

CATABASIS PHARMACEUTICALS INC  
Form S-1/A  
June 12, 2018

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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

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Amendment No. 1  
to

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

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**CATABASIS PHARMACEUTICALS, INC.**

(Exact name of registrant as specified in its charter)

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**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)

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**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 <input type="checkbox"/>	Accelerated filer <input type="checkbox"/>	Non-accelerated filer <input type="checkbox"/> (Do not check if a smaller reporting company)	Smaller reporting company <input type="checkbox"/>  Emerging growth company <input type="checkbox"/>
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If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

## CALCULATION OF REGISTRATION FEE

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)

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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.**

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The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and it is not soliciting 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."

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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.**

	Per Common Unit	Per Pre-funded Unit	Total
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.**

Prospectus dated \_\_\_\_\_, 2018

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**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.

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## 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 Linker<sup>SM</sup>, 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- $\kappa$ 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<sup>®</sup> 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



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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- $\kappa$ 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- $\kappa$ B-mediated induction of microRNAs that inhibit dystrophin translation. Inhibition of NF- $\kappa$ 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.

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**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.

***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- $\kappa$ B, 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

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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 points<sup>2</sup>). 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 (creatin 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,

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<sup>1</sup> 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.

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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- $\kappa$ 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- $\kappa$ B regulated and inflammation-related gene transcripts that are driven by  $C_{\text{trough}}$ , which is the lowest concentration of drug substance prior to receiving the next dose. In preclinical models, we observed that  $C_{\text{trough}}$  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- $\kappa$ 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

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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](http://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

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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.

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**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.

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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.



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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.

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## 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.

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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

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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.

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**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

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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.

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**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 Linker<sup>SM</sup> 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;

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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



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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.

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**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.

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## **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.

Table of Contents**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	0.38
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	\$ 0.65

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

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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.

Table of Contents**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:

	<b>Common Stock</b>	
	<b>High</b>	<b>Low</b>
<b>2018</b>		
First Quarter	\$ 2.38	\$ 1.15
Second Quarter (through June 8, 2018)	\$ 1.89	\$ 1.47
<b>2017</b>		
First Quarter	\$ 5.51	\$ 1.08
Second Quarter	\$ 2.05	\$ 1.23
Third Quarter	\$ 2.25	\$ 1.09
Fourth Quarter	\$ 3.78	\$ 1.48
<b>2016</b>		
First Quarter	\$ 8.15	\$ 3.90
Second Quarter	\$ 7.23	\$ 3.53
Third Quarter	\$ 7.89	\$ 3.31
Fourth Quarter	\$ 6.25	\$ 3.22
<b>2015</b>		
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

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**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."

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**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



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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.

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***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

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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.

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**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

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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

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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.

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*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.

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**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.**

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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.

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**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,

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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.

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*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.

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*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

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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

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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.**



Table of Contents**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 \_\_\_\_\_.

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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

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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

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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.*

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**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<sup>o</sup>-or-2<sup>o</sup>-or 3<sup>o</sup> 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*).

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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.

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**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

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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.



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## 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](http://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;

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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](http://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.

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**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**

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**PROSPECTUS**

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, 2018

**Oppenheimer & Co.**

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Table of Contents**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	\$ 425,000

**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,

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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.

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- (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.

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**EXHIBIT INDEX**

<b>Exhibit Number</b>	<b>Description of Exhibit</b>
1.1	<u>Form of Underwriting Agreement</u>
3.1	<u>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)</u>
3.2	<u>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)</u>
4.1	<u>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)</u>
4.2	<u>Form of Pre-Funded Warrant</u>
4.3	<u>Form of Warrant</u>
5.1	<u>Opinion of Wilmer Cutler Pickering Hale and Dorr LLP</u>
10.1	<u>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)</u>
10.2	<u>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)</u>
10.3	<u>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)</u>
10.4	<u>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)</u>
10.5	<u>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)</u>
10.6	<u>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)</u>
10.7	<u>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)</u>
10.8	<u>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>

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<b>Exhibit Number</b>	<b>Description of Exhibit</b>
10.9	<u>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)</u>
10.10	<u>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)</u>
10.11	<u>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)</u>
10.12	<u>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)</u>
10.13	<u>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)</u>
10.14	<u>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)</u>
10.15	<u>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)</u>
10.16	<u>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)</u>
10.17	<u>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)</u>
10.18	<u>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)</u>
10.19	<u>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>

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<b>Exhibit Number</b>	<b>Description of Exhibit</b>
10.20	<u>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)</u>
10.21	<u>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)</u>
10.22	<u>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)</u>
10.23	<u>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)</u>
10.24	<u>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)</u>
10.25	<u>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)</u>
10.26	<u>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)</u>
21.1	<u>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)</u>
23.1	<u>Consent of Ernst &amp; Young LLP, independent registered public accounting firm</u>
23.2	<u>Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)</u>
24.1*	<u>Power of Attorney</u>

\*  
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

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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)

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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,

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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.

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### **SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this Amendment No. 1 to Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on this 12<sup>th</sup> day of June, 2018.

Catabasis Pharmaceuticals, Inc.

By:                               /s/ JILL C. MILNE                              

Jill C. Milne

*President and Chief Executive Officer*

Pursuant to the requirements of the Securities Act of 1933, this Amendment No. 1 to Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<b>Signature</b>	<b>Title</b>	<b>Date</b>
<u>                              /s/ JILL C. MILNE                              </u> Jill C. Milne	President and Chief Executive Officer and Director (Principal Executive Officer)	June 12, 2018
<u>                              /s/ DEIRDRE CUNNANE                              </u> Deirdre Cunnane	Chief Legal Officer and Treasurer (Principal Financial Officer)	June 12, 2018
<u>                              /s/ NOAH CLAUSER                              </u> Noah Clauser	Vice President of Finance (Principal Accounting Officer)	June 12, 2018
<u>                              *                              </u> Michael Ross	Co-Chairman of the Board of Directors	June 12, 2018
<u>                              *                              </u> Kenneth Bate	Co-Chairman of the Board of Directors	June 12, 2018
<u>                              *                              </u> Burt Adelman	Director	June 12, 2018
<u>                              *                              </u> Jean George	Director	June 12, 2018
<u>                              *                              </u> Michael Kishbauch	Director	June 12, 2018

\*By:                               /s/ DEIRDRE A. CUNNANE                                
Deirdre A. Cunnane  
*Attorney-in-fact*