exchangeable for shares of Common Stock.

(q) “**Eligible Market**” means The Nasdaq Capital Market, the NYSE American LLC, The Nasdaq Global Select Market, The Nasdaq Global Market or The New York Stock Exchange, Inc.

(r) “**Expiration Date**” means the date sixty (60) months after the Initial Exercisability Date or, if such date falls on a day other than a Business Day or on which trading does not take place on the Principal Market (a “**Holiday**”), the next day that is not a Holiday.

16

(s) “**Fundamental Transaction**” means (A) that the Company shall, directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, (i) consolidate or merge with or into (whether or not the Company is the surviving corporation) another Subject Entity, or (ii) sell, assign, transfer, convey or otherwise dispose of all or substantially all of the properties or assets of the Company or any of its “significant subsidiaries” (as defined in Rule 1-02 of Regulation S-X) to one or more Subject Entities, or (iii) make, or allow one or more Subject Entities to make, or allow the Company to be subject to or have its shares of Common Stock be subject to or party to one or more Subject Entities making, a purchase, tender or exchange offer that is accepted by the holders of at least either (x) 50% of the outstanding shares of Common Stock, (y) 50% of the outstanding shares of Common Stock calculated as if any shares of Common Stock held by all Subject Entities making or party to, or Affiliated with any Subject Entities making or party to, such purchase, tender or exchange offer were not outstanding; or (z) such number of shares of Common Stock such that all Subject Entities making or party to, or Affiliated with any Subject Entity making or party to, such purchase, tender or exchange offer, become collectively the beneficial owners (as defined in Rule 13d-3 under the 1934 Act) of at least 50% of the outstanding shares of Common Stock, or (iv) consummate a stock purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with one or more Subject Entities whereby all such Subject Entities, individually or in the aggregate, acquire, either (x) at least 50% of the outstanding shares of Common Stock, (y) at least 50% of the outstanding shares of Common Stock calculated as if any shares of Common Stock held by all the Subject Entities making or party to, or Affiliated with any Subject Entity making or party to, such stock purchase agreement or other business combination were not outstanding; or (z) such number of shares of Common Stock such that the Subject Entities become collectively the beneficial owners (as defined in Rule 13d-3 under the 1934 Act) of at least 50% of the outstanding shares of Common Stock, or (v) reorganize, recapitalize or reclassify its shares of Common Stock, (B) that the Company shall, directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, allow any Subject Entity individually or the Subject Entities in the aggregate to be or become the “beneficial owner” (as defined in Rule 13d-3 under the 1934 Act), directly or indirectly, whether through acquisition, purchase, assignment, conveyance, tender, tender offer, exchange, reduction in outstanding shares of Common Stock, merger, consolidation, business combination, reorganization, recapitalization, spin-off, scheme of arrangement, reorganization, recapitalization or reclassification or otherwise in any manner whatsoever, of either (x) at least 50% of the aggregate ordinary voting power represented by

issued and outstanding shares of Common Stock, (y) at least 50% of the aggregate ordinary voting power represented by issued and outstanding shares of Common Stock not held by all such Subject Entities as of the Subscription Date calculated as if any shares of Common Stock held by all such Subject Entities were not outstanding, or (z) a percentage of the aggregate ordinary voting power represented by issued and outstanding shares of Common Stock or other equity securities of the Company sufficient to allow such Subject Entities to effect a statutory short form merger or other transaction requiring other stockholders of the Company to surrender their Common Stock without approval of the stockholders of the Company or (C) directly or indirectly, including through subsidiaries, Affiliates or otherwise, in one or more related transactions, the issuance of or the entering into any other instrument or transaction structured in a manner to circumvent, or that circumvents, the intent of this definition in which case this definition shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this definition to the extent necessary to

correct this definition or any portion of this definition which may be defective or inconsistent with the intended treatment of such instrument or transaction.

(t) **“Group”** means a “group” as that term is used in Section 13(d) of the 1934 Act and as defined in Rule 13d-5 thereunder.

(u) **“Options”** means any rights, warrants or options to subscribe for or purchase shares of Common Stock or Convertible Securities.

(v) **“Parent Entity”** of a Person means an entity that, directly or indirectly, controls the applicable Person, including such entity whose common stock or equivalent equity security is quoted or listed on an Eligible Market (or, if so elected by the Holder, any other market, exchange or quotation system), or, if there is more than one such Person or such entity, the Person or such entity designated by the Holder or in the absence of such designation, such Person or entity with the largest public market capitalization as of the date of consummation of the Fundamental Transaction.

(w) **“Person”** means an individual, a limited liability company, a partnership, a joint venture, a corporation, a trust, an unincorporated organization, any other entity and a government or any department or agency thereof.

(x) **“Principal Market”** means The Nasdaq Global Market.

(y) **“Standard Settlement Period”** means the standard settlement period, expressed in a number of Trading Days, for the Company’s primary trading market or quotation system with respect to the Common Stock that is in effect on the date of delivery of an applicable Exercise Notice.

(z) **“Subject Entity”** means any Person, Persons or Group or any Affiliate or associate of any such Person, Persons or Group.

(aa) **“Successor Entity”** means one or more Person or Persons (or, if so elected by the Holder, the Company or Parent Entity) formed by, resulting from or surviving any Fundamental Transaction or one or more Person or Persons (or, if so elected by the Holder, the Company or the Parent Entity) with which such Fundamental Transaction shall have been entered into.

(bb) **“Trading Day”** means any day on which the Common Stock is traded on the Principal Market, or, if the Principal Market is not the principal trading market for the Common Stock, then on the principal securities exchange or securities market on which the Common Stock is then traded.

(cc) **“Transaction Documents”** means any agreement entered into by and between the Company and the Holder, as applicable.

(dd) **“Weighted Average Price”** means, for any security as of any date, the dollar volume-weighted average price for such security on the Principal Market during the period beginning at 9:30:01 a.m., New York time (or such other time as the Principal Market

publicly announces is the official open of trading), and ending at 4:00:00 p.m., New York time (or such other time as the Principal Market publicly announces is the official close of trading), as reported by Bloomberg through its “Volume at Price” function or, if the foregoing does not apply, the dollar volume-weighted average price of such security in the over-the-counter market on the electronic bulletin board for such security during the period beginning at 9:30:01 a.m., New York time (or such other time as such market publicly announces is the official open of trading), and ending at 4:00:00 p.m., New York time (or such other time as such market publicly announces is the official close of trading), as reported by Bloomberg, or, if no dollar volume-weighted average price is reported for such security by Bloomberg for such hours, the average of the highest Closing Bid Price and the lowest closing ask price of any of the market makers for such security as reported in the OTC Link or “pink sheets” by OTC Markets Group Inc. (formerly Pink OTC Markets Inc.). If the Weighted Average Price cannot be calculated for a security on a particular date on any of the foregoing bases, the Weighted Average Price of such security on such date shall be the fair market value as mutually determined by the Company and the Holder. If the Company and the Holder are unable to agree upon the fair market value of such security, then such dispute shall be resolved pursuant to Section 11 but with the term “Weighted Average Price” being substituted for the term “Exercise Price.” All such determinations shall be appropriately adjusted for any stock dividend, stock split, stock combination, reclassification or other similar transaction during the applicable calculation period.

[Signature Page Follows]

IN WITNESS WHEREOF, the Company has caused this Warrant to Purchase Common Stock to be duly executed as of the Issuance Date set out above.

By: _____
Name: _____
Title: _____

EXHIBIT A

EXERCISE NOTICE

TO BE EXECUTED BY THE REGISTERED HOLDER TO EXERCISE THIS
WARRANT TO PURCHASE COMMON STOCK

CATABASIS PHARMACEUTICALS, INC.

The undersigned holder hereby exercises the right to purchase _____ shares of Common Stock (“**Warrant Shares**”) of Catabasis Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), evidenced by the attached Warrant to Purchase Common Stock (the “**Warrant**”). Capitalized terms used herein and not otherwise defined shall have the respective meanings set forth in the Warrant.

1. Form of Exercise Price. The Holder intends that payment of the Exercise Price shall be made as:

a “Cash Exercise” with respect to _____ Warrant Shares; and/or

a “Cashless Exercise” with respect to _____ Warrant Shares.

2. Payment of Exercise Price. In the event that the holder has elected a Cash Exercise with respect to some or all of the Warrant Shares to be issued pursuant hereto, the holder shall pay the Aggregate Exercise Price in the sum of \$ _____ to the Company in accordance with the terms of the Warrant.

3. Delivery of Warrant Shares. The Company shall deliver to the holder _____ Warrant Shares in accordance with the terms of the Warrant.

Date: _____,

Name of Registered Holder

By: _____
Name: _____
Title: _____

ACKNOWLEDGMENT

The Company hereby acknowledges this Exercise Notice and hereby directs American Stock Transfer & Trust Company, LLC to issue the above indicated number of shares of Common Stock on or prior to the applicable Share Delivery Date.

CATABASIS PHARMACEUTICALS, INC.

By: _____
Name: _____
Title: _____

June 12, 2018

Catabasis Pharmaceuticals, Inc.
One Kendall Square
Building 1400E, Suite B14202
Cambridge, Massachusetts 02139

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion is furnished to you in connection with the Registration Statement on Form S-1 (File No. 333-225410) (the "Registration Statement") filed by Catabasis Pharmaceuticals, Inc., a Delaware corporation (the "Registrant"), with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the purpose of registering with the Commission under the Securities Act a proposed maximum aggregate offering price of \$66,000,000 of (i) common units (each a "Common Unit"), each Common Unit consisting of one share of common stock, \$0.001 par value per share (each a "Share"), and a warrant to purchase one Share (each a "Common Warrant" and each Share underlying a Common Warrant, a "Common Warrant Share"), and (ii) pre-funded units (each a "Pre-funded Unit" and, together with the Common Units, the "Units"), each Pre-funded Unit consisting of a pre-funded warrant to purchase one Share (each a "Pre-funded Warrant" and, together with the Common Warrants, the "Warrants" and each Share underlying a Pre-funded Warrant, a "Pre-funded Warrant Share" and, the Pre-funded Warrant Shares together with the Common Warrant Shares, the "Warrant Shares") and one Common Warrant, of the Registrant, as set forth in the Registration Statement and the prospectus contained therein. The Units, the Shares, the Warrants and the Warrant Shares are collectively referred to as the "Securities."

The Securities are to be sold by the Registrant pursuant to an underwriting agreement (the "Underwriting Agreement") to be entered into by and among the Registrant and Oppenheimer & Co. Inc., as representative of the several underwriters named in the Underwriting Agreement, the form of which has been filed as Exhibit 1 to the Registration Statement.

We are acting as counsel for the Registrant in connection with the issue and sale by the Registrant of the Securities. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon the Underwriting Agreement, minutes of meetings and actions of the stockholders and the Board of Directors of the Registrant as provided to us by the Registrant, stock record books of the Registrant as provided to us by the Registrant, the Certificate of Incorporation and By-Laws of the Registrant, each as restated and/or amended to date, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

Our opinions set forth below are qualified to the extent that they may be subject to or affected by (i) applicable bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance or similar laws relating to or affecting the rights of creditors generally, (ii) statutory or decisional law concerning recourse by creditors to security in the absence of notice or hearing, (iii) duties and standards imposed on creditors and parties to contracts, including,

Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109

Beijing Berlin Boston Brussels Denver Frankfurt London Los Angeles New York Palo Alto Washington

without limitation, requirements of good faith, reasonableness and fair dealing, and (iv) general equitable principles. We express no opinion as to the availability of any equitable or specific remedy upon any breach of any of the agreements as to which we are opining herein, or any of the agreements, documents or obligations referred to therein, or to the successful assertion of any equitable defenses, inasmuch as the availability of such remedies or the success of any equitable defense may be subject to the discretion of a court.

We also express no opinion herein as to any provision of any agreement (a) which may be deemed to or construed to waive any right of the Company, (b) to the effect that rights and remedies are not exclusive, that every right or remedy is cumulative and may be exercised in addition to or with any other right or remedy and does not preclude recourse to one or more other rights or remedies, (c) relating to the effect of invalidity or unenforceability of any provision of the Warrants on the validity or enforceability of any other provision thereof, (d) which is in violation of public policy, including, without limitation, any provision relating to indemnification and contribution with respect to securities law matters, (e) which provides that the terms of the Warrants may not be waived or modified except in writing or (f) relating to choice of law or consent to jurisdiction.

We express no opinion herein as to the laws of any state or jurisdiction other than the state laws of the State of New York and the General Corporation Law of the State of Delaware.

Based upon and subject to the foregoing, we are of the opinion that:

1. The Shares have been duly authorized for issuance and, when the Shares are issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Shares will be validly issued, fully paid and non-assessable.

2. The Units and the Warrants have been duly authorized for issuance and, when the Units and the Warrants are issued and paid for and executed and delivered by the Registrant in accordance with the terms and conditions of the Underwriting Agreement, the Units and the Warrants will constitute valid and legally binding obligations of the Company, enforceable against the Company in accordance with their terms.
3. The Warrant Shares have been duly authorized for issuance and, when issued and paid for in accordance with the provisions of the Warrants, including the payment of the exercise price therefor, following issuance and payment for and execution and delivery by the Registrant of the Warrants in accordance with the terms and conditions of the Underwriting Agreement, the Warrant Shares will be validly issued, fully paid and non-assessable.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

WILMER CUTLER PICKERING HALE AND DORR LLP

By: /s/ Rosemary G. Reilly
Rosemary G. Reilly, a Partner

Consent of Independent Registered Public Accounting Firm

We consent to the reference to our firm under the caption "Experts" in Amendment No. 1 to the Registration Statement (Form S-1 No. 333-225410) and related Prospectus of Catabasis Pharmaceuticals, Inc. for the registration of common units, pre-funded units and shares of common stock issuable upon exercise of warrants included in such common units and pre-funded units and to the incorporation by reference therein of our report dated March 15, 2018, with respect to the consolidated financial statements of Catabasis Pharmaceuticals, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2017, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Boston, Massachusetts

June 12, 2018

QuickLinks

[Exhibit 23.1](#)

[Consent of Independent Registered Public Accounting Firm](#)

June 12, 2018

By Electronic Submission

Securities and Exchange Commission
Division of Corporation Finance
100 F Street, N.E.
Washington, DC 20549

Attention: Ada Sarmento

Re: Catabasis Pharmaceuticals, Inc.
Registration Statement on Form S-1
Filed June 4, 2018
File No. 333-225410

Ladies and Gentlemen:

On behalf of Catabasis Pharmaceuticals, Inc. (the "Company"), submitted herewith is Amendment No. 1 ("Amendment No. 1") to the Registration Statement referenced above (the "Registration Statement").

Amendment No. 1 is being submitted in response to comments contained in a letter, dated June 8, 2018 (the "Letter"), from the staff (the "Staff") of the Securities and Exchange Commission (the "Commission") to Jill C. Milne, the Company's Chief Executive Officer. The response contained herein is based on information provided to us by representatives of the Company. The response is keyed to the numbering of the comment in the Letter and to the heading used in the Letter. The Company has responded to the Staff's comments by making changes to the disclosure in the Registration Statement as set forth in Amendment No. 1.

Cover Page

1. *Please revise your prospectus prior to effectiveness to disclose the number of common units to be offered and the number of pre-funded units to be offered. For guidance, please refer to Securities Act Rules Compliance and Disclosure Interpretations Question 227.02.*

Response: In response to the Staff's comment, the prospectus included in Amendment No. 1 discloses the estimated number of common units and pre-funded units to be offered.

Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109

Beijing Berlin Boston Brussels Denver Frankfurt London Los Angeles New York Oxford Palo Alto Washington

Securities and Exchange Commission
Division of Corporation Finance
June 12, 2018
Page 2

If you have any further questions or comments, or if you require any additional information, please contact the undersigned by telephone at (617) 526-6633 or facsimile at (617) 526-5000. Thank you for your assistance.

Very truly yours,

/s/ Rosemary G. Reilly

Rosemary G. Reilly

cc: Jill C. Milne, Catabasis Pharmaceuticals, Inc.
