

Jaguar Health, Inc.  
Form 424B5  
November 24, 2017

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Filed Pursuant to 424(b)(5)  
Registration No. 333-220236

**PROSPECTUS SUPPLEMENT (TO PROSPECTUS DATED SEPTEMBER 14, 2017)**

## **JAGUAR HEALTH, INC.**

### **2,000,000 Shares of Common Stock**

We are offering 2,000,000 shares of our common stock, par value \$0.0001 per share, directly to the investor in this offering at a price of approximately \$0.25 per share. We are not paying underwriting discounts or commissions, so the proceeds to us, before expenses, will be \$0.5 million. We estimate that our total expenses of this offering will be approximately \$9,000.

Concurrently with this offering and pursuant to a separate prospectus supplement, we are entering into a common stock purchase agreement (the "CSPA") with L2 Capital, LLC, a Kansas limited liability company ("L2 Capital"), relating to an offering (the "Equity Line Offering") of an aggregate of up to 12,100,000 shares of our common stock, of which 10,000,000 of such shares are being offered in an indirect primary offering consisting of an equity line of credit.

Our common stock is listed on the NASDAQ Capital Market under the symbol "JAGX." On November 22, 2017, the last reported sale price of our common stock on the NASDAQ Capital Market was \$0.17 per share.

The aggregate market value of our outstanding common stock held by non-affiliates, or public float, is approximately \$42.4 million, which was calculated based on 90,836,710 shares of outstanding common stock held by non-affiliates on November 20, 2017 and on a closing price per share of \$0.47 on September 26, 2017. Following this offering and the concurrent Equity Line Offering, we will have sold securities with an aggregate market value of approximately \$10.0 million pursuant to General Instruction I.B.6 of Form S-3 during the prior 12 calendar month period that ends on and includes the date hereof.

**Investing in our common stock involves a high degree of risk. Before deciding whether to invest in our securities, you should consider carefully the risks that we have described on page S-18 of this prospectus supplement under the caption "Risk Factors" and in the documents incorporated by reference into this prospectus supplement and the accompanying prospectus.**

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.**



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**ABOUT THIS PROSPECTUS SUPPLEMENT**

This prospectus supplement and the accompanying prospectus dated September 14, 2017 are part of a registration statement that we filed with the Securities and Exchange Commission (the "SEC") using a "shelf" registration process. This prospectus supplement and the accompanying prospectus relate to the offer by us of shares of our common stock to certain investors. We provide information to you about this offering of shares of our common stock in two separate documents that are bound together: (1) this prospectus supplement, which describes the specific details regarding this offering; and (2) the accompanying prospectus, which provides general information, some of which may not apply to this offering. Generally, when we refer to this "prospectus," we are referring to both documents combined. If information in this prospectus supplement is inconsistent with the accompanying prospectus, you should rely on this prospectus supplement. However, if any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in this prospectus supplement or the accompanying prospectus the statement in the document having the later date modifies or supersedes the earlier statement as our business, financial condition, results of operations and prospects may have changed since the earlier dates. You should not assume that the information contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or any free-writing prospectus is accurate as of any date other than as of the date of this prospectus supplement, the accompanying prospectus or any related free-writing prospectus, as the case may be, or in the case of the documents incorporated by reference, the date of such documents regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or any sale of our securities. You should read this prospectus supplement, the accompanying prospectus, the documents and information incorporated by reference in this prospectus supplement and the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering when making your investment decision. You should also read and consider the information in the documents to which we have referred you under the captions "Where You Can Find More Information" and "Incorporation of Information by Reference" in this prospectus supplement. We have not authorized anyone to provide you with information that is in addition to, or different from, that contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or in any free writing prospectuses we have prepared. If anyone provides you with different or inconsistent information, you should not rely on it. We are not offering to sell securities in any jurisdiction where the offer or sale is not permitted.

Unless the context otherwise requires, references in this prospectus supplement to "Jaguar," the "Company," "we," "us," and "our" refer to Jaguar Health, Inc.

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**PROSPECTUS SUPPLEMENT SUMMARY**

*The following is a summary of what we believe to be the most important aspects of our business and the offering of our securities under this prospectus supplement and in the accompanying prospectus. We urge you to read this entire prospectus supplement, the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering, including the section entitled "Risk Factors" and the more detailed financial statements, notes to the financial statements and other information incorporated by reference from our other filings with the SEC.*

**Overview**

We are a natural-products pharmaceuticals company focused on the development and commercialization of novel, sustainably derived gastrointestinal products for both human prescription use and animals on a global basis. Our wholly-owned subsidiary, Napo Pharmaceuticals, Inc. ("Napo"), focuses on the development and commercialization of proprietary human gastrointestinal pharmaceuticals for the global marketplace from plants used traditionally in rainforest areas. Our Mytesi (crofelemer) product is approved by the U.S. Food and Drug Administration ("FDA") for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy.

Jaguar was founded in San Francisco, California as a Delaware corporation on June 6, 2013. Napo formed Jaguar to develop and commercialize animal health products. Effective as of December 31, 2013, Jaguar was a wholly-owned subsidiary of Napo, and until May 13, 2015, Jaguar was a majority-owned subsidiary of Napo. On July 31, 2017, the merger of Jaguar Animal Health, Inc. and Napo became effective, at which point Jaguar Animal Health's name changed to Jaguar Health, Inc. and Napo began operating as a wholly-owned subsidiary of Jaguar focused on human health and the ongoing commercialization of, and development of follow-on indications for, Mytesi.

Mytesi is a novel, first-in-class anti-secretory agent which has a basic normalizing effect locally on the gut, and this mechanism of action has the potential to benefit multiple disorders. We believe we control commercial rights for Mytesi for all indications, territories and patient populations globally, and we are pursuing a follow-on indication for Mytesi in cancer related diarrhea ("CRD"), an important supportive care indication for patients undergoing primary or adjuvant chemotherapy for cancer treatment. Mytesi is also in development for rare disease indications for infants and children with congenital diarrheal disorders and short bowel syndrome ("SBS"); for irritable bowel syndrome ("IBS") (Mytesi has demonstrated benefit to IBS-D patients in published Phase 2 studies); for supportive care for inflammatory bowel disease ("IBD"); and as a second-generation anti-secretory agent for use in cholera patients. Mytesi has received orphan-drug designation for SBS.

Napo launched Mytesi in early 2017 with one full-time-equivalent Mytesi sales representative focused on targeting high-decile prescribing HIV doctors. Napo recently significantly expanded its internal national salesforce for Mytesi through the hire in key U.S. markets of nine additional full-time sales representatives experienced in the sale of drugs to HIV physicians and gastroenterologists. Napo's new sales representatives are based in and will cover New York, Miami, Atlanta, Los Angeles, Houston, San Francisco, New Orleans, Philadelphia/Washington D.C., Chicago, St. Louis and the surrounding regions. All of these regions are key markets for HIV-related drug sales. Six of our new territory managers have been calling on HIV physicians for over 15 years, and others possess extensive experience in drug sales to both gastroenterologists and HIV healthcare providers.

This new in-house sales team will replace the external national Mytesi salesforce Napo established as a part-time effort in February of this year. The goal of Napo's internal sales team is to deliver a frequent and consistent selling message to targeted, high-volume prescribers of antiretroviral therapies and to gastroenterologists who see large numbers of HIV patients. With ten sales representatives reporting to our newly hired national sales manager, supported by concomitant marketing, promotional activities, and medical education initiatives such as the poster presentation Napo conducted at the

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July 2017 International Aids Society Conference on HIV Science in Paris we expect a proportional response in the number of patients treated with Mytesi.

Mytesi is currently covered by all of the top 10 commercial insurance plans, representing more than 245 million U.S. lives. In the top 10 Managed Medicare plans, which represent 24 million covered lives, Mytesi is currently covered on 10% of plans. Mytesi is currently covered on Medicaid in all 50 states. We have a copay coupon program to offset the cost of Mytesi so no patient pays more than \$25, and the NapoCares Patient Assistance Program assists patients with benefit verification, prior authorization, and claims appeals.

According to a 2017 report from Research and Markets, the combined global market for prescription and OTC gastrointestinal agents is expected to reach \$21 billion by 2025.

Our management team has significant experience in gastrointestinal product development for both humans and animals. Napo was founded 28 years ago to perform drug discovery and development by leveraging the knowledge of traditional healers working in rainforest areas. Ten members of the Jaguar and Napo team have been together for more than 15 years. Dr. Steven King, our executive vice president of sustainable supply, ethnobotanical research and intellectual property, and Lisa Conte, our founder, president and CEO, have worked together for more than 28 years. Together, these dedicated personnel successfully transformed crofelemer, which is extracted from trees growing in the rainforest, to Mytesi, which is a natural, sustainably harvested, FDA-approved drug.

The active ingredient in Mytesi is the basis for our eleven different animal health products across eight different species, all of which work by the same mechanism of action, which is highly conserved across all mammals. In the animal health space, we focus on developing and commercializing first-in-class gastrointestinal products for companion and production animals, foals, and high value horses. Portfolio planning for the animal health space is of utmost importance to us, given the wide array of potential species-specific products and because we do not want animal-related research and development activities to divert significant financial resources while we are focusing on growing Mytesi sales and seeking to move the company towards profitability. Canalevia is our lead veterinary prescription drug product candidate, intended for treatment of various forms of diarrhea in dogs. We have received minor use in a minor species ("MUMS") designation for Canalevia for chemotherapy-induced diarrhea ("CID") and EID in dogs. If Canalevia is approved for CID and EID in dogs, we expect to conduct the commercial launch of Canalevia for these indications in the first half of 2018. We have completed the pivotal trial for acute diarrhea in dogs and are in discussions with the CVM with respect to our plans for this indication of Canalevia.

The equine athlete business continues to be a major focus area for the animal health side of our business. The demand, particularly in the Middle East, for a "total gut health" product for high performance equine athletes appears to be quite strong, and we believe this is indicative of an unmet medical need. Based on this demand, and with support from studies we conducted in horses with gastric ulcers a prevalent problem in competing horses and also horses with diarrhea, we have transitioned development of Equilevia to a create a non-prescription, personalized, premium proprietary product for total gut health in equine athletes. Gut health is of critical importance in horses, as conditions such as colic can lead to the death of an otherwise healthy horse in a matter of hours. We continue to assess the size of the opportunity represented by this program and potential partnerships that would increase access to relevant competitive stables and trainers.

We will consider additional animal formulations and additional animal product expenditures from time to time as part of portfolio planning and prioritization in the context of the combined company.

There are significant barriers to entry for Mytesi (crofelemer). Through Napo, we hold an extensive global patent portfolio. At the present time we hold 110 issued worldwide patents, with coverage in many cases that extends until 2031. These issued patents cover multiple indications

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including HIV-AIDS diarrhea, IBS, IBD, manufacturing, enteric protection from gastric juices, among others. We also have 68 pending patent applications worldwide in the human and animal health areas that are being prosecuted.

Mytesi is the first oral drug approved by the FDA under botanical guidance, which provides another barrier to entry from potential generic competition. The FDA requires that the manufacturer of crofelemer use a validated proprietary bioassay to release the drug substance and drug product of Mytesi. While most generic products are fashioned to meet chemical release specifications that are in the public domain, the specifics of this assay are not publicly available. In addition, Mytesi is not systemically absorbed, so the classic approach of creating a generic drug by matching pharmacokinetic blood levels is not possible. A generic player would have to conduct costly and risky clinical trials.

Crofelemer is extracted from the *Croton lechleri* tree, which we sustainably harvest and manage through programs that we have been developing over the past 28 years. This process has involved working with communities to plant trees, obtaining permits for export, and creating a supply network that is robust and reliable.

We continue to have working relationships with partners that began in the 1990s. Additionally, through the establishment of a nonprofit called the Healing Forest Conservancy (HFC), our team has created a long-term mechanism for benefit sharing that recognizes the intellectual contribution of indigenous populations. This program is intended to contribute to the continued strength and effectiveness of the valued and strategically important relationships we have carefully cultivated over the past 28 years.

**Recent Developments**

***Merger with Napo Pharmaceuticals, Inc.***

On July 31, 2017, we completed the merger with Napo (the "Merger") pursuant to the Agreement and Plan of Merger dated March 31, 2017 by and among Jaguar, Napo, Napo Acquisition Corporation, a wholly-owned subsidiary of Jaguar ("Merger Sub"), and Napo's representative (the "Merger Agreement"). In accordance with the terms of the Merger Agreement, upon the completion of the merger, Merger Sub merged with and into Napo, with Napo surviving as our wholly-owned subsidiary. Immediately following the Merger, we changed our name from "Jaguar Animal Health, Inc." to "Jaguar Health, Inc." Napo now operates as our wholly-owned subsidiary focused on human health and the ongoing commercialization of Mytesi, a Napo drug product approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. Napo provides Jaguar not only with additional revenue streams but also synergies such as the manufacture of crofelemer at a larger volume for both human and animal marketplaces.

In connection with the Merger, (i) each issued and outstanding share of Napo common stock (other than dissenting shares and shares held by us or Napo) was converted into a contingent right to receive (x) up to a whole number of shares of our common stock comprising in the aggregate up to approximately 20.2% of the fully diluted shares of our common stock immediately following the consummation of the merger, which contingent right will vest only if the resale of certain shares of our common stock (the "Tranche A Shares") issued by us to Nantucket Investments Limited ("Nantucket") pursuant to the Napo debt settlement provides Nantucket with specified cash returns over a specified period of time (the "Hurdle Amounts"), and (y) if the applicable Hurdle Amount is achieved before all of the Tranche A Shares are sold, additional shares of our common stock (equal to 50% of the unsold Tranche A Shares), which will be distributed pro rata among holders of contingent rights and holders of Napo restricted stock units, (ii) existing creditors of Napo (inclusive of Nantucket) were issued in the aggregate approximately 42,903,018 shares of our non-voting common stock and 2,282,445 shares of our voting common stock in full satisfaction of all existing indebtedness then owed by Napo to such creditors, and (iii) an existing Napo stockholder ("Invesco") was issued an aggregate of approximately

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3,243,243 shares of our common stock in return for \$3 million of new funds invested in us by such investor, which were immediately loaned to Napo to partially facilitate the extinguishment of the debt that Napo owed to Nantucket. The minimum Hurdle Amount needed for the vesting of the contingent rights will vary depending on the time period over which Nantucket receives specified cash returns in connection with the resale of the Tranche A Shares, and Napo stockholders may not receive any shares of our common stock in certain circumstances (including if the minimum Hurdle Amount is not satisfied).

***Termination, Asset Transfer and Transition Agreement***

On September 19, 2017 (the "Transfer Date"), Napo entered into the Termination, Asset Transfer and Transition Agreement (the "Glenmark Transition Agreement") with Glenmark Pharmaceuticals Ltd. ("Glenmark"). Glenmark is Napo's primary manufacturer of crofelemer, the active pharmaceutical ingredient (API) in Mytesi. The Glenmark Transition Agreement supersedes the Collaboration Agreement, dated July 2, 2005, by and between Napo and Glenmark (the "Glenmark Collaboration Agreement") and returns to Napo certain rights which Napo licensed to Glenmark pursuant to the Glenmark Collaboration Agreement related to the development and commercialization of crofelemer for certain specified human indications in India and 140 other countries largely in developing regions (the "Transferred Assets").

As a result of the execution of the Glenmark Transition Agreement, we, through Napo, now control commercial rights for Mytesi for all indications, territories and patient populations globally, and also hold commercial rights to the existing regulatory approvals for crofelemer in Brazil, Ecuador, Zimbabwe and Botswana.

In consideration for Glenmark's assignment and transfer of the Transferred Assets to Napo, Napo agreed to pay Glenmark in cash, within 45 days after receipt by Napo, 25% of any payment that Napo receives from a third party to whom Napo grants a license or sublicense or with whom Napo partners in respect of, or sells or otherwise transfers any of the Transferred Assets, subject to certain limitations, until Glenmark has received a total of \$7 million. As additional consideration for the assignment and transfer of the Transferred Assets, Napo agreed (i) to enter into, within 90 days after the Transfer Date, a manufacturing and supply agreement with Glenmark for crofelemer, which will be manufactured at either or both of Glenmark's facilities in India and (ii) to transfer and assign to Glenmark all right, title and interest in and to certain required dedicated equipment used to manufacture crofelemer located at Glenmark's Ankleshwar facility, subject to certain limitations.

***Follow-On Public Offering***

In October 2017, we completed a follow-on registered offering of our common stock. In connection with the offering, we issued 21,687,500 shares of our common stock at a price to the public of \$0.20 per share (the "Follow-On Offering"). As a result of the follow-on offering, we received approximately \$4.3 million in gross proceeds, before deducting underwriting discounts and commissions of \$303,625 and estimated offering expenses of \$400,000.

***Termination of Elanco Agreement***

On November 1, 2017, we received a letter (the "Notice") from Elanco US, Inc. ("Elanco") serving as formal notice of Elanco's decision to terminate the License, Development Co-Promotion and Commercialization Agreement, dated January 27, 2017, between Jaguar and Elanco (the "Elanco Agreement") by giving Jaguar 90 days written notice. Pursuant to the terms of the Elanco Agreement, termination of the Elanco Agreement will become effective on January 30, 2018, which is 90 days after the date of the Notice.



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The Elanco Agreement provides Elanco with license rights to Jaguar's crofelemer-based drug product candidates, including Canalevia, for treatment of diarrhea in dogs and other companion animals. Canalevia is Jaguar's lead animal prescription drug candidate, intended for treatment of various forms of diarrhea in dogs. Under the terms of the Elanco Agreement, Jaguar received an initial upfront payment of \$2,548,689, inclusive of reimbursement of past product and development expenses of \$1,048,689, and would have been eligible to receive additional payments upon achievement of certain development, regulatory and sales milestones in an aggregate amount of up to \$61.0 million payable throughout the term of the Elanco Agreement, as well as product development expense reimbursement for any additional product development expenses incurred, and royalty payments on global sales.

On the effective date of termination of the Elanco Agreement, all licenses granted to Elanco by Jaguar under the Elanco Agreement will be revoked and the rights granted thereunder revert back to Jaguar.

**Product Pipeline**

***Human Health***

In addition to our Mytesi (crofelemer) product that is approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy, we are also developing a pipeline of prescription drug product candidates to address unmet needs in gastrointestinal health through Napo. Mytesi (crofelemer) is a novel, first-in-class anti-secretory agent which has a basic normalizing effect locally on the gut, and this mechanism of action has the potential to benefit multiple disorders. Clinical trials demonstrated that nearly 80 percent of Mytesi users experienced an improvement in their diarrhea over a four-week period. At week 20 of the pivotal trial, over half the patients had no watery stools, or a 100% decrease, and 83% had at least a 50% decrease in watery stools. Initiation on a new antiretroviral therapy has been shown to cause diarrhea 15% of the time. Our Mytesi pipeline currently includes prescription drug product candidates for four follow-on indications, several of which are backed by strong Phase 2 evidence from completed Phase 2 trials. In addition, a second-generation proprietary anti-secretory agent is in development for cholera.

**Napo Prescription Drug Product Candidates**

<b>Product Candidates</b>	<b>Indication</b>	<b>Completed Milestones</b>	<b>Current Phase of Development</b>	<b>Anticipated Near-Term Milestones</b>
Formulation of crofelemer	Cancer related diarrhea (CRD)	Two investigator-initiated clinical trials funded by Genentech, Roche & Puma	Phase 2	Protocol development with KOLs for discussions with FDA
Formulation of crofelemer	Supportive care for IBD	Safety	Phase 2	Start pivotal trial in 2018*
		Multiple Phase 2 studies completed in various secretory diarrheas (not IBD)		Protocol development for discussions with FDA



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<b>Product Candidates</b>	<b>Indication</b>	<b>Completed Milestones</b>	<b>Current Phase of Development</b>	<b>Anticipated Near-Term Milestones</b>
Formulation of crofelemer	Rare disease indications (SBS & CDD)	Phase 1 study	Phase 2	Formulation/proof-of-concept 2018, Abu Dhabi
		Orphan designation for SBS		Pivotal Trial 2018*
				Pursue orphan-drug status for CDD
Formulation of crofelemer	Irritable Bowel Syndrome diarrhea predominant (IBS-D)	Phase 1 study	Phase 2	Protocol development with KOLs for discussions with FDA
		Two significant Phase 2 studies completed		Publication of supplemental analysis of Phase 2 data
SB-300	Second-generation anti-secretory agent for multiple indications including cholera	Animal and human studies in secretory diarrheas; successful cholera trial design for anti-secretory mechanism of action with crofelemer	Pre IND	CMC development for SB-300
				Pre-clinical and Phase 1 in 2018*

\*  
Clinical trials are funding dependent

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We believe the medical need for Mytesi is significant, compelling, and unmet, and that doctors are looking for a drug product with a mechanism of action that is distinct from the options currently available to resolve diarrhea. A growing percentage of HIV patients have lived with the virus in their gut for 10+ years, often causing gut enteropathy and chronic or chronic-episodic diarrhea. According to data from the U.S. Centers for Disease Control and Prevention, by 2020 more than 70% of Americans with HIV are expected to be 50 and older.

<b>Market</b>	<b>Number of Competitors for Mytesi's Approved/Anticipated Labeled Indication</b>	<b>Market Size/Potential</b>
HIV-D	0	We estimate the U.S. market revenue potential for Mytesi to be approximately \$100 million in gross annual sales
CRD	0	An estimated 650,000 U.S. cancer patients receive chemotherapy in an outpatient oncology clinic.(1) Comparable supportive care (i.e. CINV) product sales of ~\$620 million in 2013, which is projected to reach \$1.0 billion by 2020(2)
IBD	0	Estimated 1,171,000 Americans have IBD(3)
IBS-D	3	Most IBS products have estimated revenue potential of greater than \$1.0 billion(4)
CDD/SBS-Orphan	0	Financial benefits of Orphan Designation
Cholera (hydration maintenance) PRV (SB-300)	0	Priority review vouchers have recently sold for \$125 million to \$350 million(5)

- (1) Centers for Disease Control and Prevention. Preventing Infections in Cancer Patients: Information for Health Care Providers ([cdc.gov/cancer/preventinfections/providers.htm](http://cdc.gov/cancer/preventinfections/providers.htm))
- (2) Heron Therapeutics, Inc. Form 10-K for the fiscal year ended December 31, 2016
- (3) Kappelman, M. et al. Recent Trends in the Prevalence of Crohn's Disease and Ulcerative Colitis in a Commercially Insured US Population. *Dig Dis Sci.* 2013 Feb; 58(2): 519-525
- (4) Merrill Lynch forecasts peak US sales of roughly \$1.5 bn for Ironwood's Linzess (<http://247wallst.com/healthcare-business/2015/04/27/key-analyst-sees-nearly-30-upside-in-ironwood>); Rodman & Renshaw estimate peak annual sales of Synergy Pharmaceuticals' Trulance at \$2.3 bn in 2021 (Source: <https://www.benzinga.com/analyst-ratings/analyst-color/17/03/9224181/analyst-synergy-pharma-could-achieve-sustainable-profit>)
- (5) In Aug. 2015, AbbVie Inc. bought a priority review voucher from United Therapeutics Corp for \$350 million (<http://www.reuters.com/article/us-abbvie-priorityreview/abbvie-buys-special-review-voucher-for-350-million-idUSKCN0QO1LQ20150819>). In Feb. 2017 Sarpeta Therapeutics sold a priority review voucher to Gilead Sciences, Inc. for \$125 million (<http://fortune.com/2017/02/21/sarepta-gilead-review-voucher/>).

***Animal Health***

Our pipeline currently includes prescription drug product candidates and non-prescription products targeting eight species. Neonorm Foal is an antidiarrheal product for newborn horses, which we



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launched in the United States in early 2016. Neonorm Calf is an antidiarrheal product for preweaned dairy calves, which we launched in the United States at the end of 2014. We are also developing a pipeline of prescription drug product candidates and non-prescription (non-drug) products to address unmet needs in animal health.

Neonorm is a standardized botanical extract derived from the *Croton lechleri* tree. The reception among users of Neonorm Calf and Neonorm Foal has been positive. In June 2017 we launched neonorm.com, a commercial website for both Neonorm products. As we announced on June 14, 2017, the Organic Materials Review Institute ("OMRI") has reviewed Neonorm Calf and determined that it is allowed for use in compliance with the U.S. Department of Agriculture National Organic Program. OMRI is an international nonprofit organization that determines which input products are allowed for use in organic production and processing. To date, our non-prescription animal health products have generated approximately \$206,805 in net revenue in 2017.

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**Jaguar Animal Prescription Drug Product Candidates**

<b>Product Candidates</b>	<b>Species</b>	<b>Indication</b>	<b>Recent Developments</b>	<b>Anticipated Near-Term Milestones</b>
Canalevia	Dogs	CID	Completed safety study with commercial formulation in June 2015	Commercial launch in first half of 2018
	Dogs	EID	Received MUMS designation	
	Dogs	General diarrhea	Completed safety study with commercial formulation in June 2015  FDA indicated that use of Canalevia for this indication qualifies as a "minor use"	Commercial launch in first half of 2018
Species-specific formulations of crofelemer	Cats	General diarrhea	Concurred protocol	Program specifics funded by Elanco, including initiating development of second generation flavored chew formulation
			Initiated pivotal field trial to evaluate safety and effectiveness	
Species-specific formulations of crofelemer	Cats	General diarrhea	Entered into License, Development, Co-Promotion and Commercialization Agreement with Elanco in January 2017	
			INAD opened in 2014	Program specifics funded by Elanco
Species-specific formulations of crofelemer	Cats	General diarrhea	Entered into License, Development, Co-Promotion and Commercialization Agreement with Elanco in January 2017	

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Virend (topical)	Cats	Herpes virus	INAD opened in 2014	Subject to future portfolio planning and prioritization
Species-specific formulations of NP-500	Dogs	Obesity-related metabolic dysfunction	INAD opened in 2014	
	Horses	Metabolic syndrome	INAD opened in 2014	
	Cats	Type II diabetes	INAD opened in 2014	

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**Jaguar Animal Non-Prescription Products**

<b>Products</b>	<b>Species</b>	<b>Use</b>	<b>Recent Developments</b>	<b>Anticipated Near-Term Milestones</b>
Equilevia	Horses	Total gut health		
			Proof-of-concept safety and effectiveness results in January 2016 for gastrointestinal ulcers	Finalize formulation and conduct commercial launch of personalized product in Q4 2017
Neonorm Calf	Dairy & beef calves	Helps proactively retain fluids in calves aiding the animals in avoiding debilitating, dangerous levels of dehydration	Positive racing results Field study supports beneficial effect on prewean weight gain	Launch second generation formulation for administration in liquid, prophylaxis in Q2 2018
			Positive prophylactic results	Commercial launch and business development activities in selected international geographies in the first half of 2018
			Distribution deal China	
Species-specific formulations of Neonorm	Horse foals	Anti-diarrheal for newborn horses	Completed proof-of-concept study in November 2015	Evaluation of Neonorm Horse product
			Soft-launched product in December 2015	
			Commercial launch with exclusive Henry Schein distribution deal at AAEP, 2016	
	Piglets	Normalize fecal formation in piglets	Positive preliminary topline results of two	Expansion of distribution in China

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studies by Integrated Animal Nutrition and Health Inc. to evaluate the safety and effectiveness of Neonorm in piglets

Other farm/production animals

Supports gut health normalizing fecal formation

Selected clinical research

Initiate proof-of-concept studies and partnering discussions, multiple species; multiple geographies, subject to future portfolio planning and prioritization

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**Business Strategy**

Our goal is to become a leading pharmaceuticals company with first-in-class, sustainably derived products that address significant unmet gastrointestinal medical needs globally. To accomplish this goal, we plan to:

***Expand Mytesi by leveraging our significant gastrointestinal knowledge, experience and intellectual property portfolio.***

Mytesi is a novel, first-in-class anti-secretory agent which has a basic normalizing effect locally on the gut, and this mechanism of action has the potential to benefit multiple disorders. Our Mytesi (crofelemer) product is approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. We believe we control commercial rights for Mytesi for all indications, territories and patient populations globally, and we are pursuing a follow-on indication for Mytesi in CRD, an important supportive care indication for patients undergoing primary or adjuvant chemotherapy for cancer treatment. Mytesi is also in development for rare disease indications for infants and children with congenital diarrheal disorders and short bowel syndrome; for IBS (Mytesi has demonstrated benefit to IBS-D patients in published Phase 2 studies); for supportive care for IBD; and as a second-generation anti-secretory agent for use in cholera patients. Mytesi has received orphan-drug designation for SBS.

Our management team collectively has more than 100 years of experience in the development of gastrointestinal prescription drug and non-prescription products. This experience covers all aspects of product development, including discovery, preclinical and clinical development, GMP manufacturing, and regulatory strategy. Key members of this team successfully developed Mytesi.

***Establish and expand commercial capabilities in Mytesi sales and marketing efforts.***

We plan to significantly expand Mytesi sales and marketing efforts in the third quarter of 2017. As announced on August 7, 2017, we appointed Pete Riojas, a 29-year pharmaceutical industry veteran, to lead Mytesi sales nationally. We also significantly expanded our internal national salesforce for Mytesi through the hire in key U.S. markets of nine additional sales representatives experienced in the sale of drugs to HIV physicians and gastroenterologists. Our new sales representatives are based in and will cover New York, Miami, Atlanta, Los Angeles, Houston, San Francisco, New Orleans, Philadelphia/Washington D.C., Chicago, St. Louis and the surrounding regions. All of these regions are key markets for HIV-related drug sales. Six of our new territory managers have been calling on HIV physicians for more than 15 years, and others possess extensive experience in drug sales to both gastroenterologists and HIV healthcare providers.

***Leverage our relationships with key opinion leaders regarding development of human and animal follow-on indications***

To date, we have identified more than 30 key opinion leaders (KOLs) who are recognized specialists in HIV patient care, CRD, IBD, IBS, cholera, SBS, CDD and equine gut health, and who are participating in our KOL advisory program in some manner.

***Strategically sequence the development of follow-on indications of Mytesi and seek geographically-focused licensing opportunities.***

Although it is possible that we may enter into corporate partnering relationships related to Mytesi, our intention would be to retain all commercialization and promotional rights in the U.S., so that we do not become primarily a royalty-collecting organization, and we are opposed to entering into any Mytesi partnering relationship that would require splitting indications. We are seeking to put limited geographically-focused partnerships in place in the near term, while also considering possibilities for a

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worldwide partnership with a leading global entity (excluding the US commercial rights) in the field of gastrointestinal care and cancer in the long term.

***Strategically plan our portfolio in the animal health space.***

Portfolio planning for the animal health space is of utmost importance to us, given the wide array of potential species-specific products and because we do not want animal-related research and development activities to divert significant financial resources while we are focusing on growing Mytesi sales and seeking to move our company towards profitability. Additional formulations and additional animal product expenditures will be considered from time to time as part of portfolio planning and prioritization in the context of the combined company. Canalevia is our lead veterinary prescription drug product candidate, intended for treatment of various forms of diarrhea in dogs. Our next expected veterinary product commercial launch will be for Equilevia, a personalized premium proprietary total gut health product for equine athletes, which will be non-prescription.

***Reduce risks relating to product development.***

Risk reduction is a key focus of our product development planning. Mytesi is approved for chronic indication, providing us the ability to leverage this corresponding safety data when seeking approval for planned follow-on indications. Crofelemer manufacturing is being conducted at a new, multimillion-dollar commercial manufacturing facility that has been FDA-inspected and approved. In an effort to reduce risk further, we have implemented the following approach: First, we meet with key opinion leaders, typically at medical conferences as we have already done in 2017 at Digestive Disease Week for IBS and IBD, the American Society of Clinical Oncology annual meeting, and the Multinational Association of Supportive Care and Congress. Next, we confirm unmet medical needs with these key opinion leaders, and discuss the practicality of patient enrollment and trial implementation. We then generate protocols to discuss with the FDA, seeking, when possible, special protocol assessments. Our goal, by the time we start devoting significant funds to a clinical trial, is to have derisked the program as much as we believe we possibly can. We believe this approach will lead to better long-term outcomes for our products in development.

**Risks Related to Our Business**

Our business, and our ability to execute our business strategy, is subject to a number of risks as more fully described in the section titled "Risk Factors." These risks include, among others, the following:

We have a limited operating history, have not yet generated any material revenues, expect to continue to incur significant research and development and other expenses, and may never become profitable. Our independent registered public accounting firm has expressed substantial doubt about our ability to continue as a going concern.

We have never generated any material revenue from operations and may need to raise additional capital to achieve our goals.

We are substantially dependent on the success of our current lead prescription drug product candidates, Mytesi and Canalevia, and our non-prescription products, Equilevia and Neonorm, and cannot be certain that necessary approvals will be received for planned Mytesi follow-on indications or Canalevia or that these product candidates will be successfully commercialized, either by us or any of our partners.

The results of earlier studies may not be predictive of the results of our pivotal trials or other future studies, and we may be unable to obtain any necessary regulatory approvals for our existing or future prescription drug product candidates under applicable regulatory requirements.

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Development of prescription drug products, and, to a lesser extent, non-prescription products, for the human health and animal health market is inherently expensive, time-consuming and uncertain, and any delay or discontinuance of our current or future pivotal trials, or dosage or formulation studies, would harm our business and prospects.

Even if we obtain any required regulatory approvals for our current or future prescription drug product candidates, they may never achieve market acceptance or commercial success.

We are dependent upon contract manufacturers for supplies of our current prescription drug product candidates and non-prescription products and intend to rely on contract manufacturers for commercial quantities of any of our commercialized products.

If we are not successful in identifying, developing and commercializing additional prescription drug product candidates and non-prescription products, our ability to expand our business and achieve our strategic objectives may be impaired.

**Corporate Information**

We were incorporated in the State of Delaware on June 6, 2013. Our principal executive offices are located at 201 Mission Street, Suite 2375, San Francisco, CA 94015 and our telephone number is (415) 371-8300. Our website address is [www.jaguar.health](http://www.jaguar.health). The information contained on, or that can be accessed through, our website is not part of this prospectus supplement. Our common stock is listed on the NASDAQ Capital Market and trades under the symbol "JAGX."

Jaguar Health, our logo, Mytesi, Canalevia, Equilevia and Neonorm and are our trademarks that are used in this prospectus supplement. This prospectus supplement also includes trademarks, tradenames and service marks that are the property of other organizations. Solely for convenience, trademarks and tradenames referred to in this prospectus supplement appear without the ©, ® or ™ symbols, but those references are not intended to indicate that we will not assert, to the fullest extent under applicable law, our rights or that the applicable owner will not assert its rights, to these trademarks and tradenames.

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**THE OFFERING**

Common stock offered by us	2,000,000 shares
Public offering price	\$0.25 per share
Common stock outstanding prior to this offering	90,836,710 shares
Common stock to be outstanding after this offering and the concurrent Equity Line Offering	104,936,710 shares
Use of proceeds	We intend to use the net proceeds from this offering and the concurrent Equity Line Offering for the commercialization of Mytesi and working capital and general corporate purposes. See "Use of Proceeds" on page S-57.
Concurrent equity line offering	Concurrently with this offering and pursuant to a separate prospectus supplement, we are entering into a common stock purchase agreement (the "CSPA") with L2 Capital, relating to an offering (the "Equity Line Offering") of an aggregate of up to 12,100,000 shares of our common stock, of which 10,000,000 of such shares are being offered in an indirect primary offering consisting of an equity line of credit. This offering is contingent upon our entry into the CSPA with L2 Capital, and the Equity Line Offering is contingent upon the completion of this offering. In addition, we have the option to increase the equity line of credit by an additional 7,808,142 shares by notifying L2 Capital and issuing an additional commitment fee of 1,000,000 shares no earlier than 30 days from the closing of the Equity Line Offering and no later than 40 days from the closing of the Equity Line Offering.
Risk factors	You should read the "Risk Factors" section of this prospectus supplement and in the documents incorporated by reference in this prospectus supplement for a discussion of factors to consider before deciding to invest in our common stock.
NASDAQ Capital Market symbol	"JAGX"
	We have two classes of common stock: (i) voting common stock, par value \$0.0001 per share, and (ii) non-voting common stock, par value \$0.0001 per share. The shares offered by us in this offering are voting common stock.

The number of shares of our common stock to be outstanding after this offering and the concurrent Equity Line Offering is based on 67,800,655 shares of our common stock outstanding as of September 30, 2017, and excludes the following:

2,984,304 shares of voting common stock issuable upon exercise of outstanding options as of September 30, 2017, with a weighted average exercise price of \$2.46 per share;

513,385 shares of voting common stock reserved for future issuance under the 2014 Stock Incentive Plan;

6,656,333 shares of voting common stock issuable upon exercise of warrants outstanding as of September 30, 2017, with a weighted average exercise price of \$1.15 per share;

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5,893,849 shares of voting common stock issuable upon vesting of outstanding restricted stock unit awards, or RSUs, as of September 30, 2017; and

up to 15,550,753 shares of common stock issuable upon conversion of outstanding convertible promissory notes in the aggregate principal amount of \$13,800,627 issued as of September 30, 2017.

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**RISK FACTORS**

Investing in our common stock involves a high degree of risk. You should carefully consider the risks described below, as well as the other information contained in or incorporated by reference in this prospectus supplement, including our financial statements and the related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, as updated in our Quarterly Reports on Form 10-Q, before deciding whether to invest in our common stock. The occurrence of any of the events or developments described below could harm our business, financial condition, results of operations and prospects. In such an event, the market price of our common stock could decline, and you may lose all or part of your investment. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may harm our business, financial condition, results of operations and prospects.

**Risks Related to Our Business**

*We have a limited operating history, expect to incur further losses as we grow and may be unable to achieve or sustain profitability. Our independent registered public accounting firm has expressed substantial doubt about our ability to continue as a going concern.*

Since formation in June 2013, our operations have been primarily limited to the research and development of our animal prescription drug product candidate, Canalevia, to treat various forms of diarrhea in dogs, our non-prescription product, Neonorm Calf, to help dairies and calf farms proactively retain fluid in calves, the ongoing commercialization of Neonorm Foal, our antidiarrheal for newborn horses, and Equilevia, our planned product for total gut health in high-performance equine athletes. Since the consummation of the Merger on July 31, 2017, our operations have also been heavily focused on research, development and the ongoing commercialization of our lead prescription drug product candidate, Mytesi, which is approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. As a result, we have limited meaningful historical operations upon which to evaluate our business and prospects and have not yet demonstrated an ability to broadly commercialize any of our animal health products, obtain any required marketing approval for any of our animal prescription drug product candidates or successfully overcome the risks and uncertainties frequently encountered by companies in emerging fields such as the animal health industry or the gastrointestinal health industry in general. We also have not generated any material revenue to date, and expect to continue to incur significant research and development and other expenses. Our net loss and comprehensive loss for the year ended December 31, 2016 was \$14.7 million. As of December 31, 2016, we had total stockholders' deficit of \$2.5 million. We expect to continue to incur losses for the foreseeable future, which will increase significantly from historical levels as we expand our product development activities, seek necessary approvals for our human and veterinary drug product candidates, conduct species-specific formulation studies for our non-prescription products and begin commercialization activities. Even if we succeed in developing and broadly commercializing one or more of our products or product candidates, we expect to continue to incur losses for the foreseeable future, and we may never become profitable. If we fail to achieve or maintain profitability, then we may be unable to continue our operations at planned levels and be forced to reduce or cease operations.

As more fully discussed in Note 1 to our financial statements incorporated by reference in this prospectus supplement, we believe there is substantial doubt about our ability to continue as a going concern as we do not currently have sufficient cash resources to fund our operations through February 15, 2018, or one year from the filing date of our Form 10-K. Our financial statements do not include any adjustments that may result from the outcome of this uncertainty. If we are unable to continue as a viable entity, our stockholders may lose their entire investment.



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***We have never generated any material revenue from operations and may not generate any material revenue from our operations in the foreseeable future.***

We are a natural-products pharmaceuticals company focused on the development and commercialization of novel, sustainably derived gastrointestinal products for both human prescription use and animals on a global basis. Since inception in June 2013, we have not generated any material revenue from operations. There is no guarantee that our recent commercial launch of Mytesi for symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS or our ongoing commercialization efforts for Neonorm Calf for preweaned dairy calves in the United States and Neonorm Foal for newborn horses in the United States will be successful or that we will be able to sell any products in the future. Further, in order to commercialize our prescription drug product candidates, we must receive regulatory approval from the FDA in the United States and other regulatory agencies in various jurisdictions. Other than Mytesi, we have not yet received any regulatory approvals for our prescription drug product candidates. In addition, certain of our non-prescription products, such as Neonorm Calf, may be subject to regulatory approval outside the United States prior to commercialization in other countries. Accordingly, until and unless we receive any necessary regulatory approvals, we cannot market or sell our products in many regions. Moreover, even if we receive the necessary approvals, we may not be successful in generating revenue from sales of our products as we do not have any meaningful experience marketing or distributing our products. Accordingly, we may never generate any material revenue from our operations.

***We expect to incur significant additional costs as we continue commercialization efforts for current prescription drug candidates, Neonorm, or other product candidates, and undertake the clinical trials necessary to obtain any necessary regulatory approvals, which will increase our losses.***

We commenced sales of Neonorm for preweaned dairy calves in the United States under the brand name Neonorm Calf at the end of 2014, and Napo commenced sales of Mytesi for adults with HIV/AIDS on antiretroviral therapy in February 2017. We will need to continue to invest in developing our internal and third-party sales and distribution network and outreach efforts to key opinion leaders in the gastrointestinal health industry, including physicians and veterinarians, as applicable. We will also need to conduct clinical trials for Canalevia in order to obtain necessary initial regulatory approvals and to subsequently broaden Mytesi to additional indications and Canalevia to additional indications and additional species. We will also need to conduct species-specific testing with Neonorm to expand to additional animal populations.

We are actively identifying additional products for development and commercialization, and will continue to expend substantial resources for the foreseeable future to develop Mytesi, Equilevia, Canalevia and Neonorm and develop products from Napo's library of over 2,300 medicinal plants. These expenditures will include costs associated with:

identifying additional potential prescription drug product candidates and non-prescription products;

formulation studies;

conducting pilot, pivotal and toxicology studies;

completing other research and development activities;

payments to technology licensors;

maintaining our intellectual property;

obtaining necessary regulatory approvals;

establishing commercial supply capabilities; and

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sales, marketing and distribution of our commercialized products.

We also may incur unanticipated costs in connection with developing and commercializing our products. Because the outcome of our development activities and commercialization efforts is inherently uncertain, the actual amounts necessary to successfully complete the development and commercialization of our current or future products and product candidates may be greater than we anticipate.

Because we anticipate incurring significant costs for the foreseeable future, if we are not successful in broadly commercializing any of our current or future products or product candidates or raising additional funding to pursue our research and development efforts, we may never realize the benefit of our development efforts and our business may be harmed.

***We will need to raise substantial additional capital in the future in the event that we conduct clinical trials for new indications and we may be unable to raise such funds when needed and on acceptable terms, which would force us to delay, limit, reduce or terminate one or more of our product development programs.***

We are forecasting continued losses and negative cash flows as we continue to fund our operating and marketing activities and research and development programs, and we will not have sufficient cash on hand to fund our operating plan through February 2018 and to complete the development of all the current products in our pipeline, or any additional products we may identify. We will need to seek additional funds sooner than planned through public or private equity or debt financings or other sources such as strategic collaborations. Other than the loan and security agreement with Hercules (which provided for an initial loan commitment of \$6.0 million), the common stock purchase agreement (the "Aspire CSPA"), with Aspire Capital Fund, LLC ("Aspire Capital") (which committed Aspire Capital to purchase up to an aggregate of \$15.0 million of our shares of common stock over the term of the Aspire CSPA), Napo's Amended and Restated Note Purchase Agreement (the "Kingdon NPA") with Kingdon Associates, M. Kingdon Offshore Master Fund L.P., Kingdon Family Partnership, L.P., and Kingdon Credit Master Fund L.P. (pursuant to which we issued \$10.0 million aggregate principal amount of convertible notes in exchange for a cash payment of \$8.0 million), and convertible note purchase agreements with three purchasers (pursuant to which we issued approximately \$3.5 million aggregate principal amount of convertible notes in exchange for a cash payment of \$2.75 million), we have no current agreements or arrangements with respect to any such financings or collaborations, and any such financings or collaborations may result in dilution to our stockholders, the imposition of debt covenants and repayment obligations or other restrictions that may harm our business or the value of our common stock. We may also seek from time to time to raise additional capital based upon favorable market conditions or strategic considerations such as potential acquisitions or potential license arrangements.

Our future capital requirements depend on many factors, including, but not limited to:

the scope, progress, results and costs of researching and developing our current and future prescription drug product candidates and non-prescription products;

the timing of, and the costs involved in, obtaining any regulatory approvals for our current and any future products;

the number and characteristics of the products we pursue;

the cost of manufacturing our current and future products and any products we successfully commercialize;

the cost of commercialization activities for Mytesi, Neonorm, Equilevia and Canalevia, if approved, including sales, marketing and distribution costs;

the expenses needed to attract and retain skilled personnel;

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the costs associated with being a public company;

our ability to establish and maintain strategic collaborations, distribution or other arrangements and the financial terms of such agreements; and

the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing possible patent claims, including litigation costs and the outcome of any such litigation.

Additional funds may not be available when we need them on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to delay, limit, reduce or terminate one or more of our product development programs or future commercialization efforts.

***We are substantially dependent on the success of our current lead prescription drug product candidates, Mytesi and Canalevia, and our non-prescription products, Equilevia and Neonorm, and cannot be certain that necessary approvals will be received for planned Mytesi follow-on indications or Canalevia or that these product candidates will be successfully commercialized, either by us or any of our partners.***

Other than Mytesi, we currently do not have regulatory approval for any of our prescription drug product candidates, including Canalevia. Our current efforts are primarily focused on the ongoing commercialization of Mytesi, Neonorm Calf and Neonorm Foal in the United States, and development efforts related to Mytesi, Equilevia, and Canalevia, and on the development of formulations of Neonorm for additional species. With regard to Mytesi, we are focused on the commercial launch of the product in the United States as well as on development efforts related to a follow-on indication for Mytesi in CRD, an important supportive care indication for patients undergoing primary or adjuvant chemotherapy for cancer treatment. Mytesi is also in development for rare disease indications for infants and children with congenital diarrheal disorders and short bowel syndrome; for IBS (Mytesi has demonstrated benefit to IBS-D patients in published Phase 2 studies); for supportive care for IBD; and as a second-generation anti-secretory agent for use in cholera patients. Mytesi has received orphan-drug designation for SBS. Accordingly, our near term prospects, including our ability to generate material product revenue, obtain any new financing if needed to fund our business and operations or enter into potential strategic transactions, will depend heavily on the success of Mytesi, Equilevia and Neonorm, as well as on Canalevia, if Canalevia is approved.

Substantial time and capital resources have been previously devoted by third parties in the development of crofelemer, the active pharmaceutical ingredient, or API, in Mytesi and Canalevia, and the development of the botanical extract used in Equilevia and Neonorm. Both crofelemer and the botanical extract used in Equilevia and Neonorm were originally developed at Shaman Pharmaceuticals, Inc. ("Shaman"), by certain members of our management team, including Lisa A. Conte, our chief executive officer and president, and Steven R. King, Ph.D., our executive vice president of sustainable supply, ethnobotanical research and intellectual property and secretary. Shaman spent significant development resources before voluntarily filing for bankruptcy in 2001 pursuant to Chapter 11 of the U.S. Bankruptcy Code. The rights to crofelemer and the botanical extract used in Equilevia and Neonorm, as well as other intellectual property rights, were subsequently acquired by Napo from Shaman in 2001 pursuant to a court approved sale of assets. Ms. Conte founded Napo in 2001 and was the current interim chief executive officer of Napo and a member of Napo's board of directors prior to the Merger. While at Napo, certain members of our management team, including Ms. Conte and Dr. King, continued the development of crofelemer. In 2005, Napo entered into license agreements with Glenmark and Luye Pharma Group Limited for rights to various human indications of crofelemer in certain territories as defined in the respective license agreements with these licensees. Subsequently, after expending significant sums developing crofelemer, including trial design and on-going patient enrollment in the final pivotal Phase 3 trial for crofelemer for non-infectious diarrhea in adults with HIV/AIDS on antiretroviral therapy, in late 2008, Napo entered into a collaboration

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agreement with Salix Pharmaceuticals, Inc., or Salix, for development and commercialization rights to certain indications worldwide and certain rights in North America, Europe, and Japan, to crofelemer for human use. In January 2014, Jaguar entered into the Napo License Agreement pursuant to which Jaguar acquired an exclusive worldwide license to Napo's intellectual property rights and technology, including crofelemer and the botanical extract used in Equilevia and Neonorm, for all veterinary treatment uses and indications for all species of animals. In February 2014, most of the executive officers of Napo, and substantially all Napo's employees, became Jaguar's employees. Following the Merger in July 2017, Napo became Jaguar's wholly-owned subsidiary. If we are not successful in the development and commercialization of Mytesi, Neonorm, Equilevia and Canalevia, our business and our prospects will be harmed.

The successful development and commercialization of Mytesi, Equilevia and Neonorm, and, if approved, Canalevia will depend on a number of factors, including the following:

the successful completion of the pivotal trials and toxicology studies for Canalevia, which may take significantly longer than we currently anticipate and will depend, in part, upon the satisfactory performance of third-party contractors;

our ability to demonstrate to the satisfaction of the FDA and any other regulatory bodies, the safety and efficacy of Canalevia;

our ability and that of our contract manufacturers to manufacture supplies of Mytesi, Neonorm, Equilevia and Canalevia and to develop, validate and maintain viable commercial manufacturing processes that are compliant with current good manufacturing practices, or cGMP, if required;

the success of Neonorm field studies and acceptance of their results by dairy producers;

our ability to successfully launch Mytesi and Neonorm, whether alone or in collaboration with others;

our ability to successfully launch Canalevia, assuming approval is obtained, and Equilevia, whether alone or in collaboration with others;

the availability, perceived advantages, relative cost, relative safety and relative efficacy of our prescription drug product candidates and non-prescription products compared to alternative and competing treatments;

the acceptance of our prescription drug product candidates and non-prescription products as safe and effective by physicians, veterinarians, patients, animal owners and the human and animal health community, as applicable;

our ability to achieve and maintain compliance with all regulatory requirements applicable to our business; and

our ability to obtain and enforce our intellectual property rights and obtain marketing exclusivity for our prescription drug product candidates and non-prescription products, and avoid or prevail in any third-party patent interference, patent infringement claims or administrative patent proceedings initiated by third parties or the U.S. Patent and Trademark Office ("USPTO").

Many of these factors are beyond our control. Accordingly, we may not be successful in developing or commercializing Mytesi, Neonorm, Equilevia, Canalevia or any of our other potential products. If we are unsuccessful or are significantly delayed in developing and commercializing Mytesi, Neonorm, Equilevia, Canalevia or any of our other potential products, our business and prospects will be harmed and you may lose all or a portion of the value of your investment in our common stock.



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***If we are not successful in identifying, licensing, developing and commercializing additional product candidates and products, our ability to expand our business and achieve our strategic objectives could be impaired.***

Although a substantial amount of our efforts is focused on the commercial performance of Mytesi, Equilevia and Neonorm and the continued development and potential approval of Canalevia, a key element of our strategy is to identify, develop and commercialize a portfolio of products to serve the gastrointestinal health market. Most of our potential products are based on our knowledge of medicinal plants. Our current focus is primarily on product candidates whose active pharmaceutical ingredient or botanical extract has been successfully commercialized or demonstrated to be safe and effective in human or animal trials. In some instances, we may be unable to further develop these potential products because of perceived regulatory and commercial risks. Even if we successfully identify potential products, we may still fail to yield products for development and commercialization for many reasons, including the following:

competitors may develop alternatives that render our potential products obsolete;

an outside party may develop a cure for any disease state that is the target indication for any of our planned or approved drug products;

potential products we seek to develop may be covered by third-party patents or other exclusive rights;

a potential product may on further study be shown to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria;

a potential product may not be capable of being produced in commercial quantities at an acceptable cost, or at all; and

a potential product may not be accepted as safe and effective by physicians, veterinarians, patients, animal owners, key opinion leaders and other decision-makers in the gastrointestinal health market, as applicable.

While we are developing specific formulations, including flavors, methods of administration, new patents and other strategies with respect to our current potential products, we may be unable to prevent competitors from developing substantially similar products and bringing those products to market earlier than we can. If such competing products achieve regulatory approval and commercialization prior to our potential products, our competitive position may be impaired. If we fail to develop and successfully commercialize other potential products, our business and future prospects may be harmed and we will be more vulnerable to any problems that we encounter in developing and commercializing our current potential products.

***Mytesi faces significant competition from other pharmaceutical companies, both for its currently approved indication and for planned follow-on indications, and our operating results will suffer if we fail to compete effectively.***

The development and commercialization of products for human gastrointestinal health is highly competitive and our success depends on our ability to compete effectively with other products in the market. During the ongoing commercialization of Mytesi for its currently approved indication, and during the future commercialization of Mytesi for any planned follow-on indications, if such follow-on indications receive regulatory approval, we expect to compete with major pharmaceutical and biotechnology companies that operate in the gastrointestinal space, such as Sucampo AG, Takeda Pharmaceuticals, Allergan, Inc., Ironwood Pharmaceuticals, Inc., Synergy Pharmaceuticals Inc., Heron Therapeutics, Inc., Sebela Pharmaceuticals, Inc. and Salix Pharmaceuticals.

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Many of our competitors and potential competitors in the human gastrointestinal space have substantially more financial, technical and human resources than we do. Many also have more experience in the development, manufacture, regulation and worldwide commercialization of human gastrointestinal health products.

For these reasons, we cannot be certain that we and Mytesi can compete effectively.

***Our animal health products face significant competition from other pharmaceutical companies and our operating results will suffer if we fail to compete effectively.***

The development and commercialization of animal health products is highly competitive and our success depends on our ability to compete effectively with other products in the market. We expect to compete with the animal health divisions of major pharmaceutical and biotechnology companies such as Merck Animal Health, Merial Inc., Elanco Animal Health, Bayer Animal Health GmbH, Novartis Animal Health Inc. and Boehringer Ingelheim Animal Health, as well as specialty animal health medicines companies such as Zoetis Inc., Phibro Animal Health Corporation and, in Europe, Virbac S.A., Vétquinol S.A., Ceva Animal Health S.A. and Dechra Pharmaceuticals PLC. We are also aware of several early-stage companies that are developing products for use in the animal health market, including Aratana Therapeutics, Inc., Kindred Biosciences, Inc., Parnell Pharmaceuticals Holdings Ltd, Nexvet Biopharma and ImmuCell Corporation. We also compete with academic institutions, governmental agencies and private organizations that are conducting research in the field of animal health products.

Although there are currently no FDA-approved anti-secretory products to treat chemotherapy-induced diarrhea (CID) in dogs, we anticipate that Canalevia, if approved, may face competition from various products, including products approved for use in humans that are used extra-label in animals. Extra-label use is the use of an approved drug outside of its cleared or approved indications in the animal context. All of our potential products could also face competition from new products in development. These and other potential competing products may benefit from greater brand recognition and brand loyalty than our products and product candidates may achieve.

Many of our competitors and potential competitors have substantially more financial, technical and human resources than we do. Many also have more experience in the development, manufacture, regulation and worldwide commercialization of animal health products, including animal prescription drugs and non-prescription products.

For these reasons, we cannot be certain that we and our products can compete effectively.

***We may be unable to obtain, or obtain on a timely basis, regulatory approval for our existing or future human or animal prescription drug product candidates under applicable regulatory requirements, which would harm our operating results.***

The research, testing, manufacturing, labeling, approval, sale, marketing and distribution of human and animal health products are subject to extensive regulation. We are typically not permitted to market our prescription drug product candidates in the United States until we receive approval of the product from the FDA through the filing of an NDA or NADA, as applicable. To gain approval to market a prescription drug, we must provide the FDA with safety and efficacy data from pivotal trials that adequately demonstrate that our prescription drug product candidates are safe and effective for the intended indications. Likewise, to gain approval to market an animal prescription drug for a particular species, we must provide the FDA with safety and efficacy data from pivotal trials that adequately demonstrate that our prescription drug product candidates are safe and effective in the target species (e.g. dogs, cats or horses) for the intended indications. In addition, we must provide manufacturing data evidencing that we can produce our product candidates in accordance with cGMP. For the FDA, we must also provide data from toxicology studies, also called target animal safety

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studies, and in some cases environmental impact data. In addition to our internal activities, we will partially rely on contract research organizations ("CROs"), and other third parties to conduct our toxicology studies and for certain other product development activities. The results of toxicology studies, other initial development activities, and/or any previous studies in humans or animals conducted by us or third parties may not be predictive of future results of pivotal trials or other future studies, and failure can occur at any time during the conduct of pivotal trials and other development activities by us or our CROs. Our pivotal trials may fail to show the desired safety or efficacy of our prescription drug product candidates despite promising initial data or the results in previous human or animal studies conducted by others. Success of a prescription drug product candidate in prior animal studies, or in the treatment of humans, does not ensure success in subsequent studies. Clinical trials in humans and pivotal trials in animals sometimes fail to show a benefit even for drugs that are effective because of statistical limitations in the design of the trials or other statistical anomalies. Therefore, even if our studies and other development activities are completed as planned, the results may not be sufficient to obtain a required regulatory approval for a product candidate.

Regulatory authorities can delay, limit or deny approval of any of our prescription drug product candidates for many reasons, including:

if they disagree with our interpretation of data from our pivotal studies or other development efforts;

if we are unable to demonstrate to their satisfaction that our product candidate is safe and effective for the target indication and, if applicable, in the target species;

if they require additional studies or change their approval policies or regulations;

if they do not approve of the formulation, labeling or the specifications of our current and future product candidates; and

if they fail to approve the manufacturing processes of our third-party contract manufacturers.

Further, even if we receive a required approval, such approval may be for a more limited indication than we originally requested, and the regulatory authority may not approve the labeling that we believe is necessary or desirable for successful commercialization.

Any delay or failure in obtaining any necessary regulatory approval for the intended indications of our human or animal product candidates would delay or prevent commercialization of such product candidates and would harm our business and our operating results.

***The results of our earlier studies of Mytesi and Neonorm may not be predictive of the results in any future clinical trials and species-specific formulation studies, respectively, and we may not be successful in our efforts to develop or commercialize line extensions of Mytesi and Neonorm.***

Our human and animal product pipeline includes a number of potential indications of Mytesi, our lead prescription product, and a number of species-specific formulations of Neonorm, our commercially available non-prescription product. The results of our studies and other development activities and of any previous studies in humans or animals conducted by us or third parties may not be predictive of future results of these clinical studies and formulation studies, respectively. Failure can occur at any time during the conduct of these trials and other development activities. Even if our formulation/clinical studies and other development activities are completed as planned, the results may not be sufficient to pursue a particular line extension for Mytesi or Neonorm, respectively. Further, even if we obtain promising results from our clinical trials or species-specific formulation studies, as applicable, we may not successfully commercialize any line extension. Because line extensions are developed for a particular market, we may not be able to leverage our experience from the commercial launch of Mytesi, Neonorm Calf and Neonorm Foal in new markets. If we are not successful in developing and



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successfully commercializing these line extension products, we may not be able to grow our revenue and our business may be harmed.

***Development of prescription drug products is inherently expensive, time-consuming and uncertain, and any delay or discontinuance of our current or future pivotal trials would harm our business and prospects.***

Development of prescription drug products for human and animal gastrointestinal health remains an inherently lengthy, expensive and uncertain process, and our development activities may not be successful. We do not know whether our current or planned pivotal trials for any of our product candidates will begin or conclude on time, and they may be delayed or discontinued for a variety of reasons, including if we are unable to:

address any safety concerns that arise during the course of the studies;

complete the studies due to deviations from the study protocols or the occurrence of adverse events;

add new study sites;

address any conflicts with new or existing laws or regulations; or

reach agreement on acceptable terms with study sites, which can be subject to extensive negotiation and may vary significantly among different sites.

Further, we may not be successful in developing new indications for Mytesi and/or species-specific formulations for Neonorm, and Neonorm may be subject to the same regulatory regime as prescription drug products in jurisdictions outside the United States. Any delays in completing our development efforts will increase our costs, delay our development efforts and approval process and jeopardize our ability to commence product sales and generate revenue. Any of these occurrences may harm our business, financial condition and prospects. In addition, factors that may cause a delay in the commencement or completion of our development efforts may also ultimately lead to the denial of regulatory approval of our product candidates which, as described above, would harm our business and prospects.

***We will partially rely on third parties to conduct our development activities. If these third parties do not successfully carry out their contractual duties, we may be unable to obtain regulatory approvals or commercialize our current or future human or animal product candidates on a timely basis, or at all.***

We will partially rely upon CROs to conduct our toxicology studies and for other development activities. We intend to rely on CROs to conduct one or more of our planned pivotal trials. These CROs are not our employees, and except for contractual duties and obligations, we have limited ability to control the amount or timing of resources that they devote to our programs or manage the risks associated with their activities on our behalf. We are responsible for ensuring that each of our studies is conducted in accordance with the development plans and trial protocols presented to regulatory authorities. Any deviations by our CROs may adversely affect our ability to obtain regulatory approvals, subject us to penalties or harm our credibility with regulators. The FDA and foreign regulatory authorities also require us and our CROs to comply with regulations and standards, commonly referred to as good clinical practices ("GCPs"), or good laboratory practices ("GLPs"), for conducting, monitoring, recording and reporting the results of our studies to ensure that the data and results are scientifically valid and accurate.

Agreements with CROs generally allow the CROs to terminate in certain circumstances with little or no advance notice. These agreements generally will require our CROs to reasonably cooperate with us at our expense for an orderly winding down of the CROs' services under the agreements. If the CROs conducting our studies do not comply with their contractual duties or obligations, or if they

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experience work stoppages, do not meet expected deadlines, or if the quality or accuracy of the data they obtain is compromised, we may need to secure new arrangements with alternative CROs, which could be difficult and costly. In such event, our studies also may need to be extended, delayed or terminated as a result, or may need to be repeated. If any of the foregoing were to occur, regulatory approval, if required, and commercialization of our product candidates may be delayed and we may be required to expend substantial additional resources.

***Even if we obtain regulatory approval for planned follow-on indications of Mytesi, or for Canalevia or our other product candidates, they may never achieve market acceptance. Further, even if we are successful in the ongoing commercialization of Mytesi and Neonorm, we may not achieve commercial success.***

If we obtain necessary regulatory approvals for planned follow-on indications of Mytesi or for Canalevia or our other product candidates, such products may still not achieve market acceptance and may not be commercially successful. Market acceptance of Mytesi, Canalevia, Neonorm and any of our other products depends on a number of factors, including:

the safety of our products as demonstrated in our target animal studies;

the indications for which our products are approved or marketed;

the potential and perceived advantages over alternative treatments or products, including generic medicines and competing products currently prescribed by physicians or veterinarians, as applicable, and, in the case of animal products, products approved for use in humans that are used extra-label in animals;

the acceptance by physicians, veterinarians, companion animal owners and production animal owners, including in the dairy industry, as applicable, of our products as safe and effective;

the cost in relation to alternative treatments and willingness on the part of physicians, veterinarians, patients and animal owners, as applicable, to pay for our products;

the prevalence and severity of any adverse side effects of our products;

the relative convenience and ease of administration of our products; and

the effectiveness of our sales, marketing and distribution efforts.

Any failure by Mytesi, Canalevia, Equilevia, Neonorm or any of our other products to achieve market acceptance or commercial success would harm our financial condition and results of operations.

***The dairy industry is subject to conditions beyond our control and the occurrence of any such conditions may harm our business and impact the demand for our products.***

The demand for production animal health products, such as Neonorm Calf, is heavily dependent on factors that affect the dairy market that are beyond our control, including the following, any of which may harm our business:

cost containment measures within the dairy industry, in response to international, national and local general economic conditions, which may affect the market adoption of our products;

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state and federal government policies, including government-funded programs or subsidies whose discontinuance or modification could erode the demand for our products;

a decline in demand for dairy products due to changes in consumer diets away from dairy products, which could adversely affect the demand for production animal health products;

adverse weather conditions and natural disasters, such as floods, droughts, and pestilence, which can lower dairy yields; and

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disease or other conditions beyond our control.

***Human and animal gastrointestinal health products are subject to unanticipated post-approval safety or efficacy concerns, which may harm our business and reputation.***

The success of our commercialization efforts will depend upon the perceived safety and effectiveness of human and animal gastrointestinal health products, in general, and of our products, in particular. Unanticipated safety or efficacy concerns can subsequently arise with respect to approved prescription drug products, such as Mytesi, or non-prescription products, such as Neonorm, which may result in product recalls or withdrawals or suspension of sales, as well as product liability and other claims. Any safety or efficacy concerns, or recalls, withdrawals or suspensions of sales of our products could harm our reputation and business, regardless of whether such concerns or actions are justified.

***Future federal and state legislation may result in increased exposure to product liability claims, which could result in substantial losses.***

Under current federal and state laws, companion and production animals are generally considered to be the personal property of their owners and, as such, the owners' recovery for product liability claims involving their companion and production animals may be limited to the replacement value of the animal. Companion animal owners and their advocates, however, have filed lawsuits from time to time seeking non-economic damages such as pain and suffering and emotional distress for harm to their companion animals based on theories applicable to personal injuries to humans. If new legislation is passed to allow recovery for such non-economic damages, or if precedents are set allowing for such recovery, we could be exposed to increased product liability claims that could result in substantial losses to us if successful. In addition, some horses can be worth millions of dollars or more, and product liability for horses may be very high. While we currently have product liability insurance, such insurance may not be sufficient to cover any future product liability claims against us.

***If we fail to retain current members of our senior management, or to identify, attract, integrate and retain additional key personnel, our business will be harmed.***

Our success depends on our continued ability to attract, retain and motivate highly qualified management and scientific personnel. We are highly dependent upon our senior management, particularly Lisa A. Conte, our president and Chief Executive Officer. The loss of services of any of our key personnel would cause a disruption in our ability to develop our current or future product pipeline and commercialize our products and product candidates. Although we have offer letters with these key members of senior management, such agreements do not prohibit them from resigning at any time. For example, the resignation of our former Chief Financial Officer, Charles O. Thompson, in September 2014, and the mutually agreed departure of our former Chief Veterinary Officer, Serge Martinod, D.V.M., Ph.D. in February 2015, caused us to incur additional expenses and expend resources to ensure a smooth transition with their respective successors, which diverted management attention away from executing our operational plan during this period. We currently do not maintain "key man" life insurance on any of our senior management team. The loss of Ms. Conte or other members of our current senior management could adversely affect the timing or outcomes of our current and planned studies, as well as the prospects for commercializing our products.

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In addition, competition for qualified personnel in the human and animal gastrointestinal health fields is intense, because there are a limited number of individuals who are trained or experienced in the field. Further, our headquarters are located in San Francisco, California, and the dairy and agriculture industries are not prevalent in urban areas such as San Francisco. We will need to hire additional personnel as we expand our product development and commercialization activities. Even if we are successful in hiring qualified individuals, as we are a growing organization, we do not have a track record for integrating and retaining individuals. If we are not successful in identifying, attracting, integrating or retaining qualified personnel on acceptable terms, or at all, our business will be harmed.

***We are dependent on two suppliers for the raw material used to produce the active pharmaceutical ingredient in Mytesi and Canalevia and the botanical extract in Neonorm and Equilevia. The termination of either of these contracts would result in a disruption to product development and our business will be harmed.***

The raw material used to manufacture Mytesi, Canalevia, Neonorm and Equilevia is crude plant latex ("CPL"), derived from the *Croton lechleri* tree, which is found in countries in South America, principally Peru. The ability of our contract suppliers to harvest CPL is governed by the terms of their respective agreements with local government authorities. Although CPL is available from multiple suppliers, we only have contracts with two suppliers to obtain CPL and arrange the shipment to our contract manufacturer. Accordingly, if our contract suppliers do not or are unable to comply with the terms of our respective agreements, and we are not able to negotiate new agreements with alternate suppliers on terms that we deem commercially reasonable, it may harm our business and prospects. The countries from which we obtain CPL could change their laws and regulations regarding the export of the natural products or impose or increase taxes or duties payable by exporters of such products. Restrictions could be imposed on the harvesting of the natural products or additional requirements could be implemented for the replanting and regeneration of the raw material. Such events could have a significant impact on our cost and ability to produce Mytesi, Canalevia, Neonorm, Equilevia and anticipated line extensions.

***We are dependent upon third-party contract manufacturers, both for the supply of the active pharmaceutical ingredient in Mytesi and Canalevia and the botanical extract in Neonorm and Equilevia, as well as for the supply of finished products for commercialization.***

We have contracted with third parties for the formulation of API and botanical extract into finished products for our studies. We have also entered into memorandums of understanding with Indena S.p.A. for the manufacture of CPL received from our suppliers into the API in Canalevia to support our regulatory filings, as well as the botanical extract in Neonorm and agreed to negotiate a commercial supply agreement. Indena S.p.A. has never manufactured either such ingredient to commercial scale. As a second supplier situation, we have entered into a four-year manufacturing and supply agreement with Glenmark for the supply of the API in Canalevia. Glenmark is the current manufacturer of crofelemer, the active API in Canalevia, for Mytesi, and the manufacturer on file for the NADA to which we have a right of reference. As announced in October of 2015, we have entered an agreement with Patheon, a provider of drug development and delivery solutions, under which Patheon provides enteric-coated tablets to us for use in animals. We also may contract with additional third parties for the formulation and supply of finished products, which we will use in our planned studies and commercialization efforts.

We will be dependent upon our contract manufacturers for the supply of the API in Mytesi and Canalevia. We currently have sufficient quantities of the botanical extract used in Neonorm and Equilevia to support initial commercialization of Neonorm and Equilevia. However, we will require additional quantities of the botanical extract if our ongoing commercial launch of Neonorm or our commercial launch of and Equilevia is successful. If we are not successful in reaching agreements with third parties on terms that we consider commercially reasonable for manufacturing and formulation, or

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if our contract manufacturer and formulator are not able to produce sufficient quantities or quality of API, botanical extract or finished product under their agreements, it could delay our plans and harm our business prospects.

The facilities used by our third-party contractors are subject to inspections, including by the FDA, and other regulators, as applicable. We also depend on our third-party contractors to comply with cGMP. If our third-party contractors do not maintain compliance with these strict regulatory requirements, we and they will not be able to secure or maintain regulatory approval for their facilities, which would have an adverse effect on our operations. In addition, in some cases, we also are dependent on our third-party contractors to produce supplies in conformity to our specifications and maintain quality control and quality assurance practices and not to employ disqualified personnel. If the FDA or a comparable foreign regulatory authority does not approve the facilities of our third-party contractors if so required, or if it withdraws any such approval in the future, we may need to find alternative manufacturing or formulation facilities, which could result in delays in our ability to develop or commercialize our human and animal products, if at all. We and our third-party contractors also may be subject to penalties and sanctions from the FDA and other regulatory authorities for any violations of applicable regulatory requirements. The USDA and the European Medicines Agency (the "EMA"), employ different regulatory standards than the FDA, so we may require multiple manufacturing processes and facilities for the same human or animal product candidate or any approved product. We are also exposed to risk if our third-party contractors do not comply with the negotiated terms of our agreements, or if they suffer damage or destruction to their facilities or equipment.

***If we are unable to establish sales capabilities on our own or through third parties, we may not be able to market and sell our current or future human or animal products and product candidates, if approved, and generate product or other revenue.***

We currently have limited sales, marketing or distribution capabilities, and prior to Napo's launch of Mytesi for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy, and our launch of Neonorm for preweaned dairy calves, we had no experience in the sale, marketing and distribution of human or animal health products. There are significant risks involved in building and managing a sales organization, including our potential inability to attract, hire, retain and motivate qualified individuals, generate sufficient sales leads, provide adequate training to sales and marketing personnel and effectively oversee a geographically dispersed sales and marketing team. Any failure or delay in the development of our internal sales, marketing and distribution capabilities and entry into adequate arrangements with distributors or other partners would adversely impact the commercialization of Mytesi, Neonorm, Equilevia and, if approved, Canalevia. If we are not successful in commercializing Mytesi, Neonorm, Equilevia, Canalevia or any of our other line extension products, either on our own or through one or more distributors, or in generating upfront licensing or other fees, we may never generate significant revenue and may continue to incur significant losses, which would harm our financial condition and results of operations.

***Changes in distribution channels for animal health prescription drugs may make it more difficult or expensive to distribute our animal health prescription drug products.***

In the United States, animal owners typically purchase their animal health prescription drugs from their local veterinarians who also prescribe such drugs. There is a trend, however, toward increased purchases of animal health prescription drugs from Internet-based retailers, "big-box" retail stores and other over-the-counter distribution channels, which follows an emerging shift in recent years away from the traditional veterinarian distribution channel. It is also possible that animal owners may come to rely increasingly on Internet-based animal health information rather than on their veterinarians. We currently expect to market our animal health prescription drugs directly to veterinarians, so any

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reduced reliance on veterinarians by animal owners could harm our business and prospects by making it more difficult or expensive for us to distribute our animal health prescription drug products.

Legislation has been or may be proposed in various states that would require veterinarians to provide animal owners with written prescriptions and disclosures that the animal owner has the right to fill the prescriptions through other means. If enacted, such legislation could lead to a reduction in the number of animal owners who purchase their animal health pharmaceuticals directly from veterinarians, which also could harm our business.

***Consolidation of our customers could negatively affect the pricing of our animal health products.***

Veterinarians will be our primary customers for our prescription animal health drug products, as well as, to some extent, our non-prescription animal health products, such as Neonorm and Equilevia. In recent years, there has been a trend towards the consolidation of veterinary clinics and animal hospitals. If this trend continues, these large clinics and hospitals could attempt to leverage their buying power to obtain favorable pricing from us and other animal health product companies. Any downward pressure on the prices of any of our animal health products could harm our operating results and financial condition.

***We will need to increase the size of our organization and may not successfully manage such growth.***

As of August 31, 2017, we had 25 full-time equivalent (FTE) employees. Our ability to manage our growth effectively will require us to hire, train, retain, manage and motivate additional employees and to implement and improve our operational, financial and management systems. These demands also may require the hiring of additional senior management personnel or the development of additional expertise by our senior management personnel. If we fail to expand and enhance our operational, financial and management systems in conjunction with our potential future growth, it could harm our business and operating results.

***Research and development with respect to our animal health products and product candidates relies on evaluations in animals, which is controversial and may become subject to bans or additional regulations.***

The evaluation of our animal health products and product candidates in target animals is required to develop, formulate and commercialize our animal health products and product candidates. Although our animal testing will be subject to GLPs and GCPs, as applicable, animal testing in the human pharmaceutical industry and in other industries continues to be the subject of controversy and adverse publicity. Some organizations and individuals have sought to ban animal testing or encourage the adoption of additional regulations applicable to animal testing. To the extent that such bans or regulations are imposed, our research and development activities with respect to animal health products, and by extension our operating results and financial condition, could be harmed. In addition, negative publicity about animal practices by us or in our industry could harm our reputation among potential customers.

***If approved, our animal health prescription drug product candidates may be marketed in the United States only in the target animals and for the indications for which they are approved, and if we want to expand the approved animals or indications, it will need to obtain additional approvals, which may not be granted.***

If our animal health prescription drug product candidates are approved by regulatory authorities, we may market or advertise them only in the specific species and for treatment of the specific indications for which they were approved, which could limit use of the products by veterinarians and animal owners. We intend to develop, promote and commercialize approved products for other animals and new treatment indications in the future, but we cannot be certain whether or at what additional

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time and expense we will be able to do so. If we do not obtain marketing approvals for other species or for new indications, our ability to expand our animal health business may be harmed.

Under the Animal Medicinal Drug Use Clarification Act of 1994, veterinarians are permitted to prescribe extra-label uses of certain approved animal drugs and approved human drugs for animals under certain conditions. While veterinarians may in the future prescribe and use human-approved products or use our products for extra-label uses, we may not promote our animal health products for extra-label uses. We note that extra-label uses are uses for which the product has not received approval. If the FDA determines that any of our marketing activities constitute promotion of an extra-label use, we could be subject to regulatory enforcement, including seizure of any misbranded or mislabeled drugs, and civil or criminal penalties, any of which could have an adverse impact on our reputation and expose us to potential liability. We will continue to spend resources ensuring that our promotional claims for our animal health products and product candidates remain compliant with applicable FDA laws and regulations, including materials we post or link to on our website. For example, in 2012, our Chief Executive Officer received an "untitled letter" from the FDA while at Napo regarding preapproval promotion statements constituting misbranding of crofelemer, which was then an investigational drug. These statements were included in archived press releases included on Napo's website. Napo was required to expend time and resources to revise its website to remove the links in order to address the concerns raised in the FDA's letter.

***If our human or animal prescription drug product candidates are approved by regulatory authorities, the misuse or extra-label use of such products may harm our reputation or result in financial or other damages.***

If our human or animal prescription drug product candidates are approved by regulatory authorities, there may be increased risk of product liability if physicians, veterinarians, patients, animal owners or others, as applicable, attempt to use such products extra-label, including the use of our products for indications or in species for which they have not been approved. Furthermore, the use of an approved human or animal drug for indications other than those indications for which such products have been approved may not be effective, which could harm our reputation and lead to an increased risk of litigation. If we are deemed by a governmental or regulatory agency to have engaged in the promotion of any approved human or animal product for extra-label use, such agency could request that we modify our training or promotional materials and practices and we could be subject to significant fines and penalties, and the imposition of these sanctions could also affect our reputation and position within the gastrointestinal health industry. Any of these events could harm our reputation and our operating results.

***We may not maintain the benefits associated with MUMS designation, including market exclusivity.***

Although we have received MUMS designation for Canalevia for the treatment of CID in dogs, we may not maintain the benefits associated with MUMS designation. MUMS designation is a status similar to "orphan drug" status for human drugs. When we were granted MUMS designation for Canalevia for the indication of CID in dogs, we became eligible for incentives to support the approval or conditional approval of the designated use. This designation does not allow us to commercialize a product until such time as we obtain approval or conditional approval of the product.

Because Canalevia has received MUMS designation for the identified particular intended use, we are eligible to obtain seven years of exclusive marketing rights upon approval (or conditional approval) of Canalevia for that intended use and become eligible for grants to defray the cost of our clinical work. Each designation that is granted must be unique, *i.e.*, only one designation can be granted for a particular API in a particular dosage form for a particular intended use. The intended use includes both the target species and the disease or condition to be treated.



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At some point, we could lose MUMS designation. The basis for a lost designation can include but is not limited to, our failure to engage with due diligence in moving forward with a non-conditional approval, or a competing product has received conditional approval or approval prior to our product candidate for the same indication or species. In addition, MUMS designation may be withdrawn for a variety of reasons such as where the FDA determines that the request for designation was materially defective, or if the manufacturer is unable to assure sufficient quantity of the prescription drug product to meet the needs of animals with the rare disease or condition. If this designation is lost, it could have a negative impact on the product and us, which includes but is not limited to, market exclusivity related to MUMS designation, or eligibility for grants as a result of MUMS designation.

***The market for our human or animal products, and the gastrointestinal health market as a whole, is uncertain and may be smaller than we anticipate, which could lead to lower revenue and harm our operating results.***

It is very difficult to estimate the commercial potential of any of our human or animal products because the gastrointestinal health market continues to evolve and it is difficult to predict the market potential for our products. The market will depend on important factors such as safety and efficacy compared to other available treatments, changing standards of care, preferences of physicians and veterinarians, as applicable, the willingness of patients and companion and production animal owners, as applicable, to pay for such products, and the availability of competitive alternatives that may emerge either during the product development process or after commercial introduction. If the market potential for our human or animal products is less than we anticipate due to one or more of these factors, it could negatively impact our business, financial condition and results of operations. Further, the willingness of patients and companion and production animal owners to pay for our products may be less than we anticipate, and may be negatively affected by overall economic conditions. Moreover, with respect to our animal health products, the current penetration of animal insurance in the United States is low, animal owners are likely to have to pay out-of-pocket, and such owners may not be willing or able to pay for our products.

***Insurance coverage for Mytesi for its current approved indication could decrease or end, or Mytesi might not receive insurance coverage for any approved follow-on indications, which could lead to lower revenue and harm our operating results.***

For its current approved indication, Mytesi is currently covered by all of the top 10 commercial insurance plans, representing more than 245 million U.S. lives. In 50% of these plans it is currently on Tier 3 with no restrictions, and in 50% it is currently on Tier 3 with a prior authorization required. In the top 10 Managed Medicare plans, which represent 24 million covered lives, Mytesi is currently covered on 10% of plans. Mytesi is currently covered on Medicaid in all 50 states. However, the nature or extent of coverage for Mytesi by any of these plans or programs could change or be terminated, or Mytesi might not receive insurance coverage for any approved follow-on indications. Either outcome could lead to significantly lower revenue and significantly harm our operating results.

***If we fail to maintain effective internal control over financial reporting in the future, the accuracy and timing of our financial reporting may be adversely affected.***

Our management is responsible for establishing and maintaining adequate internal control over our financial reporting, as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934, as amended (the "Exchange Act").

Preparing our consolidated financial statements involves a number of complex manual and automated processes, which are dependent upon individual data input or review and require significant management judgment. One or more of these elements may result in errors that may not be detected and could result in a material misstatement of our consolidated financial statements. If we fail to

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maintain the adequacy of our internal controls over financial reporting, our business and operating results may be harmed and we may fail to meet our financial reporting obligations. If material weaknesses in our internal control are discovered or occur, our consolidated financial statements may contain material misstatements and we could be required to restate our financial results.

Our internal control over financial reporting may not prevent or detect misstatements because of its inherent limitations, including the possibility of human error, the circumvention or overriding of controls, or fraud. Even effective internal controls can provide only reasonable assurance with respect to the preparation and fair presentation of financial statements. Any failure of our internal controls could adversely affect the results of the periodic management evaluations regarding the effectiveness of our internal control over financial reporting. If we cannot provide reliable financial reports or prevent fraud, our business and results of operations could be harmed, investors could lose confidence in our reported financial information, and the trading price of our stock may decline.

***We may engage in future acquisitions that increase our capital requirements, dilute our stockholders, cause us to incur debt or assume contingent liabilities and subject us to other risks.***

We may evaluate various strategic transactions, including licensing or acquiring complementary products, technologies or businesses. Any potential acquisitions may entail numerous risks, including increased operating expenses and cash requirements, assimilation of operations and products, retention of key employees, diversion of our management's attention and uncertainties in our ability to maintain key business relationships of the acquired entities. In addition, if we undertake acquisitions, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

***Certain of the countries in which we plan to commercialize our products in the future are developing countries, some of which have potentially unstable political and economic climates.***

We may commercialize our products in jurisdictions that are developing and emerging countries. This may expose us to the impact of political or economic upheaval, and we could be subject to unforeseen administrative or fiscal burdens. At present, we are not insured against the political and economic risks of operating in these countries. Any significant changes to the political or economic climate in any of the developing countries in which we operate or plan to sell products either now or in the future may have a substantial adverse effect on our business, financial condition, trading performance and prospects.

***Fluctuations in the exchange rate of foreign currencies could result in currency transactions losses.***

As we expand our operations, we expect to be exposed to risks associated with foreign currency exchange rates. We anticipate that we will commercialize Neonorm for preweaned dairy calves and its line extensions, as well as possibly Canalevia and its line extensions in jurisdictions outside the United States. As a result, we will also be further affected by fluctuations in exchange rates in the future to the extent that sales are denominated in currencies other than U.S. dollars. We do not currently employ any hedging or other strategies to minimize this risk, although we may seek to do so in the future.

***The unaudited pro forma combined condensed financial statements incorporated by reference in this document are preliminary and the actual financial condition and results of operations after the Merger may differ materially.***

The unaudited pro forma combined condensed financial statements incorporated by reference in this prospectus supplement are presented for illustrative purposes only and are not necessarily

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indicative of what our actual financial condition or results of operations would have been had the Merger been completed on the dates indicated. The unaudited pro forma combined condensed financial statements reflect adjustments to illustrate the effect of the Merger had it been completed on the dates indicated, which are based upon preliminary estimates, to record the Napo identifiable assets acquired and liabilities assumed at fair value and the resulting goodwill recognized. The purchase price allocation for the Merger reflected in the pro forma combined financial statements is preliminary, and final allocation of the purchase price will be based upon the actual purchase price and the fair value of the assets and liabilities of Napo as of the date of the completion of the Merger. Accordingly, the final acquisition accounting adjustments may differ materially from the pro forma adjustments reflected in financial statements incorporated by reference in this document.

***There are other gastrointestinal-focused human pharmaceutical companies, and we face competition in the marketplaces in which we operate or plan to operate.***

Our commercial success in the human drug arena remains dependent on maintaining or establishing a competitive position in the market for the current, approved specialty indication of Mytesi as well as for planned Mytesi follow-on indications. In the IBS-D market in particular, several competitors have commercially available products approved for our planned IBS-D indication. The availability of our competitors' products could limit the demand, and the price we are able to charge, for any drug candidate we develop. The inability to compete with existing or subsequently introduced drug candidates would have a material adverse impact on our business, financial condition and prospects.

***Our obligations to Hercules, and subject to certain events, to CVP, are secured by a security interest in substantially all of our veterinary related assets, so if we default on those obligations, Hercules or CVP could foreclose on our assets.***

Our obligations under the loan and security agreement with Hercules Capital, Inc. (f/k/a Hercules Technology Growth Capital, Inc.) ("Hercules") are secured by a security interest in substantially all of our veterinary related assets, including intellectual property. As a result, if we default on our obligations under the loan and security agreement (the "Hercules Debt"), Hercules could foreclose on its security interests and liquidate some or all of these assets, which would harm our veterinary related business, financial condition and results of operations and could require us to reduce or cease operations. In addition, Chicago Venture Partners, L.P. ("CVP") may acquire a security interest in substantially all of our veterinary related assets upon the earlier of CVP purchasing Hercules Debt or the repayment in full of the Hercules Debt, as provided in the Security Agreement, dated June 29, 2017, between us and CVP and the Subordination Agreement and Right to Purchase Debt, dated June 29, 2017, by and among us, CVP and Hercules.

***Napo's obligations to the holders of the Kingdon Notes are secured by a security interest in substantially all of Napo's assets, so if we default on those obligations, the convertible note holders could foreclose on Napo's assets.***

Napo's obligations under the convertible promissory notes (the "Kingdon Notes") issued pursuant to the Amended and Restated Note Purchase Agreement, dated March 31, 2017, by and among Kingdon Associates, M. Kingdon Offshore Master Fund L.P., Kingdon Family Partnership, L.P. and Kingdon Credit Master Fund L.P. (collectively, the "Kingdon Purchasers") and Napo and the related transaction documents are secured by a security interest in substantially all of Napo's assets, including Napo intellectual property. As a result, if we default under our obligations under the Kingdon Notes or the transaction documents, the holders of such Kingdon Notes, acting through their appointed agent, could foreclose on their security interests and liquidate some or all of these assets, which would harm

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our business, financial condition and results of operations and could require us to reduce or cease operations.

**Risks Related to Intellectual Property**

*We cannot be certain that our patent strategy will be effective to protect against competition*

Our commercial success depends in large part on obtaining and maintaining patent, trademark and trade secret protection of our human or animal products, both prescription and non-prescription, our current human or animal product candidates and any future human or animal product candidates, and their respective components, formulations, methods used to manufacture them and methods of treatment, as well as successfully defending our patents and other intellectual property rights against third-party challenges. Our ability to stop unauthorized third parties from making, using, selling, offering to sell or importing our products or our product candidates is dependent upon the extent to which we have rights under valid and enforceable patents, trade secrets and other similar intellectual property that cover these activities. The patent prosecution process is expensive and time-consuming, and we may not be able to prepare, file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of inventions made in the course of development and commercialization activities in time to obtain patent protection on them.

We have a portfolio of United States and foreign issued patents and pending applications related to our products and product candidates. We have five issued United States patents listed in the FDA's Orange Book for Mytesi. We plan to rely on certain of these issued patents as protection for Canalevia. The strength of patents in the field of pharmaceuticals and animal health involves complex legal and scientific questions and can be uncertain. We cannot be certain that pending applications will issue as patents. For those patents that are already issued and even if other patents do successfully issue, third parties may challenge their validity, enforceability or scope, which may result in such patents being narrowed, invalidated or held unenforceable. Furthermore, even if they are unchallenged, our patents may not adequately protect our intellectual property or prevent others from designing around their claims. If the patents we have are not maintained or their scope is significantly narrowed or if we are not able to obtain issued patents from pending applications, our business and prospects would be harmed.

Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of any patent applications and the enforcement or defense of any patents that issue. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted, redefine prior art, may affect patent litigation, and switch the U.S. patent system from a "first-to-invent" system to a "first-to-file" system. Under a "first-to-file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The USPTO has developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first-to-file provisions, became effective on March 16, 2013. Among some of the other changes to the patent laws are changes that limit where a patentee may file a patent infringement suit and that provide opportunities for third parties to challenge any issued patent in the USPTO. The Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our patents and any other patents that issue, all of which could harm our business and financial condition.

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

Periodic maintenance and annuity fees on any issued patent and, in certain jurisdictions, pending applications, are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of the patent. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. If we fail to maintain the patents and patent applications covering our prescription drug products, prescription drug product candidates and non-prescription products, our competitors might be able to enter the market, which would harm our business.

***Third parties may initiate legal proceedings alleging that we are infringing their intellectual property rights, which would be costly, time-consuming and, if successfully asserted against us, delay or prevent the development and commercialization of our current or future products and product candidates.***

Our research, development and commercialization activities may infringe or otherwise violate or be claimed to infringe or otherwise violate patents owned or controlled by other parties. There may be patents already issued of which we are unaware that might be infringed by a product or one of our current or future prescription drug product candidates or non-prescription products. Moreover, it is also possible that patents may exist that we are aware of, but that we do not believe are relevant to our current or future prescription drug product candidates or non-prescription products, which could nevertheless be found to block our freedom to market these products. Because patent applications can take many years to issue and may be confidential for 18 months or more after filing, there may be applications now pending of which we are unaware and which may later result in issued patents that may be infringed by our current or future prescription drug product candidates or non-prescription products. We cannot be certain that our products, current or future prescription drug product candidates or non-prescription products will not infringe these or other existing or future third-party patents. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents.

To the extent we become subject to future third-party claims against us or our collaborators, we could incur substantial expenses and, if any such claims are successful, we could be liable to pay substantial damages, including treble damages and attorney's fees if we or our collaborators are found to be willfully infringing a third party's patents. If a patent infringement suit were brought against us or our collaborators, we or they could be forced to stop or delay research, development, manufacturing or sales of the human or animal prescription drug or non-prescription product that is the subject of the suit. Even if we are successful in defending such claims, infringement and other intellectual property claims can be expensive and time-consuming to litigate and divert management's attention from our business and operations. As a result of or in order to avoid potential patent infringement claims, we or our collaborators may be compelled to seek a license from a third party for which we would be required to pay license fees or royalties, or both. Moreover, these licenses may not be available on acceptable terms, or at all. Even if we or our collaborators were able to obtain such a license, the rights may be nonexclusive, which could allow our competitors access to the same intellectual property. Any of these events could harm our business and prospects.

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***Our proprietary position depends upon patents that are formulation or method-of-use patents, which do not prevent a competitor from using the same human or animal drug for another use.***

Composition-of-matter patents on the API in prescription drug products are generally considered to be the strongest form of intellectual property protection because such patents provide protection without regard to any particular method of use or manufacture or formulation of the API used. The composition-of-matter patents for crofelemer, the API in Mytesi and Canalevia, have expired, and the issued patents and applications relevant to our products and product candidates cover formulations and methods of use for crofelemer and the botanical extract in Neonorm and Equilevia.

Method-of-use patents protect the use of a product for the specified method and formulation patents cover formulations of the API or botanical extract. These types of patents do not prevent a competitor from developing or marketing an identical product for an indication that is outside the scope of the patented method or from developing a different formulation that is outside the scope of the patented formulation. Moreover, with respect to method-of-use patents, even if competitors do not actively promote their product for our targeted indications or uses for which we may obtain patents, physicians may recommend that patients use our products extra-label, and veterinarians may recommend that animal owners use these products extra-label, or animal owners may do so themselves. Although extra-label use may infringe or contribute to the infringement of method-of-use patents, the practice is common and such infringement is difficult to prevent or prosecute.

***We may be involved in lawsuits to protect or enforce our patents, which could be expensive, time-consuming and unsuccessful, and third parties may challenge the validity or enforceability of our patents and they may be successful.***

We intend to rely upon a combination of regulatory exclusivity periods, patents, trade secret protection, and confidentiality agreements to protect the intellectual property related to Mytesi, our current prescription drug product candidates, non-prescription products and our development programs.

If the breadth or strength of protection provided by any patents, patent applications or future patents we may own, license, or pursue with respect to any of our current or future product candidates or products is threatened, it could threaten our ability to commercialize any of our current or future human or animal product candidates or products. Further, if we encounter delays in our development efforts, the period of time during which we could market any of our current or future product candidates or products under any patent protection we obtain would be reduced.

Given the amount of time required for the development, testing and regulatory review of new product candidates or products, patents protecting such candidates might expire before or shortly after such product candidates or products are commercialized. Patent term extension has been applied for US 7,341,744 to account for regulatory delays in obtaining human marketing approval for crofelemer. The FDA and the USPTO have confirmed that US 7,341,744 is eligible for an extension of 1075 days and we await issuance of the patent term extension certificate. With respect to requests for patent term extensions, the applicable authorities, including the USPTO and the FDA, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to patents, or may grant more limited extensions than requested. If this occurs, our competitors may take advantage of our investment in development and trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case.

Even where laws provide protection or we are able to obtain patents, costly and time-consuming litigation may be necessary to enforce and determine the scope of our proprietary rights, and the outcome of such litigation would be uncertain. Moreover, any actions we may bring to enforce our intellectual property against our competitors could provoke them to bring counterclaims against us, and some of our competitors have substantially greater intellectual property portfolios than we have. To

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counter infringement or unauthorized use of any patents we may obtain, we may be required to file infringement claims, which can be expensive and time-consuming to litigate. In addition, if we or one of our future collaborators were to initiate legal proceedings against a third party to enforce a patent covering one of our products, current product candidates, or one of our future products, the defendant could counterclaim that the patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace and challenges to validity of patents in certain foreign jurisdictions is common as well. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, non-enablement or lack of statutory subject matter. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant material information from the USPTO, or made a materially misleading statement, during prosecution. In particular, Mytesi has regulatory exclusivity as a new chemical entity until December 31, 2017. Under the Hatch-Waxman Act, a competitor seeking to market a generic form of Mytesi before the expiration of any of the patents listed in the FDA's Orange Book for Mytesi could file (and could have filed after December 31, 2016) an ANDA with a certification under 21 U.S.C. § 355(j)(2)(A)(iv) that each of these patents (except for those which the ANDA filer states it will market only after its expiration) is either invalid, unenforceable or not infringed. We may assert the patents in Hatch-Waxman litigation against the party filing the ANDA to keep the competing product off of the market until the patents expire but there is a risk that we will not succeed. The party filing the ANDA may also counterclaim in the litigation that the our patents are not valid or unenforceable, and the court may find one or more claims of our patents invalid or unenforceable. If this occurs, a competing generic product could be marketed prior to expiration of our patents listed in the Orange Book, which would harm our business.

Third parties may also raise similar validity claims before the USPTO in post-grant proceedings such as *ex parte* reexaminations, *inter partes* review, or post-grant review, or oppositions or similar proceedings outside the United States, in parallel with litigation or even outside the context of litigation. The outcome following legal assertions of invalidity and unenforceability is unpredictable. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of any future patent protection on one or more of our products or our current or future product candidates. Such a loss of patent protection could harm our business. We cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution or other basis for a finding of invalidity. Litigation proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be unsuccessful, it could have an adverse effect on the price of our common stock. Finally, we may not be able to prevent, misappropriation of our trade secrets or confidential information, particularly in countries where the laws may not protect those rights as fully as in the United States.

***If we are unable to prevent disclosure of our trade secrets or other confidential information to third parties, our competitive position may be impaired.***

We also rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or for which we have not filed patent applications, processes for which patents are difficult to enforce and other elements of our product development processes that involve proprietary know-how, information or technology that is not covered by patents. Although we require all of our employees to assign their inventions to us, and endeavor to execute confidentiality agreements with all of our employees, consultants, advisors and any third parties who have access to

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our proprietary know-how, information or technology, we cannot be certain that we have executed such agreements with all parties who may have helped to develop our intellectual property or had access to our proprietary information, or that our agreements will not be breached. We cannot guarantee that our trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to our trade secrets or independently develop substantially equivalent information and techniques. If we are unable to prevent disclosure of our intellectual property to third parties, we may not be able to maintain a competitive advantage in our market, which would harm our business.

Any disclosure to or misappropriation by third parties of our confidential proprietary information could enable competitors to quickly duplicate or surpass our technological achievements, and erode our competitive position in our market.

***Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.***

As is the case with other human or animal pharmaceutical product companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the human and animal health industries involves both technological and legal complexity. Therefore, obtaining and enforcing patents is costly, time-consuming and inherently uncertain. In addition, the United States has recently enacted and implemented wide-ranging patent reform legislation. The U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce patents that we have licensed or that we might obtain in the future.

***We may not be able to protect our intellectual property rights throughout the world, which could impair our business.***

Filing, prosecuting and defending patents on human and animal drug products, product candidates and non-prescription products throughout the world would be prohibitively expensive. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we may obtain patent protection, but where patent enforcement is not as strong as that in the United States. These products may compete with our products in jurisdictions where we do not have any issued or licensed patents and any future patent claims or other intellectual property rights may not be effective or sufficient to prevent them from so competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to animal health products, which could make it difficult for us to stop the infringement of our future patents, if any, or patents we have in licensed, or marketing of competing products in violation of our proprietary rights generally. Further, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in protecting and defending our intellectual property both in the United States and abroad. Proceedings to enforce our future patent rights, if any, in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.



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***Our business could be harmed if we fail to obtain certain registered trademarks in the United States or in other countries.***

Our registered and pending U.S. trademarks include NEONORM®, MYTESI®, NAPO®, Napo Logo®, CANALEVIA, EQUILEVIA, JAGUAR ANIMAL HEALTH, the Jaguar Animal Health logo and MY HIV THANK YOU. We also own pending applications for the CANALEVIA mark in a number of foreign countries. We have not yet filed applications for our company name or our logo in the U.S. During trademark registration proceedings, we may receive rejections of our trademark applications. If so, we will have an opportunity to respond, but we may be unable to overcome such rejections. In addition, the USPTO and comparable agencies in many foreign jurisdictions may permit third parties to oppose pending trademark applications and to seek to cancel registered trademarks. If opposition or cancellation proceedings are filed against any of our trademark applications or any registered trademarks, our trademarks may not survive such proceedings. Moreover, any name we propose to use with our prescription drug product candidates in the United States, including CANALEVIA, must be approved by the FDA, regardless of whether we have registered or applied to register as a trademark. The FDA typically conducts a review of proposed prescription drug product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed proprietary product names, we may be required to expend significant additional resources in an effort to identify a suitable substitute name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

***We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties.***

We have received confidential and proprietary information from third parties. In addition, we employ individuals who were previously employed at other biotechnology, pharmaceutical or animal health companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise improperly used or disclosed confidential information of these third parties or our employees' former employers. Litigation may be necessary to defend against any such claims. Even if we were successful in defending against any such claims, such litigation could result in substantial cost and be a distraction to our management and employees.

**Risks Related to Government Regulation**

***Even if we receive any of the required regulatory approvals for our current or future prescription drug product candidates and non-prescription products, we will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense.***

If the FDA or any other regulatory body approves any of our current or future prescription drug product candidates, or if necessary, our non-prescription products, the manufacturing processes, clinical development, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for the product may be subject to extensive and ongoing regulatory requirements. These requirements could include, but are not limited to, submissions of efficacy and safety and other post-marketing information and reports, establishment registration, and product listing, compliance with new rules promulgated under the FSMA, as well as continued compliance with cGMP, GLP and GCP for any studies that we conduct post-approval. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with our contract manufacturers or manufacturing processes, or failure to comply with regulatory requirements, are reportable events to the FDA and may result in, among other things:

restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, revised labeling, or voluntary or involuntary product recalls;

additional clinical studies, fines, warning letters or holds on target animal studies;

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refusal by the FDA, or other regulators to approve pending applications or supplements to approved applications filed by us or our strategic collaborators related to the unknown problems, or suspension or revocation of the problematic product's license approvals;

product seizure or detention, or refusal to permit the import or export of products; and

injunctions and/or the imposition of civil or criminal penalties.

The FDA or other regulatory agency's policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates or require certain changes to the labeling or additional clinical work concerning safety and efficacy of the product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability, which would harm our business. In addition, failure to comply with these regulatory requirements could result in significant penalties.

In addition, from time to time, we may enter into consulting and other financial arrangements with veterinarians, who prescribe or recommend our products, once approved. As a result, we may be subject to state, federal and foreign healthcare and/or veterinary medicine laws.. If our financial relationships with veterinarians are found to be in violation of such laws that apply to us, we may be subject to penalties.

***The issuance by the FDA of protocol concurrences for our pivotal studies does not guarantee ultimate approval of our NADA.***

We intend to seek protocol concurrences from the FDA for the pivotal trial of Canalevia that we have initiated for acute diarrhea in dogs and for future pivotal trials in other indications. A pivotal study protocol is submitted to the FDA by a drug sponsor for purposes of obtaining FDA review of the protocol. Prior FDA review of the protocol for a pivotal study makes it more likely that the study design will generate information the sponsor needs to demonstrate to the satisfaction of the FDA whether the drug is safe and effective for its intended use. It creates an expectation by the sponsor that the FDA should not later alter its perspectives on these issues unless public or animal health concerns appear that were not recognized at the time of protocol assessment. Even if the FDA issues a protocol concurrence, ultimate approval of an NADA by the FDA is not guaranteed because a final determination that the agreed-upon protocol satisfies a specific objective, such as the demonstration of efficacy, or supports an approval decision, will be based on a complete review of all the data submitted to the FDA including the outcome of the study for which protocol concurrence was received. Even if we were to obtain protocol concurrence such concurrence does not guarantee that the results of the study will support a particular finding or approval of the new drug.

***Any of our current or future prescription drug product candidates or non-prescription products may cause or contribute to adverse medical events that we would be required to report to regulatory authorities and, if we fail to do so, we could be subject to sanctions that would harm our business.***

If we are successful in commercializing any of our current or future prescription drug product candidates or non-prescription products, certain regulatory authorities will require that we report certain information about adverse medical events if those products may have caused or contributed to those adverse events. The timing of our obligation to report would be triggered by the date we become aware of the adverse event as well as the nature of the event. We may fail to report adverse events we become aware of within the prescribed timeframe. We may also fail to appreciate that we have become aware of a reportable adverse event, especially if such event is not reported to us as an adverse event

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or if it is an adverse event that is unexpected or removed in time from the use of our products. If we fail to comply with our reporting obligations, the regulatory authorities could take action including, but not limited to, criminal prosecution, seizure of our products, facility inspections, removal of our products from the market, recalls of certain lots or batches, or cause a delay in approval or clearance of future products.

***Legislative or regulatory reforms with respect to animal health may make it more difficult and costly for us to obtain regulatory clearance or approval of any of our current or future product candidates and to produce, market, and distribute our products after clearance or approval is obtained.***

From time to time, legislation is drafted and introduced in the U.S. Congress or other jurisdictions in which we intend to operate that could significantly change the statutory provisions governing the testing, regulatory clearance or approval, manufacture, and marketing of regulated products. In addition, the FDA's regulations and guidance are often revised or reinterpreted by the FDA and such other regulators in ways that may significantly affect our business and our products and product candidates. Similar changes in laws or regulations can occur in other countries. Any new regulations or revisions or reinterpretations of existing regulations in the United States or in other countries may impose additional costs or lengthen review times of any of our current or future products and product candidates. We cannot determine what effect changes in regulations, statutes, legal interpretation or policies, when and if promulgated, enacted or adopted may have on our business in the future. Such changes could, among other things, require:

changes to manufacturing methods;

additional clinical trials or testing;

new requirements related to approval to enter the market;

recall, replacement, or discontinuance of certain products; and

additional record keeping or the development of certain regulatory required hazard identification plans.

Each of these would likely entail substantial time and cost and could harm our financial results. In addition, delays in receipt of or failure to receive regulatory clearances or approvals for any future products would harm our business, financial condition, and results of operations.

***We believe that our non-prescription products are not subject to regulation by regulatory agencies in the United States, but there is a risk that regulatory bodies may disagree with our interpretation, or may redefine the scope of their regulatory reach in the future, which would result in additional expense and could delay or prevent the commercialization of these products.***

The FDA retains jurisdiction over all animal prescription drug products however, in many instances, the Federal Trade Commission will exercise primary or concurrent jurisdiction with FDA on non-prescription products as to post marketing claims made regarding the product. On April 22, 1996, the FDA published a statement in the Federal Register, 61 FR 17706, that it believes that the Dietary Supplement and Health Education Act ("DSHEA"), does not apply to animal health supplement products, such as our non-prescription products. Accordingly, the FDA's Center for Veterinary Medicine only regulates those animal supplements that fall within the FDA's definition of an animal drug, animal food or animal feed additive. The Federal Food Drug and Cosmetic Act defines food as "articles used for food or drink for man or other animals and articles used as components of any such article." Animal foods are not subject to pre-market approval and are designed to provide a nutritive purpose to the animals that receive them. Feed additives are defined as those articles that are added to an animal's feed or water as illustrated by the guidance documents. Our non-prescription products are not added to food, are not ingredients in food nor are they added to any animal's drinking water.

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Therefore, our non-prescription products do not fall within the definition of a food or feed additive. In light of the pronouncement by the FDA that the DSHEA was not intended to apply to animals, the FDA seeks to regulate such supplements as food or food additives depending on the intended use of the product. The intended use is demonstrated by how the article is included in a food, or added to the animals' intake (*i.e.*, through its drinking water). If the intended use of the product does not fall within the proscribed use making the product a food, it cannot be regulated as a food. There is no intent to make our non-prescription products a component of an animal food, either directly or indirectly. A feed additive is a product that is added to a feed for any reason including the top dressing of an already prepared feed. Some additives, such as certain forage, are deemed to be Generally Recognized as Safe, or GRAS, and therefore, not subject to a feed Additive Petition approval prior to use. However, the substances deemed GRAS are generally those that are recognized as providing nutrients as a food does. We do not believe that our non-prescription products fit within this framework either. Finally, a new animal drug refers to drugs intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease in animals. Our non-prescription Neonorm Foal and Neonorm Calf products are not intended to diagnose, cure, mitigate, treat or prevent disease and therefore, do not fit within the definition of an animal drug. Additionally, because a previously marketed human formulation of the botanical extract in our non-prescription products was regulated as a human dietary supplement subject to the DSHEA (and not regulated as a drug by the FDA), we do not believe that the FDA would regulate the animal formulation used in our non-prescription products in a different manner. We do not believe that our non-prescription products fit the definition of an animal drug, food or food additive and therefore are not regulated by the FDA at this time.

However, despite many such unregulated animal supplements currently on the market, the FDA may choose in the future to exercise jurisdiction over animal supplement products in which case, we may be subject to unknown regulations thereby inhibiting our ability to launch or to continue marketing our non-prescription products. In the past, the FDA has redefined or attempted to redefine some non-prescription non-feed products as falling within the definition of drug, feed or feed additive and therefore subjected those products to the relevant regulations. We have not discussed with the FDA its belief that the FDA currently does not exercise jurisdiction over our non-prescription products. Should the FDA assert regulatory authority over our non-prescription products, we would take commercially reasonable steps to address the FDA's concerns, potentially including but not limited to, seeking registration for such products, reformulating such products to further distance such products from regulatory control, or ceasing sale of such products. Further, the Animal and Plant Health Inspection Service, an agency of the USDA, may at some point choose to exercise jurisdiction over certain non-prescription products that are not intended for production animals. We do not believe we are currently subject to such regulation, but could be in the future. If the FDA or other regulatory agencies, such as the USDA, try to regulate our non-prescription products, we could be required to seek regulatory approval for our non-prescription products, which would result in additional expense and could delay or prevent the commercialization of these products.

***Even if Napo receives the required regulatory approvals for Napo's current or future prescription drug product candidates and non-prescription products, Napo will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense.***

If the FDA or any other regulatory body approves any of Napo's current or future prescription drug product candidates, or if necessary, Napo's non-prescription products, the manufacturing processes, clinical development, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for the product is subject to extensive and ongoing regulatory requirements. These requirements could include, but are not limited to, submissions of efficacy and safety and other post-marketing information and reports, establishment registration, and product listing, compliance with new rules promulgated under the FSMA, as well as continued compliance with cGMP, GLP and GCP for any studies that Napo conducts post-approval. Later discovery of previously

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unknown problems with a product, including adverse events of unanticipated severity or frequency, or with Napo's contract manufacturers or manufacturing processes, or failure to comply with regulatory requirements, are reportable events to the FDA and may result in, among other things:

restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, revised labeling, or voluntary or involuntary product recalls;

additional clinical studies fines, warning letters or holds on studies;

refusal by the FDA, or other regulators to approve pending applications or supplements to approved applications filed by Napo or Napo's strategic collaborators related to the unknown problems, or suspension or revocation of the problematic product's license approvals;

product seizure or detention, or refusal to permit the import or export of products; and

injunctions or the imposition of civil or criminal penalties.

The FDA or other regulatory agency's policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of Napo's product candidates or require certain changes to the labeling or require additional clinical work concerning safety and efficacy of the product candidates. Napo cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If Napo is slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if Napo is not able to maintain regulatory compliance, Napo may lose any marketing approval that Napo may have obtained and Napo may not achieve or sustain profitability, which would harm Napo's business. In addition, failure to comply with these regulatory requirements could result in significant penalties.

In addition, from time to time, Napo may enter into consulting and other financial arrangements with physicians, who prescribe or recommend Napo's products, once approved. As a result, Napo may be subject to state, federal and foreign healthcare laws, including but not limited to anti-kickback laws. If Napo's financial relationships with physicians are found to be in violation of such laws that apply to Napo, Napo may be subject to penalties.

***The issuance by the FDA of protocol concurrences for Napo's pivotal studies does not guarantee ultimate approval of Napo's NDA.***

Napo intends to seek protocol concurrences from the FDA for future pivotal trials that Napo initiates. A pivotal study protocol is submitted to the FDA by a drug sponsor for purposes of obtaining FDA review of the protocol. Prior FDA review of the protocol for a pivotal study makes it more likely that the study will generate information the sponsor needs to demonstrate whether the drug is safe and effective for its intended use. It creates an expectation by the sponsor that the FDA should not later alter its perspectives on these issues unless public concerns appear that were not recognized at the time of protocol assessment. Even if the FDA issues a protocol concurrence, ultimate approval of an NDA by the FDA is not guaranteed because a final determination that the agreed-upon protocol satisfies a specific objective, such as the demonstration of efficacy, or supports an approval decision, will be based on a complete review of all the data submitted to the FDA. Even if Napo were to obtain protocol concurrence such concurrence does not guarantee that the results of the study will support a particular finding or approval of the new drug.

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*Any of Napo's current or future prescription drug product candidates or non-prescription products may cause or contribute to adverse medical events that Napo would be required to report to regulatory authorities and, if Napo fails to do so, Napo could be subject to sanctions that would harm Napo's business.*

If Napo is successful in commercializing any of Napo's current or future prescription drug product candidates or non-prescription products, certain regulatory authorities will require that Napo report certain information about adverse medical events if those products may have caused or contributed to those adverse events. The timing of Napo's obligation to report would be triggered by the date Napo becomes aware of the adverse event as well as the nature of the event. Napo may fail to report adverse events Napo becomes aware of within the prescribed timeframe. Napo may also fail to appreciate that Napo has become aware of a reportable adverse event, especially if it is not reported to Napo as an adverse event or if it is an adverse event that is unexpected or removed in time from the use of Napo's products. If Napo fails to comply with Napo's reporting obligations, the regulatory authorities could take action including, but not limited to, criminal prosecution, seizure of Napo's products, facility inspections, removal of Napo's products from the market, recalls of certain lots or batches, or cause a delay in approval or clearance of future products.

*Legislative or regulatory reforms make it more difficult and costly for Napo to obtain regulatory clearance or approval of any of Napo's current or future product candidates and to produce, market, and distribute Napo's products after clearance or approval is obtained.*

From time to time, legislation is drafted and introduced in the U.S. Congress or other jurisdictions in which Napo intends to operate that could significantly change the statutory provisions governing the testing, regulatory clearance or approval, manufacture, and marketing of regulated products. In addition, the FDA's regulations and guidance are often revised or reinterpreted by the FDA and such other regulators in ways that may significantly affect Napo's business and Napo's products and product candidates. Similar changes in laws or regulations can occur in other countries. Any new regulations or revisions or reinterpretations of existing regulations in the United States or in other countries may impose additional costs or lengthen review times of any of Napo's current or future products and product candidates. Napo cannot determine what effect changes in regulations, statutes, legal interpretation or policies, when and if promulgated, enacted or adopted may have on Napo's business in the future. Such changes could, among other things, require:

changes to manufacturing methods;

additional clinical trials or testing;

new requirements related to approval to enter the market;

recall, replacement, or discontinuance of certain products; and

additional record keeping or the development of certain regulatory required hazard identification plans.

Each of these would likely entail substantial time and cost and could harm Napo's financial results. In addition, delays in receipt of or failure to receive regulatory clearances or approvals for any future products would harm Napo's business, financial condition, and results of operations.

**Risks Related to this Offering and Our Common Stock**

*Our failure to meet the continued listing requirements of The NASDAQ Capital Market could result in a delisting of our common stock.*

Our common stock is listed on The NASDAQ Capital Market, which imposes, among other requirements a minimum bid requirement. The closing bid price for our common stock must remain at or above \$1.00 per share to comply with NASDAQ's minimum bid requirement for continued listing. If

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the closing bid price for our common stock is less than \$1.00 per share for 30 consecutive business days, NASDAQ may send us a notice stating that we will be provided a period of 180 days to regain compliance with the minimum bid requirement or else NASDAQ may make a determination to delist our common stock. Our common stock traded for less than \$1.00 for 30 consecutive business days, and we received notice of this from The NASDAQ Capital Market on May 16, 2017. Since we did not regain compliance with the minimum bid price requirement during the initial 180 calendar day grace period, on November 13, 2017, we requested and were granted a second 180 calendar day grace period, or until May 14, 2018, to regain compliance with the minimum bid price requirement. The minimum bid price requirement will be met if our common stock has a minimum closing bid price of at least \$1.00 per share for a minimum of 10 consecutive business days during the 180 calendar day grace period. We are diligently working to evidence compliance with the minimum bid requirement for continued listing on NASDAQ; however, there can be no assurance that we will be able to regain compliance or that NASDAQ will grant us a further extension of time to regain compliance, if necessary.

The delisting of our common stock from NASDAQ may make it more difficult for us to raise capital on favorable terms in the future. Such a delisting would likely have a negative effect on the price of our common stock and would impair your ability to sell or purchase our common stock when you wish to do so. Further, if we were to be delisted from The NASDAQ Capital Market, our common stock would cease to be recognized as covered securities and we would be subject to regulation in each state in which it offers its securities.

Moreover, there is no assurance that any actions that we take to restore our compliance with the NASDAQ minimum bid requirement would stabilize the market price or improve the liquidity of our common stock, prevent our common stock from falling below the NASDAQ minimum bid price required for continued listing again or prevent future non-compliance with NASDAQ's listing requirements.

***If our shares become subject to the penny stock rules, it would become more difficult to trade our shares.***

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a price of less than \$5.00, other than securities registered on certain national securities exchanges or authorized for quotation on certain automated quotation systems, provided that current price and volume information with respect to transactions in such securities is provided by the exchange or system. If we do not retain a listing on The NASDAQ Capital Market and if the price of our common stock is less than \$5.00, our common stock will be deemed a penny stock. The penny stock rules require a broker-dealer, before a transaction in a penny stock not otherwise exempt from those rules, to deliver a standardized risk disclosure document containing specified information. In addition, the penny stock rules require that before effecting any transaction in a penny stock not otherwise exempt from those rules, a broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive (i) the purchaser's written acknowledgment of the receipt of a risk disclosure statement; (ii) a written agreement to transactions involving penny stocks and (iii) a signed and dated copy of a written suitability statement. These disclosure requirements may have the effect of reducing the trading activity in the secondary market for our common stock, and therefore stockholders may have difficulty selling their shares.

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*The price of our common stock could be subject to volatility related or unrelated to our operations, and purchasers of our common stock could incur substantial losses.*

The trading price of our common stock could be subject to wide fluctuations in response to various factors, some of which are beyond our control. These factors include those discussed previously in this "Risk Factors" section of this report and others, such as:

delays in the commercialization of Mytesi, Neonorm, Canalevia, Equilevia or our other current or future prescription drug product candidates and non-prescription products;

any delays in, or suspension or failure of, our current and future studies;

announcements of regulatory approval or disapproval of any of our current or future product candidates or of regulatory actions affecting our company or our industry;

manufacturing and supply issues that affect product candidate or product supply for our studies or commercialization efforts;

quarterly variations in our results of operations or those of our competitors;

changes in our earnings estimates or recommendations by securities analysts;

the payment of licensing fees or royalties in shares of our common stock;

announcements by us or our competitors of new prescription drug products or product candidates or non-prescription products, significant contracts, commercial relationships, acquisitions or capital commitments;

announcements relating to future development or license agreements including termination of such agreements;

adverse developments with respect to our intellectual property rights or those of our principal collaborators;

commencement of litigation involving us or our competitors;

any major changes in our board of directors or management;

new legislation in the United States relating to the prescription, sale, distribution or pricing of gastrointestinal health products;

product liability claims, other litigation or public concern about the safety of our prescription drug product or product candidates and non-prescription products or any such future products;



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market conditions in the human or animal industry, in general, or in the gastrointestinal health sector, in particular, including performance of our competitors; and

general economic conditions in the United States and abroad.

In addition, the stock market, in general, or the market for stocks in our industry, in particular, may experience broad market fluctuations, which may adversely affect the market price or liquidity of our common stock. Any sudden decline in the market price of our common stock could trigger securities class-action lawsuits against us. If any of our stockholders were to bring such a lawsuit against us, we could incur substantial costs defending the lawsuit and the time and attention of our management would be diverted from our business and operations. We also could be subject to damages claims if we were found to be at fault in connection with a decline in our stock price.

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***No active market for our common stock exists or may develop, and you may not be able to resell our common stock at or above the public offering price.***

Prior to our initial public offering in May 2015, there was no public market for shares of our common stock. The listing of our common stock on The NASDAQ Capital Market does not assure that a meaningful, consistent and liquid trading market exists. Although our common stock is listed on The NASDAQ Capital Market, trading volume in our common stock has been limited and an active trading market for our shares may never develop or be sustained. If an active market for our common stock does not develop, you may be unable to sell your shares when you wish to sell them or at a price that you consider attractive or satisfactory. The lack of an active market may also adversely affect our ability to raise capital by selling securities in the future, or impair our ability to license or acquire other product candidates, businesses or technologies using our shares as consideration.

***The sale of our common stock to Aspire Capital may cause substantial dilution to our existing stockholders and the sale of the shares of common stock acquired by Aspire Capital could cause the price of our common stock to decline.***

On June 8, 2016, we entered into the Aspire CSPA with Aspire Capital, in which Aspire Capital committed to purchase, at our election, up to an aggregate of \$15.0 million shares of our common stock over a period of approximately 30 months (i.e., 30 months from July 8, 2016, the effective date of the initial registration statement on Form S-1 that we filed to register the shares that we issued and may issue to Aspire pursuant to the Aspire CSPA).

Through September 30, 2017, we have issued 6,000,000 shares of our common stock to Aspire Capital under the Aspire CSPA for gross proceeds of approximately \$5.0 million. We may ultimately sell all, some or none of the approximately \$10.0 million of common stock remaining under the Aspire CSPA to Aspire Capital, and Aspire Capital may sell all, some or none of our shares that it holds or comes to hold under the Aspire CSPA. Sales by Aspire Capital of shares acquired pursuant to the Aspire CSPA may result in dilution to the interests of other holders of our common stock. The sale of a substantial number of shares of our common stock by Aspire Capital, or anticipation of such sales, could make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect sales. However, we have the right to control the timing and amount of sales of our shares to Aspire Capital, and the Aspire CSPA may be terminated by us at any time at our discretion without any penalty or cost to us.

***If securities or industry analysts do not publish research or reports about our company, or if they issue adverse or misleading opinions regarding us or our stock, our stock price and trading volume could decline.***

The trading market for our common stock depends in part on the research and reports that industry or financial analysts publish about us or our business. We do not influence or control the reporting of these analysts. If one or more of the analysts who do cover us downgrade or provide a negative outlook on our company or our industry, or the stock of any of our competitors, the price of our common stock could decline. If one or more of these analysts ceases coverage of our company, we could lose visibility in the market, which in turn could cause the price of our common stock to decline.

***You may be diluted by conversions of outstanding non-voting common stock and convertible notes and exercises of outstanding options and warrants.***

As of August 31, 2017, we had (i) outstanding options to purchase an aggregate of 2,992,039 shares of our common stock at a weighted average exercise price of \$2.46 per share, (ii) warrants to purchase an aggregate of 6,656,333 shares of our common stock at a weighted-average exercise price of \$1.15 per share and (iii) outstanding convertible promissory notes in an aggregate principal amount of \$13,800,627, which are convertible for up to 15,549,637 shares of our common stock.

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The exercise of such options and warrants or conversion of the convertible promissory notes will result in further dilution of your investment. In addition, you may experience additional dilution if we issue common stock in the future. As a result of this dilution, you may receive significantly less in net tangible book value than the full purchase price you paid for the shares in the event of liquidation.

***Shares eligible for future sale may adversely affect the market for our common stock.***

Of the 90,836,710 shares of our common stock outstanding as of November 20, 2017, approximately 90,231,201 shares are held by "non-affiliates" and are, or will become, freely tradable without restriction pursuant to Rule 144. In addition, in August 2017, we filed with the SEC a Registration Statement on Form S-3 for purposes of registering the resale of 23,634,341 shares of restricted common stock sold in connection with the Merger and related refinancing transactions, including 18,750,096 shares of voting common stock issuable upon conversion of non-voting common stock, and in November 2017 we filed an additional registration statement on Form S-3 for purposes of registering the resale of the 35,699,675 shares of restricted common stock we issued to certain Napo creditors and investors in connection with the Merger and related refinancing transactions. While sales of certain of these shares are subject to contractual resale restrictions, any substantial sale of our common stock pursuant to Rule 144 or pursuant to any resale prospectus may have a material adverse effect on the market price of our common stock.

***If shares of our non-voting common stock are converted into shares of our voting common stock, your voting power will be diluted.***

As of November 20, 2017, we had 48,218,817 shares of voting common stock and 42,617,893 shares of non-voting common stock outstanding. Generally, holders of our non-voting common stock have no voting power (other than in connection with a change of control of our company) and have no right to participate in any meeting of stockholders or to have notice thereof. However, shares of our non-voting common stock that are converted into voting common stock will have all the voting rights of the voting common stock. Shares of our non-voting common stock are convertible into shares of our voting common stock on a one-for-one basis (i) at the option of the respective holders thereof, at any time and from time to time on or after April 1, 2018 or (ii) automatically, without any payment of additional consideration by the holder thereof, (x) upon a transfer of such shares to any person or entity that is neither an affiliate of Nantucket nor an investment fund, investment vehicle or other account, that is, directly or indirectly, managed or advised by Nantucket or any of its affiliates pursuant to a sale of such stock to a third-party for cash in accordance with the terms and condition set forth in the Investor Rights Agreement, or (y) upon the subsequent release or transfer of such shares to the registered pre-Merger legacy stockholders of Napo's outstanding shares of common stock as of July 31, 2017 (the "Napo Legacy Stockholders"). Upon conversion of any non-voting common stock, your voting power will be diluted in proportion to the decrease in your ownership of the total outstanding voting common stock.

***We will have broad discretion to use the net proceeds from this offering, and may use them in ways that do not enhance our operating results or the market price of our common stock.***

Our management will have broad discretion regarding the use of the net proceeds from this offering, and we could spend the net proceeds in ways our stockholders may not agree with or that do not yield a favorable return, if at all. We intend to use the net proceeds from this offering for the commercialization of Mytesi and general corporate and working capital purposes. We may also use a portion of the net proceeds to acquire additional product candidates or complementary assets or businesses; however, we currently have no agreements or commitments to complete any such transaction. Our use of these proceeds may differ substantially from our current plans. If we do not

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invest or apply the net proceeds from this offering in ways that improve our operating results or our prospects, our stock price could decline.

***Provisions in our charter documents and under Delaware law could discourage a takeover that stockholders may consider favorable and may lead to entrenchment of management.***

Our third amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could delay or prevent changes in control or changes in our management without the consent of our board of directors. These provisions to include the following:

a classified board of directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our board of directors;

no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates;

the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of the board of directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our board of directors;

the ability of our board of directors to authorize the issuance of shares of preferred stock and to determine the terms of those shares, including preferences and voting rights, without stockholder approval, which could adversely affect the rights of our common stockholders or be used to deter a possible acquisition of our company;

the ability of our board of directors to alter our bylaws without obtaining stockholder approval;

the required approval of the holders of at least 75% of the shares entitled to vote at an election of directors to adopt, amend or repeal our bylaws or repeal the provisions of our third amended and restated certificate of incorporation regarding the election and removal of directors;

a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;

the requirement that a special meeting of stockholders may be called only by the chairman of the board of directors, the chief executive officer, the president or the board of directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and

advance notice procedures that stockholders must comply with in order to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

These provisions could inhibit or prevent possible transactions that some stockholders may consider attractive.

We are also subject to the anti-takeover provisions contained in Section 203 of the Delaware General Corporation Law. Under Section 203, a corporation generally may not engage in a business combination with any holder of 15% or more of its capital stock unless the holder has held the stock for three years or, among other exceptions, the board of directors has approved the transaction.



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***Our amended and restated bylaws designate the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or other employees.***

Our amended and restated bylaws provide that, unless we consent in writing to an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director, officer or other employee to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, (iv) any action asserting a claim that is governed by the internal affairs doctrine or (v) any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws. Any person purchasing or otherwise acquiring any interest in any shares of our capital stock shall be deemed to have notice of and to have consented to this provision of our amended and restated bylaws. This choice-of-forum provision may limit our stockholders' ability to bring a claim in a judicial forum that they find favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits. Alternatively, if a court were to find this provision of our amended and restated bylaws inapplicable or unenforceable with respect to one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could harm our business and financial condition.

***We do not intend to pay dividends on our common stock, and your ability to achieve a return on your investment will depend on appreciation in the market price of our common stock.***

We currently intend to invest our future earnings, if any, to fund our growth and not to pay any cash dividends on our common stock. Moreover, so long as Nantucket or any of its affiliates owns any shares of our non-voting common stock, we cannot pay dividends on our common stock or non-voting common stock without obtaining the prior written consent of Nantucket. Because we do not intend to pay dividends and may be required to obtain written consent if we were to do so, your ability to receive a return on your investment will depend on any future appreciation in the market price of our common stock. We cannot be certain that our common stock will appreciate in price.

***Our principal stockholders own a significant percentage of our voting stock and will be able to exert significant control over matters subject to stockholder approval.***

As of August 31, 2017, our executive officers, directors, holders of 5% or more of our capital stock and their respective affiliates beneficially owned in the aggregate approximately 62% of the outstanding shares of our voting common stock. As a result of their stock ownership, these stockholders may have the ability to influence our management and policies, and will be able to significantly affect the outcome of matters requiring stockholder approval such as elections of directors, amendments of our organizational documents or approvals of any merger, sale of assets or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may feel are in your best interest as one of our stockholders.

***The requirements of being a public company, including compliance with the reporting requirements of the Exchange Act and the requirements of the Sarbanes-Oxley Act, may strain our resources, increase our costs and distract management, and we may be unable to comply with these requirements in a timely or cost-effective manner.***

Our initial public offering had a significant, transformative effect on us. Prior to our initial public offering, our business operated as a privately-held company, and we were not required to comply with public reporting, corporate governance and financial accounting practices and policies required of a publicly-traded company. As a publicly-traded company, we incur significant additional legal, accounting

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and other expenses compared to historical levels. In addition, new and changing laws, regulations and standards relating to corporate governance and public disclosure, including the Dodd-Frank Wall Street Reform and Consumer Protection Act and the rules and regulations thereunder, as well as under the Sarbanes-Oxley Act, the JOBS Act and the rules and regulations of the SEC and The NASDAQ Capital Market, may result in an increase in our costs and the time that our board of directors and management must devote to our compliance with these rules and regulations. These rules and regulations have substantially increased our legal and financial compliance costs and diverted management time and attention from our product development and other business activities.

The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of its internal control over financial reporting annually and the effectiveness of our disclosure controls and procedures quarterly. In particular, Section 404 of the Sarbanes-Oxley Act, or Section 404, requires us to perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on, and our independent registered public accounting firm potentially to attest to, the effectiveness of our internal control over financial reporting. We have needed to expend time and resources on documenting our internal control over financial reporting so that we are in a position to perform such evaluation when required. As an "emerging growth company," we expect to avail ourselves of the exemption from the requirement that our independent registered public accounting firm attest to the effectiveness of our internal control over financial reporting under Section 404. However, we may no longer avail itself of this exemption when we cease to be an "emerging growth company." When our independent registered public accounting firm is required to undertake an assessment of our internal control over financial reporting, the cost of our compliance with Section 404 will correspondingly increase. Our compliance with applicable provisions of Section 404 requires that we incur substantial accounting expense and expend significant management time on compliance-related issues as we implement additional corporate governance practices and comply with reporting requirements. Moreover, if we are not able to comply with the requirements of Section 404 applicable to us in a timely manner, or if we or our independent registered public accounting firm identifies deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, the market price of our stock could decline and we could be subject to sanctions or investigations by the SEC or other regulatory authorities, which would require additional financial and management resources.

***We are an "emerging growth company" and we cannot be certain if the reduced disclosure requirements applicable to "emerging growth companies" will make our common stock less attractive to investors.***

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and we may take advantage of certain exemptions and relief from various reporting requirements that are applicable to other public companies that are not "emerging growth companies." In particular, while we are an "emerging growth company" (i) we will not be required to comply with the auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act, (ii) we will be subject to reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and (iii) we will not be required to hold nonbinding advisory votes on executive compensation or stockholder approval of any golden parachute payments not previously approved. In addition, the JOBS Act provides that an emerging growth company can delay its adoption of any new or revised accounting standards, but we have irrevocably elected not to avail ourselves of this exemption and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. In addition, investors may find our common stock less attractive if we rely on the exemptions and relief granted by the JOBS Act. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may decline and/or become more volatile.

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We may remain an "emerging growth company" until as late as December 31, 2020 (the fiscal year-end following the fifth anniversary of the closing of our initial public offering, which occurred on May 18, 2015), although we may cease to be an "emerging growth company" earlier under certain circumstances, including (i) if the market value of our common stock that is held by non-affiliates exceeds \$700.0 million as of any June 30, in which case we would cease to be an "emerging growth company" as of December 31 of such year, (ii) if our gross revenue exceeds \$1.0 billion in any fiscal year or (iii) if we issue more than \$1.0 billion of non-convertible debt over a three-year period.

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**CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This prospectus supplement and the documents incorporated by reference into it contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). We have made these statements in reliance on the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. All statements other than statements of historical facts contained in or incorporated by reference into this prospectus supplement, including statements regarding our future results of operations and financial position, business strategy, prospective products, product approvals, research and development costs, timing of receipt of clinical trial, field study and other study data, and likelihood of success, commercialization plans and timing, other plans and objectives of management for future operations, and future results of current and anticipated products are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "expect," "plan," "aim," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential" or "continue" or the negative of these terms or other similar expressions. The forward-looking statements in this prospectus supplement are only predictions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. These forward-looking statements speak only as of the date of this prospectus supplement and are subject to a number of risks, uncertainties and assumptions including those listed in the "Risk Factors" incorporated by reference into this prospectus supplement from our Annual Report on Form 10-K, as updated by subsequent reports. Forward-looking statements are subject to inherent risks and uncertainties, some of which cannot be predicted or quantified and some of which are beyond our control. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Moreover, we operate in a dynamic industry and economy. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties that we may face. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

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**UNAUDITED PRO FORMA CONSOLIDATED FINANCIAL INFORMATION**

Incorporated by reference herein is the unaudited pro forma consolidated financial information reflecting the consummation of the Merger and related transactions. This financial information is included in Exhibit 99.2 to our Current Report on Form 8-K, filed with the SEC on August 29, 2017 and consists of (i) the unaudited pro forma combined condensed statement of operations for the six months ended June 30, 2017, (ii) the unaudited pro forma consolidated balance sheet, as of June 30, 2017 and (iii) the unaudited pro forma combined condensed statement of operations for the year ended December 31, 2016. The unaudited pro forma consolidated financial information should be read in conjunction with the historical consolidated financial statements and the related notes of the Company, included in the Company's periodic reports filed with the SEC, and of Napo, included in Exhibit 99.2 to our Current Report on Form 8-K/A, filed with the SEC on August 4, 2017 and Exhibit 99.1 to our Current Report on Form 8-K, filed with the SEC on August 29, 2017, each of which are incorporated by reference herein. See "Incorporation of Information by Reference."

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**USE OF PROCEEDS**

We estimate that we will receive net proceeds of approximately \$0.4 million from the sale of the shares of common stock offered by us in this offering after deducting estimated offering costs payable by us.

We intend to use the net proceeds from this offering and the concurrent Equity Line Offering for the commercialization of Mytesi and for working capital and general corporate purposes.

As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses of the proceeds from this offering. As a result, our management will have broad discretion in the allocation and use of the net proceeds from this offering, and investors will be relying on the judgment of our management regarding the application of the proceeds of this offering. The actual use and allocation of proceeds realized from this offering will depend upon our operating revenues and cash position and our working capital requirements and may change. We may also invest the net proceeds temporarily in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities, until we use them for their stated purposes.

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**DILUTION**

The sale of our common stock to L2 Capital in this offering will have a dilutive impact on our stockholders. As a result, our net income/(loss) per share would decrease/increase in future periods and the market price of our common stock could decline.

After giving effect to (i) the issuance of the 2,000,000 shares for gross proceeds of \$0.5 million in this offering, (ii) the issuance of the 2,100,000 Commitment Shares in the concurrent Equity Line Offering, and (iii) the sale of 10,000,000 shares of common stock at an offering price of \$0.52 per share in the concurrent Equity Line Offering, and after deducting estimated offering expenses of \$9,000 payable by us, our as adjusted net tangible book value as of September 30, 2017 would have been \$32.3 million, or \$0.09 per share of common stock. This represents an immediate decrease in as adjusted net tangible book value of \$0.14 per share to our existing shareholders and an immediate anti-dilution in as adjusted net tangible book value of \$0.14 per share to investors participating in this offering and the Equity Line Offering.

The following table illustrates this dilution:

Public offering price per share	\$ 0.25
Historical net tangible book value per share as of September 30, 2017	\$ 0.48
Decrease in net tangible book value per share attributable to this offering and the Equity Line Offering	\$ 0.09
As adjusted net tangible book value per share after this offering and the Equity Line Offering	0.39
Anti-Dilution per share to new investors in this offering	\$ 0.14

The number of shares of our common stock to be outstanding after this offering and the concurrent Equity Line Offering is based on 67,800,655 shares of our common stock outstanding as of September 30, 2017, and excludes the following:

2,984,304 shares of voting common stock issuable upon exercise of outstanding options as of September 30, 2017, with a weighted average exercise price of \$2.46 per share;

513,385 shares of voting common stock reserved for future issuance under the 2014 Stock Incentive Plan;

6,656,333 shares of voting common stock issuable upon exercise of warrants outstanding as of September 30, 2017, with a weighted average exercise price of \$1.15 per share;

5,893,849 shares of voting common stock issuable upon vesting of outstanding restricted stock unit awards, or RSUs, as of September 30, 2017; and

up to 15,550,753 shares of common stock issuable upon conversion of outstanding convertible promissory notes in the aggregate principal amount of \$13,800,627 issued as of September 30, 2017.

To the extent any of these outstanding options or warrants are exercised or RSUs vest, there will be further dilution to new investors. If all of such outstanding options or warrants had been exercised or RSUs vested as of September 30, 2017, the as adjusted net tangible book value after this offering and the Equity Line Offering would be \$0.55 per share, and total dilution to new investors would be \$0.30 per share.

If we exercise our option to increase the equity line of credit under the Equity Line Offering by an additional 7,808,142 shares, the as adjusted net tangible book value after this offering and the Equity Line Offering would be approximately \$0.36 per share, representing a decrease in as adjusted net tangible book value of approximately \$0.12 per share to existing stockholders and immediate anti-dilution in as adjusted net tangible book value of approximately \$0.11 per share to investors purchasing our common stock in this offering at the fixed offering price of \$0.25 per share.



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**BUSINESS**

**Overview**

We are a natural-products pharmaceuticals company focused on the development and commercialization of novel, sustainably derived gastrointestinal products for both human prescription use and animals on a global basis. Our wholly-owned subsidiary, Napo, focuses on the development and commercialization of proprietary human gastrointestinal pharmaceuticals for the global marketplace from plants used traditionally in rainforest areas. Our lead prescription drug product, Mytesi (crofelemer), is approved by the FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. In the field of animal health, we are focused on developing and commercializing first-in-class gastrointestinal products for companion and production animals, foals, and high value horses.

Jaguar was founded in San Francisco, California as a Delaware corporation on June 6, 2013. Napo formed Jaguar to develop and commercialize animal health products. Effective as of December 31, 2013, Jaguar was a wholly-owned subsidiary of Napo, and until May 13, 2015, Jaguar was a majority-owned subsidiary of Napo. On July 31, 2017, the merger of Jaguar Animal Health, Inc. and Napo became effective, at which point Jaguar Animal Health's name changed to Jaguar Health, Inc. and Napo began operating as a wholly-owned subsidiary of Jaguar focused on human health and the ongoing commercialization of, and development of follow-on indications for, Mytesi.

Since our formation in June 2013, our operations have been primarily limited to the research and development of our lead animal prescription drug product candidate, Canalevia, to treat various forms of diarrhea in dogs; our non-prescription product, Neonorm Calf, to help dairies and calf farms proactively retain fluid in calves; the ongoing commercialization of Neonorm Foal, our antidiarrheal for newborn horses; and Equilevia, our planned product for total gut health in high-performance equine athletes. Dating back to July 31, 2017, the effective date of the Merger, our operations have also been heavily focused on research, development and the ongoing commercialization of Mytesi. A portion of our activities has also been focused on other efforts associated with being a recently formed company, including securing necessary intellectual property, recruiting management and key employees, and financing activities.

With the Merger effective, we believe that our newly combined company is poised to realize a number of synergistic, value adding benefits and an expanded pipeline of potential blockbuster human follow on indications, a second-generation anti secretory agent, as well as a pipeline of important animal indications for crofelemer, upon which to build global partnerships.

In May 2016, the New Drug Application ("NDA") and commercial rights for human applications of crofelemer (Mytesi) previously licensed to Salix Pharmaceuticals, Inc. ("Salix") were transferred to Napo. In October 2016 Napo launched Mytesi (formerly known as Fulyzaq), a human drug approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy ("ART"). The active pharmaceutical ingredient ("API") in Mytesi is crofelemer, our proprietary, patented gastrointestinal anti-secretory agent sustainably harvested from the rainforest.

According to the World Health Organization, there are nearly 1.7 billion cases of diarrheal disease globally every year. Although not all types of diarrhea are secretory in nature, we view the current, initial approval of Mytesi as the opening of the door to an important pipeline demonstrating approval by the FDA of the Chemistry, Manufacturing and Controls ("CMC") for this natural product, as well as acknowledgement by the FDA of the safety of the product for chronic use for the approved indication. We are pursuing a follow-on indication for Mytesi in cancer related diarrhea ("CRD"), an important supportive care indication for patients undergoing primary or adjuvant chemotherapy for cancer treatment. Mytesi is also in development for rare disease indications for infants and children with congenital diarrheal disorders and short bowel syndrome; for irritable bowel syndrome ("IBS")

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(Mytesi has demonstrated benefit to IBS-D patients in published Phase 2 studies); for supportive care for inflammatory bowel disease ("IBD"); and as a second-generation anti-secretory agent for use in cholera patients. Mytesi has received orphan-drug designation for SBS.

Diarrhea is a common adverse event seen with chemotherapy agents typically used in breast and colon cancers, and in particular in the more recently introduced therapeutic classes of epidermal growth factor receptor ("EGFR") monoclonal antibodies and tyrosine kinase inhibitors ("TKI") often used for chronic management of cancer. The increased need for and use of these agents has made diarrhea one of the most disabling issues for cancer patients.

We will seek partnerships outside the United States for the above indications, while focusing on development, and commercial access in the United States directly. We are also focused on investigating SB-300 for various gastrointestinal indications. SB-300 is a distinct and proprietary Jaguar pharmaceutical formulation of a standardized botanical extract, also sustainably derived from the *Croton lechleri* tree.

We believe SB-300, which has the same mechanism of action as crofelemer and is less costly to produce, may support efforts to receive a priority review voucher from the U.S. FDA for a cholera indication. Priority review vouchers are granted by the FDA to drug developers as an incentive to develop treatments for neglected diseases and rare pediatric diseases. Additionally, we believe SB-300 represents a long-term pipeline opportunity as a second-generation anti-secretory agent, on a global basis, for multiple gastro-intestinal diseases especially in resource-constrained countries where cost of goods is a factor, in part, because requirements often exist in such regions for drug prices to decrease annually.

Our human and animal portfolio development strategy is based on identifying indications that are potentially high-value because they address important medical needs that are significantly or globally unmet, and then strategically sequencing indication development priorities, second-generation product pipeline development, and partnering goals on a global basis.

Our technology for proprietary gastrointestinal disease products is central to the product pipelines of both veterinary and human indications. Crofelemer is also the API in Canalevia, our lead prescription drug product candidate, intended for the treatment of various forms of diarrhea in dogs. We expect our first veterinary prescription product launch will be Canalevia for chemotherapy-induced diarrhea, an interesting commercial synergy with the pursuit of follow on indications for Mytesi supported by the recent Merger.

Napo launched Mytesi in early 2017 with one full-time-equivalent Mytesi sales representative for the first half of 2017 focused on targeting high-decile prescribing HIV doctors. Napo recently significantly expanded its internal national salesforce for Mytesi through the hire in key U.S. markets of nine sales representatives experienced in the sale of drugs to HIV physicians and gastroenterologists. Napo's new sales representative team will cover New York, Miami, Atlanta, Los Angeles, Houston, San Francisco, New Orleans, Philadelphia/Washington D.C., Chicago, St. Louis and the surrounding regions. All of these regions are key markets for HIV-related drug sales. Six of our new territory managers have been calling on HIV physicians for more than 15 years, and others possess extensive experience in drug sales to both gastroenterologists and HIV healthcare providers.

This new in-house sales team will replace the external national Mytesi salesforce Napo established as a part-time effort in February of this year. The goal of Napo's internal sales team is to deliver a frequent and consistent selling message to targeted, high-volume prescribers of antiretroviral therapies and to gastroenterologists who see large numbers of HIV patients. With seven sales representatives reporting to our newly hired national sales manager, supported by concomitant marketing, promotional activities, and medical education initiatives such as the poster presentation Napo conducted at the

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July 2017 International Aids Society Conference on HIV Science in Paris we expect a proportional response in the number of patients treated with Mytesi.

We estimate the potential U.S. market for Mytesi to be approximately \$100 million in gross annual sales.

Our management team has significant experience in gastrointestinal product development. This experience includes the development of crofelemer for human use, from discovery and preclinical and toxicity studies, including the existing animal studies to be used by us for Canalevia regulatory approvals, through human clinical development and commercial manufacturing and supply.

**Mytesi Clinical Data**

Mytesi has been clinically demonstrated to have:

Minimal absorption, with plasma concentrations below the level of detection

No clinically relevant drug-drug interactions

No effect on viral load or CD4 counts

Adverse events comparable to those with placebo

The efficacy of Mytesi 125-mg delayed-release tablets twice daily was evaluated in a randomized, double-blind, 24-week, multicenter study (the ADVENT trial) comprised of a placebo-controlled (1 month) treatment period and a placebo-free (5 month) treatment period. The study enrolled HIV-positive patients on stable ART with a history of diarrhea for 1 month or more. In the Mytesi 125mg bid group, more than twice as many patients (18% vs. 8% on placebo,  $p < 0.01$ ) achieved the highly rigorous endpoint defined as reduction to  $\leq 2$  watery stools per week for 2 out of the 4 weeks in the placebo-controlled period (the average baseline in the ADVENT population was 20 watery stools per week).

In a supplemental analysis of the ADVENT study population, 78% of patients in the Mytesi 125mg BID group experienced a decrease in watery stools at week 4. Among these patients that experienced a decrease, 61% had at least a 50% decrease in watery stools. At week 20, 89% of patients in the Mytesi BID group experienced a decrease in watery stools. Among these patients that experienced a decrease, 83% had at least a 50% decrease in watery stools, and over half of patients had no watery stools at all (100% decrease).

**Human Product Pipeline**

Napo is developing a pipeline of prescription drug product candidates to address unmet needs in gastrointestinal health. Napo's pipeline currently includes prescription drug product candidates for seven follow-on indications, several of which are backed by strong Phase 2 evidence from completed Phase 2 trials.



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**Napo Prescription Drug Product Candidates**

<b>Product Candidates</b>	<b>Indication</b>	<b>Completed Milestones</b>	<b>Current Phase of Development</b>	<b>Anticipated Near-Term Milestones</b>
Formulation of crofelemer	Cancer related diarrhea (CRD)	Two investigator-initiated clinical trials funded by Genentech, Roche & Puma	Phase 2	Protocol development with KOLs for discussions with FDA
Formulation of crofelemer	Supportive care for IBD	Safety	Phase 2	Start pivotal trial in 2018* Protocol development for discussions with FDA
Formulation of crofelemer	Rare disease indications (SBS & CDD)	Multiple Phase 2 studies completed in various secretory diarrheas (not IBD) Phase I study	Phase 2	Formulation/proof-of-concept 2018, Abu Dhabi
		Orphan designation for SBS		Pivotal Trial 2018*
Formulation of crofelemer	Irritable Bowel Syndrome diarrhea predominant (IBS-D)	Phase I study	Phase 2	Pursue orphan-drug status for CDD Protocol development with KOLs for discussions with FDA

## Edgar Filing: Jaguar Health, Inc. - Form 424B5

Two significant Phase 2 studies completed

Publish additional data analysis for Phase 2 studies

SB-300

Second-generation anti-secretory agent for multiple indications including cholera

Animal and human studies in secretory diarrheas; successful cholera trial design for anti-secretory mechanism of action with crofelemer

Pre IND

CMC development for SB-300 & pre-clinical and Phase 1 in 2018\*

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Clinical trials are funding dependent

The following diagram illustrates the mechanism of action of our human and animal gastrointestinal drug products and drug product candidates, which normalize chloride and water flow and transit time of fluids within the intestinal lumen.

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**Human Products in Development**

**Cancer Related Diarrhea (CRD)**

**CRD is a common problem with a relevant mechanism for crofelemer.**

**National Cancer Institute Criteria for Grading Severity of Diarrhea**

	<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>
Patients without a colostomy	Increase of <4 stools per day over pretreatment	Increase of 4 to 6 stools per day or nocturnal stools	Increase of ≥7 stools per day or incontinence; need for parenteral support for hydration	Physiologic consequences requiring intensive care; hemodynamic collapse

According to data appearing in "Treatment Guidelines for CID" in the April 2004 issue of *Gastroenterology and Endoscopy News*, diarrhea is the most common adverse event reported in chemotherapy patients. We are continuing development of Mytesi for this important and unmet medical need, and two investigator-initiated trials of the product are underway in breast cancer patients suffering from CRD, one funded by Genetech Roche with Herceptin (enrolling patients), and one funded by Puma with neratinib (planning for patient enrollment).

Diarrhea is a common adverse event seen with chemotherapy agents in the therapeutic classes of epidermal growth factor receptor ("EGFR") tyrosine kinase inhibitors ("TKI's") and EGFR monoclonal antibodies (for breast, lung, and other malignancies). The increased need for and use of these agents has made diarrhea one of the most disabling issues for cancer patients. Crofelemer offers the potential for an appropriate mechanism of action against this likely secretory diarrhea and has prompted interest among physicians concerned about this diarrheal symptom, stimulating the aforementioned investigator-initiated trials. Diarrhea is also a common adverse event seen with chemotherapy agents used in colorectal and gastric cancers, and chronic maintenance chemotherapy. There are currently no anti-diarrhea agents approved generally for chemo-therapy induced diarrhea.

**Clinical Studies**

A study titled *HALT-D: DiarrHeA Prevention and ProphyLaxis with Crofelemer in HER2 Positive Breast Cancer Patients Receiving Trastuzumab, Pertuzumab, and Docetaxel or Paclitaxel with or without Carboplatin* is currently enrolling patients in conjunction with Georgetown University. The primary objective of the study is to characterize the incidence and severity of diarrhea in patients receiving investigational therapy in the setting of prophylactic anti-diarrheal management.

A second study, titled *An open label study to characterize the incidence and severity of diarrhea in patients with early stage HER2+ breast cancer treated with adjuvant trastuzumab and neratinib followed by neratinib monotherapy, and intensive anti-diarrhea prophylaxis*, is currently enrolling patients in conjunction with the University of California at San Francisco. The study is designed to evaluate crofelemer as a salvage anti-diarrheal therapy used with the investigational breast cancer agent neratinib. The primary objective is to characterize the incidence and severity of diarrhea in patients with early stage breast cancer receiving adjuvant trastuzumab and neratinib followed by 1 year of neratinib monotherapy in the setting of prophylactic anti-diarrheal management. The secondary objectives are to evaluate the activity of crofelemer as a rescue anti-diarrheal medication; to assess neratinib adherence, holds, delays, and early discontinuation throughout the course of study therapy, which includes patients receiving neratinib for >1 year; and to assess overall toxicity including constipation and cardiac toxicity with concomitant neratinib and trastuzumab.

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**Irritable Bowel Syndrome diarrhea predominant (IBS-D)**

Diarrhea is a common symptom of irritable bowel syndrome (IBS), a frustrating, underdiagnosed and undertreated condition. IBS-D is a subtype characterized mainly by loose or watery stools at least 25 percent of the time. According to the U.S. FDA, studies estimate that IBS affects 10 to 15 percent of adults in the United States.

Abdominal pain is the key symptom of IBS, and the pain, which is associated with a change in stool frequency or consistency, can be severe. To improve the diagnosis and outcomes for IBS patients and to update clinicians on the latest research, Dr. William Chey, a gastroenterologist and professor of medicine and nutrition sciences at the University of Michigan, along with an international team of collaborators, compiled *Rome IV*, an updated compendium of diagnostic criteria on functional GI disorders such as IBS. *Rome IV* contains a chapter titled Centrally Mediated Disorders of Gastrointestinal Pain.

Although new agents for IBS-D have come on the market, there is an unmet medical need for long-term, safe management of the abdominal pain associated with IBS-D. Mytesi has been demonstrated to be safe for chronic use, and two studies provide statistically significant results of crofelemer use for abdominal pain in women.

The largest group of IBS sufferers are those with the subtype referred to as IBS-M (mixed diarrhea and constipation). IBS-M is also referred to as IBS-A, because the condition often involves frequent alternating between IBS-D and IBS-C (constipation predominant). IBS-M is distressing for patients as well as difficult to diagnose and manage, and is often associated with pain and urgency as well as significant abdominal distension and bloating. No approved drugs currently exist for IBS-M. Leading gastroenterologists have stated that IBS-C drugs may cause diarrhea in an IBS-M patient, and an IBS-D drug may cause significant constipation. We therefore believe an opportunity exists for an IBS-M indication for Mytesi. Resultingly, and due to the demonstrated safety of Mytesi for chronic use and its demonstrated benefit for abdominal pain in women, Napo is considering expanding development efforts to evaluate the IBS-M indication.

**Clinical Study**

Crofelemer has been tested in safety studies and two significant Phase 2 studies for IBS-D as detailed below. We recognize that patients suffering from IBS-D or IBS-M may require a polypharmaceutical approach to their lifetime management of the disease, and are therefore working to develop a low risk study designed to optimize efforts to develop an approved formulation to address these unmet medical needs.

**Completed Studies IBS-D**

*Phase 2a a randomized double-blind placebo-controlled, dose-ranging (placebo, 125 mg, 250 mg, and 500 mg bid) study over a 12-week treatment period in 246 patients with d-IBS (Rome II criteria), including both males and females, whose average age was 50 years old.*

n=245 subjects  
61 placebo  
62 125 mg crofelemer BID  
59 250 mg crofelemer BID  
62 500 mg crofelemer BID

IBS symptoms (pain, urgency, stool frequency and consistency, and adequate relief) were self-reported by the patients via an interactive voice response system. Patients needed to exhibit active disease during the two-week baseline period as defined by a mean daily stool frequency greater than or equal to 2/day, pain score greater than or equal to 1 and stool consistency greater than or equal to 3 (5-point Lickert scale for pain and consistency) to be enrolled. Patients received treatment for 12 weeks followed by a two-week treatment free period.

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The protocol-specified primary efficacy measure was daily stool consistency. Statistical analysis of the primary endpoint found no significant differences between placebo and any of the crofelemer dose groups ( $p \geq 0.1434$ ) and no significant dose relationship was seen with regard to change from Baseline to Month 3 in stool consistency scores ( $p = 0.1165$ ) in the ITT population.

A supplementary analysis of Rome Foundation-defined stool consistency and abdominal pain showed positive results. Responders were subjects who had stool consistency score of  $\geq 4$  for  $< 25\%$  of days in a given week and  $\geq 30\%$  improvement in abdominal pain scores a given week (i.e., Rome Foundation-defined stool consistency and abdominal pain responders).

When we look at a supplemental analysis at a reduction in a composite abdominal pain/stool consistency endpoint, the regulatory endpoint in accordance with FDA guidance, we see at the 125 mg dose bid a significant 15% difference with just women patients compared to placebo; and a significant 11% when we include both men and women. The current D-IBS products on the market have a 7-8% reduction (Viberzi and Xifaxan).

In this analysis, Rome Foundation-defined stool consistency and abdominal pain responders were significantly more likely during the entire 3 months in the 125 mg BID group when compared with placebo (24.2% versus 13.1%,  $p = 0.0399$ ) and there was a statistical trend in favor of crofelemer 125 mg BID during Months 1 through 2 (27.4% versus 16.4%,  $p = 0.0640$ ). Similar positive effects of crofelemer 125 mg BID were observed in female subjects ( $n = 183$ ). When the supplementary analysis was applied to the female patients, crofelemer at a dose of 125 mg BID was superior to placebo at Month 3 (26.1% vs 10.9%,  $p=0.0337$ ).

Results: The 125mg bid of crofelemer exhibited a consistent response during each month among most efficacy endpoints in women with d-IBS reaching statistical significance ( $p<0.05$ ) for pain.

Crofelemer had little effect on the stool consistency score, though there was a trend toward reduced stool frequency.

Treatment benefits were not apparent in men, although relatively few men enrolled in the trial (13-16/group).

As with previous trials of crofelemer, no drug-related serious adverse events were reported. Adverse event rates were similar across all dose groups, although in the two highest doses (250 and 500 mg bid) there were a higher percentage of dropouts. There were no drug-related or dose-related differences in constipation. During the two-week treatment-free follow-up period symptoms approached baseline levels.

Safety: Crofelemer at doses of 125, 250 and 500 mg had a safety profile that was generally similar to placebo among men and women with d-IBS.

*Phase 2 A Randomized, double-blind, placebo-controlled study to assess the safety and efficacy of crofelemer for the symptomatic treatment of diarrhea predominant irritable bowel syndrome (d-IBS) in 240 female subjects 18 years or older with active d-IBS according to the Rome II criteria for the diagnosis of d-IBS.*

The study consisted of a 2-week screening period and a 12-week blinded treatment period followed by a 4-week treatment-free follow-up period. During the 12-week treatment period 240 subjects were given 125 mg of crofelemer BID or placebo BID and recorded daily assessments of their IBS symptoms in the interactive voice response system.

The primary endpoint was the change from baseline for overall percentage of abdominal pain/discomfort free days (PFDs). On a daily basis, respondents recorded the intensity of their abdominal pain/discomfort for that day using the 5-point Likert scale: 0=none, 1=mild, 2=moderate, 3=intense, 4=severe. Any day that a score of zero (0) was recorded was considered a PFD.

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Stool consistency and abdominal pain endpoints were analyzed using definitions of symptom improvement from a recent FDA guidance on IBS endpoints (March 2010) and recommendations of the Rome Foundation (letter dated 28 June 2010) concerning the IBS endpoints described in this guidance.

Results: The overall increase in pain-free days (protocol-specified primary endpoint) for subjects in the crofelemer group was not statistically significant when compared with subjects in the placebo group ( $p = 0.5107$ )

A supplementary analysis of abdominal pain showed positive results. Responders were subjects who had  $\geq 30\%$  improvement in abdominal pain scores a given week (i.e., FDA-defined abdominal pain responders; this definition of abdominal pain responders was presented in the March 2010 guidance on IBS endpoints).

In this analysis, abdominal pain responders were significantly more likely during Months 1 through 2 (58.3% versus 45.0%,  $p = 0.0303$ ) and during the entire 3 months (54.2% versus 42.5%,  $p = 0.0371$ ) in the crofelemer group when compared to placebo.

Safety: The overall safety profile for crofelemer 125 mg BID for 12 weeks was comparable to that observed with placebo and was consistent with the IBS population under study.

**Rare pediatric disease indications: Congenital Diarrheal Disorders and Short Bowel Syndrome (SBS)**

Congenital diarrheal disorders (CDD) are a group of rare, chronic intestinal channel diseases, occurring exclusively in early infancy, that are characterized by severe, lifelong diarrhea and a lifelong need for nutritional intake either parenterally or with a feeding tube. CDDs are related to specific genetic defects inherited as autosomal recessive traits, and the incidence of CDDs is much more prevalent in regions where consanguineous marriage is part of the culture. CDDs are directly associated with serious secondary conditions including dehydration, metabolic acidosis, and failure to thrive, prompting the need for immediate therapy to prevent death and limit lifelong disability.

**Orphan Drug: Short Bowel Syndrome (SBS)**

SBS is a complex condition characterized by malabsorption of fluids and nutrients due to congenital deficiencies or surgical resection of small bowel segments. Consequently, patients suffer from symptoms such as debilitating diarrhea, malnutrition, dehydration and imbalances of fluids and salts. This could be due to either a genetic disorder or premature birth. In countries such as the United Arab Emirates and Saudi Arabia, SBS occurs with much higher incidence. Napo recently visited with medical centers in this region.

Clinical Study CDD and SBS

We have completed safety studies of crofelemer in children as young as 3 months of age, and a proof-of-concept study is planned for the next year, initially at the Sheif kalifa Hospital in Abu Dhabi, which has many pediatric patients suffering from these diarrheal diseases. We have received orphan-drug status for Mytesi (crofelemer) for the SBS indication and are pursuing orphan-drug status for CDD. The mission of the FDA Office of Orphan Products Development is to advance the evaluation and development of products (drugs, biologics, devices, or medical foods) that demonstrate promise for the diagnosis and/or treatment of rare diseases or conditions.

**IBD Supportive care:**

Key opinion leaders ("KOLs") identified an unmet need to treat diarrhea in IBD patients, particularly in specific subsets of patients. KOLs felt all IBD patients who undergo ileal pouch-anal anastomosis (IPAA) surgery suffer severe, chronic diarrhea following the procedure. Because this is a

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highly-motivated patient population with a low placebo-responder risk, we believe a relatively small proof-of-concept trial is the appropriate next step from a development standpoint.

KOLs felt crofelemer's novel mechanism of action may also prove to be an effective treatment for diarrhea that results from bile acid malabsorption, which has been shown to occur in approximately 30% of patients with IBD.

Additionally, KOLs felt crofelemer's novel mechanism of action may prove to be an effective treatment for diarrhea experienced by patients receiving IV infusions of Entyvio, a Takeda Pharmaceuticals prescription medicine used in adults with moderate to severe ulcerative colitis or Crohn's disease. Secretory diarrhea occurs when the intestine does not complete absorption of electrolytes and water from luminal contents. This can happen when a nonabsorbable, osmotically active substance is ingested ("osmotic diarrhea") or when electrolyte absorption is impaired ("secretory diarrhea").

Secretory diarrhea can result from bacterial toxins, luminal secretagogues (such as bile acids or laxatives), reduced absorptive surface area caused by disease or resection, circulating secretagogues (such as various hormones, drugs, and poisons), and medical problems that compromise regulation of intestinal function. These studies in acute diarrhea support the normalizing aspect of the mechanism of action, regardless of the cause of the diarrhea, and are supportive of the supportive care indication under development in IBD patients.

Clinical Study

***Completed Study Travelers' Diarrhea***

*Phase 2 a study of crofelemer in 184 persons in a double-blind, placebo-controlled study for the symptomatic treatment of acute diarrhea among travelers to Jamaica and Mexico.*

The study was designed to evaluate the effectiveness of crofelemer in the treatment of travelers' diarrhea.

A total of 184 persons from the United States who acquired diarrhea in Jamaica or Mexico were enrolled in a double-blind, placebo-controlled study examining the effectiveness of three doses of crofelemer in reducing illness. Subjects were treated with 125 mg, 250 mg, or 500 mg crofelemer or a matching placebo four times a day for 2 days. Subjects kept daily diaries of symptoms and were seen each day for 3 days. Of the subjects, 169 (92%) were included in the efficacy analysis.

The most common etiological agent identified was enterotoxigenic Escherichia coli, found in 19% of subjects. The mean time interval from taking the first dose of medication until passage of the last unformed stool during 48-hour therapy (TLUS48) was 38.7 hours for the placebo group.

TLUS48 was shortened by crofelemer:

30.6 h for the 125-mg dose group ( $p = 0.005$ );  
30.3 h for the 250-mg group; and  
32.6 h for the 500-mg group ( $p = 0.01$ ).

Treatment failures were seen in 29.3% in the placebo group compared with 7.3% ( $p = 0.01$ ), 4.3 ( $p = 0.002$ ), and 9.8 ( $p = 0.026$ ) in the three treatment groups. Crofelemer was well tolerated at all doses.

The study provided statistically significant results of crofelemer use for shortening the duration of travelers' diarrhea. This antisecretory approach works directly against the pathophysiology of travelers' diarrhea and is not likely to potentiate invasive forms of diarrhea or to produce posttreatment constipation.

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**Cholera/General Watery Diarrhea**

According to the Centers for Disease Control and Prevention of the U.S. Department of Health & Human Services, Cholera is an acute, diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*. An estimated 3-5 million cases and over 100,000 deaths occur each year around the world. The infection is often mild or without symptoms, but can sometimes be severe. Approximately one in 10 (5-10%) of infected persons will have severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these people, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours. At this time, for example, the largest cholera outbreak in recorded history is occurring in Yemen.

We are investigating SB-300 for the indication of cholera/general watery diarrhea. SB-300 is a distinct and proprietary Napo pharmaceutical formulation of a standardized botanical extract, also sustainably derived from the *Croton lechleri* tree. We believe SB-300 represents a long-term pipeline opportunity as a second-generation anti-secretory agent, on a global basis, for multiple gastro-intestinal diseases. Additionally, we believe SB-300, which has the same mechanism of action as crofelemer and is less costly to produce, may support efforts to receive a priority review voucher from the U.S. FDA for a cholera indication. Priority review vouchers are granted by the FDA to drug developers as an incentive to develop treatments for neglected diseases and rare pediatric diseases. If approved for this indication, SB-300 could serve as long-term pipeline anti-secretory agent for cholera/general watery diarrhea in geographies where cost of goods is a critical factor, for example, in resource-constrained regions and countries in which a requirement exists for drug prices to decrease annually.

**Clinical Study**

We have initiated CMC and have multiple animal and a human studies in secretory diarrheas with SB-300. We have also completed a successful trial design for cholera with an anti-secretory mechanism of action, published studies with crofelemer in patients with cholera and other acute severe watery diarrhea disease.

***Completed Studies Cholera and Severe Acute Dehydrating Watery Diarrhea***

*Phase 2 study of crofelemer in the treatment acute, severely dehydrating watery diarrhea with confirmed cholera with the use of an antibiotic (azithromycin) and oral rehydration therapy in 100 adult patients between 18 and 55 in Bangladesh.*

A total of 100 adult patients, from Bangladesh, between the ages of 18 and 55, with acute, severely dehydrating watery diarrhea with confirmed cholera were treated with crofelemer on a background of an antibiotic (azithromycin) and oral rehydration therapy. After a four hour period of rapid rehydration therapy, patients were randomized 1:2:2 to placebo or 125 mg or 250 mg oral dose of crofelemer. Crofelemer or placebo doses were administered about one hour after the oral administration of azithromycin (1 gm dose). The primary objective was to evaluate the safety and effects of crofelemer on reducing the watery stool output normalized to body weight (mL/kg) in the first 24 hours on the background of azithromycin and rehydration therapy. Crofelemer was well tolerated and there were no drug related adverse events in this study. Both doses of crofelemer produced approximately 25-30% reduction in median watery stool volumes in the 0-6 and 0-12 hour period following initiation of therapy. Crofelemer showed a strong trend in the reduction of watery stool output in the 0-6 hour and 0-12 hour intervals (p=0.07). Upon exclusion of three outlier patients, the crofelemer dose of 125 mg produced a statistically significant reduction in the normalized stool output (p=0.028) and the dose of 250 mg crofelemer showed a strong trend for reduction of watery stool output (p=0.07).

In another study, the effects of crofelemer were evaluated in patients with acute dehydrating watery diarrhea caused by various bacterial pathogens, such as enterotoxigenic strains of Escherichia coli (ETEC) and Vibrio cholerae infection. Crofelemer was evaluated in adult Indian patients with acute



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watery diarrhea of less than 24 hour duration with suspected bacterial infections, without the use of antibiotics. In this study, patients received oral doses of placebo or crofelemer at a dose of 250 mg every 6 hours for 2 days on the background of oral rehydration therapy only. The use of antibiotics was prohibited in this study. A total of 98 patients were randomized into this study (47 in placebo group and 51 in the crofelemer group). Primary endpoints for this study were changes in stool weight, frequency, consistency, duration of diarrhea. Secondary endpoints included the assessment of clinical symptoms scored as total of 7-item GI index. Clinical success was defined as no diarrhea within 48 hrs from study start date and treatment failure was defined as no improvement/worsening of symptoms after 24 hrs, fever, bloody stools or dehydration.

*Results:* 98 patients (51 crofelemer, 47 placebo) were enrolled in the study. 16 patients (4 in the crofelemer group and 12 in the placebo group) used antibiotics and were considered as treatment failures and were excluded from the "per protocol efficacy analysis". Groups were similar in age, weight, vital signs, stool frequency, consistency, dehydration and GI index.

The crofelemer group had improvement over baseline and compared to placebo at day 3. More specifically, crofelemer showed superior effects in reducing stool weight (61% vs 11%), stool frequency (65% vs 21%), reversion to soft stool (92% vs 49%) and improved the 7-item GI index (70% C vs 33% P), (all  $p < 0.05$ ).

Crofelemer was well tolerated with no related serious adverse events or concerning changes in lab values. Progression to dehydration and report of fecal incontinence was more common in placebo group ( $p < 0.05$ ).

*Conclusions:* Clinical success (cessation of diarrhea within 48 hrs of 1st dose) was achieved in 79% of crofelemer patients compared to 28% placebo patients ( $p < 0.05$ ).

**Other Human Product Potential Future indications**

**Institutional Diarrhea**

Patients in medical institutions such as hospitals often experience diarrhea following infection with *Clostridium difficile*, an anaerobic bacillus shed in feces. According to the Centers for Disease Control and Prevention of the U.S. Department of Health & Human Services, any surface, device, or material (e.g., commodes, bathing tubs, and electronic rectal thermometers) that becomes contaminated with feces may serve as a reservoir for the *C. difficile* spores, which are transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item. We believe development of an approved formulation of crofelemer for use in *C. difficile* has the potential to help patients infected with *C. difficile* leave the hospital sooner, help keep patients infected with *C. difficile* out of the hospital, and aid in controlling *C. difficile* contagion in institutional settings, which would also represent a significant economic benefit.

**Animal Products in Development**

Portfolio planning for the animal health space is of utmost importance to us, given the wide array of potential species-specific products and because we do not want animal-related research and development activities to divert significant financial resources while we are focusing on growing Mytesi sales and seeking to move our company towards profitability. Additional formulations and additional animal product expenditures will be considered from time to time as part of portfolio planning and prioritization in the context of the combined company.

Canalevia is our lead prescription drug product candidate, intended for the treatment of various forms of diarrhea in dogs. Equilevia is our personalized product candidate for total gut health in high performance equine athletes. Canalevia and Equilevia contain ingredients isolated and purified from the *Croton lechleri* tree, which is sustainably harvested. Neonorm Calf and Neonorm Foal are our lead

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non-prescription products. Neonorm is a standardized botanical extract derived from the *Croton lechleri* tree, which is also provided as a botanical extract for piglets and dairy calves in China under an exclusive distribution agreement. Canalevia and Neonorm are distinct products that act at the same last step in a physiological pathway generally present in mammals.

We are developing Canalevia as a prescription drug product and Equilevia and Neonorm as a non-prescription products due to differences between the companion, horse and production animal markets. Owners of companion animals generally visit veterinarians, who prescribe a product to treat a disease or condition. We believe the ability to make a disease treatment claim is important in this market, and such a claim is only possible with FDA approval as a prescription product. In contrast, dairy farmers and other production animal owners generally make purchasing decisions based on a product's ability to demonstrate an economic benefit from health endpoints, such as weight gain. Owners and trainers of high end equine athletes review clinical data and are seeking products tailored to their specialized training and husbandry practices to optimize the health and performance.

For our prescription product line, we are seeking protocol concurrences with the FDA where appropriate. A protocol concurrence in animal drug development means that the FDA agrees that the design and analyses proposed in a protocol are acceptable to support regulatory approval of the product candidate with respect to effectiveness of the indication studied and will not change its view of these matters, unless public or animal health concerns arise that were not recognized at the time of concurrence or we change the protocol. We plan to seek concurrence on all major regulatory trials.

We also have a pipeline of prescription drug product candidates for diabetes and metabolic syndrome for dogs, cats and horses, as well as a topical herpes product for cats. As with our lead prescription drug product candidate, these products candidates were tested in animals for safety to support their development for use in humans. We recently expanded our gastrointestinal product line to include combinations of our proprietary anti-secretory products derived from *Croton lechleri* with the non-absorbed antibiotic, rifaximin, a human approved product, for gastrointestinal indications in all animals. We are leveraging the data and knowledge gained during the development of human therapeutics into veterinary applications.

The equine athlete business continues to be a major focus area for the animal health side of our business. The demand, particularly in the Middle East, for a "total gut health" product for high performance equine athletes appears to be quite strong, and we believe this is indicative of an unmet medical need. Based on this demand, and with support from studies we conducted in horses with gastric ulcers a prevalent problem in competing horses and also horses with diarrhea, we have transitioned development of Equilevia to a create a non-prescription, personalized, premium proprietary product for total gut health in equine athletes. Gut health is of critical importance in horses, as conditions such as colic can lead to the death of an otherwise healthy horse in a matter of hours. Although we are still assessing the size of the opportunity represented by this self-funded program, we expect to begin generating revenue from the sale of Equilevia in the fourth quarter of 2017.

To date, our non-prescription animal health products have generated approximately \$206,805 in net revenue in 2017.

As we announced on January 31, 2017, we signed an agreement with Elanco US Inc., a subsidiary of Eli Lilly and Company, to license, develop, co-promote and commercialize Canalevia for treatment of acute diarrhea in dogs. The agreement grants Elanco exclusive global rights to Canalevia for use in companion animals. We and Elanco will collaborate on the global development of the product and on its commercialization in the US. We have received Minor Use in a Minor Species (MUMS) designation for Canalevia for CID in dogs. The FDA has indicated that the use of Canalevia for the treatment of EID in dogs qualifies as a "minor use", which means that Canalevia is eligible for conditional approval for the indication of EID in dogs. Under the terms of the agreement with Elanco, we have retained the

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commercial responsibility for the CID and EID indications of Canalevia in dogs. We expect to conduct the commercial launch of Canalevia for CID and EID in dogs in the first half of 2018. This is expected to be the first prescription product approval for Jaguar's animal health product development program. On November 1, 2017, we received a letter from Elanco serving as formal notice of Elanco's decision to terminate the Elanco Agreement by giving us 90 days written notice. Pursuant to the terms of the Elanco Agreement, termination of the Agreement will become effective on January 30, 2018, which is 90 days after the date of the letter. On the effective date of termination of the Elanco Agreement, all licenses granted by us to Elanco under the Elanco Agreement will be revoked and the rights granted thereunder revert back to us.

Canalevia is a canine-specific formulation of crofelemer, and as such the CMC development of this product has benefited from the regulatory approval of Mytesi and the supply chain and quality system that supports the commercial distribution of Mytesi.

Neonorm is a standardized botanical extract derived from the *Croton lechleri* tree. We launched Neonorm Calf in the United States at the end of 2014. The reception among users of Neonorm Calf and Neonorm Foal has been quite positive. The clinically-proven performance of Neonorm Foal, in combination with our heightened understanding of market needs within the global equine space, is driving our increased focus on developing a full suite of equine products to support and improve gastrointestinal health in foals and adult horses. Gastrointestinal conditions such as acute diarrhea, ulcers and diarrhea associated with acute colitis can be extremely debilitating for horses, and present a significant economic and emotional burden for veterinarians and owners around the world. Equilevia (formerly referred to as SB-300) is our personalized product for total gut health in equine athletes.

As we announced in December 2016, we have signed a distribution agreement with Henry Schein, Inc., the world's largest provider of health care products and services to office-based dental, animal health and medical practitioners, for exclusive distribution of Neonorm Foal product to all segments of the U.S. equine market. Henry Schein's animal health business, Dublin, Ohio-based Henry Schein Animal Health, employs approximately 900 team members and had 2015 net sales of \$2.9 billion. The agreement became effective on December 9, 2016, and, subject to provisions specified in the agreement, shall continue in force for an initial period of one year. Thereafter, unless either party notifies the other of its intent not to renew the term of the agreement at least 30 days prior to the end of the then current term, the term shall be automatically renewed upon expiration for successive renewal terms of one year.

In July 2016 we released data from two China-based studies sponsored by Fresno, California-based Integrated Animal Nutrition and Health Inc. showing remarkable resolution of diarrhea and cure of piglets afflicted with diarrhea following treatment with a *Croton lechleri* botanical extract administered in water. As we announced in September 2016, we signed an exclusive supply and distribution agreement for this botanical extract with Integrated Animal Nutrition and Health Inc. for dairy cattle and pigs in the Chinese marketplace. According to Index Muni, swine production is projected to reach 672.5 million head in 2017 in China, where pork is still the main protein source for many consumers. According to New Zealand-based NZX Agri, in 2017 there will be 7 million cows "in milk" (lactating cows) in China. With the world's largest population, China has been experiencing an increase in demand for dairy products as a result of sharply increasing income levels, fast-changing food habits, the desire of parents to feed their babies high-protein formula, and the loosening in 2015 of China's longstanding one-child policy, among other factors. Integrated Animal Nutrition and Health, Inc. has minimum purchase requirements of the botanical extract to maintain their exclusivity.

As we announced on February 2, 2017, we have begun entry into the organic market with Neonorm Calf, following listing of Neonorm Calf with an organization that evaluates livestock products in accordance with the U.S. Department of Agriculture (USDA) National Organic Standards on behalf

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of specified producers in New York state. Additionally, we are applying to have Neonorm Calf listed by the Organic Materials Review Institute (OMRI). OMRI is an international nonprofit organization that determines which input products are allowed for use in organic production and processing. OMRI Listed® products are allowed for use in certified organic operations under the USDA National Organic Program. According to the Organic Trade Association's (OTA) 2016 Organic Industry Survey, the U.S. organic industry posted new records in 2015, with total organic product sales hitting a new benchmark of \$43.3 billion, up 11% from the previous year's record level and outpacing the overall food market's growth rate of 3%. According to OTA, dairy, the second biggest organic food category, accounted for \$6.0 billion in sales, an increase of over 10%, and dairy accounts for 15% of total organic food sales.

Organic livestock production plays a vital role in support of a sustainable and safe farm and food system, both in the U.S. and internationally. According to a report published by Allied Market Research, the global market for organic dairy food and drinks – organic milk, yogurt, cheese, and others – is expected to grow at a compound annual growth rate of 14.25% from 2016 to reach \$36.7 billion by 2022 from \$14.5 billion in 2015. We believe Neonorm Calf will qualify as allowable for use on certified organic dairies throughout the U.S., and we are currently working to obtain additional required listings.

Through the Merger, we have access to Napo's intellectual property rights and technology, including rights to Napo's library of over 2,300 medicinal plants for all veterinary treatment uses and indications for all species of animals. This includes rights to Neonorm, Canalevia, and other distinct prescription drug product candidates in our pipeline along with the corresponding existing preclinical and clinical data packages. We also recently expanded our intellectual property portfolio to include combinations of our proprietary anti-secretory product lines, Canalevia and Neonorm, with the non-absorbed antibiotic, rifaximin, for gastrointestinal indications in all animals.

**Animal Product Pipeline**

We are developing a pipeline of prescription drug product candidates and non-prescription (non-drug) products to address unmet needs in animal health. Our pipeline currently includes prescription drug product candidates for seven indications across multiple species, and non-prescription products targeting eight species.

**Jaguar Animal Prescription Drug Product Candidates**

<b>Product Candidates</b>	<b>Species</b>	<b>Indication</b>	<b>Recent Developments</b>	<b>Anticipated Near-Term Milestones</b>
Canalevia	Dogs	CID	Completed safety study with commercial formulation in June 2015	Commercial launch in first half of 2018
	Dogs	EID	Received MUMS designation	
			Completed safety study with commercial formulation in June 2015	Commercial launch in first half of 2018
			Received MUMS designation	

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<b>Product Candidates</b>	<b>Species</b>	<b>Indication</b>	<b>Recent Developments</b>	<b>Anticipated Near-Term Milestones</b>
	Dogs	General diarrhea	<p>Concurred protocol</p> <p>Initiated pivotal field trial to evaluate safety and effectiveness</p>	<p>Program specifics funded by Elanco, including initiating development of second generation flavored chew formulation</p>
Species-specific formulations of crofelemer	Cats	General diarrhea	<p>Entered into License, Development, Co-Promotion and Commercialization Agreement with Elanco in January 2017</p> <p>INAD opened in 2014</p>	<p>Program specifics funded by Elanco</p>
Virend (topical)	Cats	Herpes virus	<p>Entered into License, Development, Co-Promotion and Commercialization Agreement with Elanco in January 2017</p> <p>INAD opened in 2014</p>	<p>Subject to future portfolio planning and prioritization</p>
Species-specific formulations of NP-500	Dogs	Obesity-related metabolic dysfunction	<p>INAD opened in 2014</p>	
	Horses	Metabolic syndrome	<p>INAD opened in 2014</p>	
	Cats	Type II diabetes	<p>INAD opened in 2014</p>	

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**Jaguar Animal Non-Prescription Products**

<b>Products</b>	<b>Species</b>	<b>Use</b>	<b>Recent Developments</b>	<b>Anticipated Near-Term Milestones</b>
Equilevia	Horses	Total gut health	<p>Proof-of-concept safety and effectiveness results in January 2016 for gastrointestinal ulcers</p>	Finalize formulation and conduct commercial launch in Q4 2017
Neonorm Calf	Dairy & beef calves	Helps proactively retain fluids in calves aiding the animals in avoiding debilitating, dangerous levels of dehydration	<p>Positive racing results</p> <p>Field study supports beneficial effect on prewean weight gain</p> <p>Positive prophylactic results</p> <p>Distribution deal China</p>	<p>Launch second generation formulation for administration in liquid, prophylaxis in Q2 2018</p> <p>Commercial launch and business development activities in selected international geographies in the first half of 2018</p>
Species-specific formulations of Neonorm	Horse foals	Anti-diarrheal for newborn horses	<p>Completed proof-of-concept study in November 2015</p> <p>Soft-launched product in December 2015</p> <p>Commercial launch with exclusive Henry Schein distribution deal at AAEP, 2016</p>	Evaluation of Neonorm Horse product
	Piglets	Normalize fecal formation in piglets	<p>Positive preliminary topline results of two studies by Integrated</p>	Expansion of distribution in China

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Animal Nutrition and Health Inc. to evaluate the safety and effectiveness of Neonorm in piglets

Other farm/production animals

Supports gut health normalizing fecal formation

Selected clinical research

Initiate proof-of-concept studies and partnering discussions, multiple species; multiple geographies, subject to future portfolio planning and prioritization

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**Market Background**

**Canalevia Chemotherapy-Induced Diarrhea (CID) and Exercise Induced Diarrhea (EID) in Dogs**

Overview

Canalevia is a three-day, twice-daily formulation of crofelemer that we are developing for the treatment of CID in dogs. Canalevia is enteric-coated for targeted release of crofelemer, the active pharmaceutical ingredient, or API, in Canalevia, in the intestine. We have received MUMS designation for Canalevia for the treatment of CID in dogs, which provides an opportunity to shorten the timeframe to commercialization. We have received Minor Use in a Minor Species (MUMS) designation for Canalevia for CID in dogs. The FDA has indicated that the use of Canalevia for the treatment of EID in dogs qualifies as a "minor use", which means that Canalevia is eligible for conditional approval for the indication of EID in dogs. In June 2015 we completed a multi-site pilot safety study involving the anticipated commercial formulation of Canalevia for CID and EID. We will have completed submission of all required major technical sections for the NADA for CID to the FDA for phased review by the end of December. We expect to receive FDA acknowledgment of the completion of all required technical sections in support of conditional approval of Canalevia in 1H, 2018 for CID and EID in dogs. Under MUMS designation, we would be required to initiate a pivotal study in the five years following conditional approval to generate the data required for full approval.

Market Opportunity

We believe there is an important unmet medical need for the treatment of CID and EID in dogs.

CID: There is currently no FDA-approved anti-secretory product that we are aware of to treat CID in dogs. We estimate that there are over 230,000 dogs receiving chemotherapy treatment for cancer each year in the United States, with over 25% suffering from CID. Severe diarrhea is a frequent side effect of the most commonly administered chemotherapy drugs. Similar to the effects in humans, we believe that if left untreated, CID in dogs can result in:

fluid and electrolyte losses, which can cause dehydration, electrolyte imbalance and renal insufficiency;

nutritional deficiencies from alteration of gastrointestinal transit and digestion; and

increased risk of infectious complication.

Efficacy of the underlying cancer treatment may also be jeopardized if CID severity requires reductions in the absorption, frequency and/or dosage of chemotherapy. From the dog owner's perspective, there are significant practical implications of CID in dogs that may affect living arrangements, as well as the cost, time and attention required to clean and care for the dog and its surroundings on a daily basis. Veterinarians sometimes prescribe human drugs in an effort to treat CID in dogs, but do not have the benefit of clinical support with respect to efficacy or dosing. In addition, administering a potentially unpalatable human formulation is often difficult and may lead to further uncertainty of the amount actually ingested by the dog.

EID is a distinct physiological manifestation that has been recorded in dogs, humans and horses. EID may occur before, during or after sustained physical exertion. EID is a common problem among working dogs, such as sled dogs and military dogs, when subjected to periods of intense, long-duration exercise off-leash. Several mammalian species that physically train and run in competitive events can push themselves to extreme physical demands. At this highest level of physical exertion, secretory diarrhea is a common result, and the diarrhea can be debilitating enough to require medical attention and removal from competition or training. Diarrhea can have serious consequences for the canine athlete due to their high capacity for metabolic heat generation and reliance on evaporative cooling to dissipate that heat.



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Our Solution

We believe that Canalevia is an ideal treatment for both CID and EID in dogs because of its demonstrated novel anti-secretory mechanism of action. Canalevia acts locally in the gut and is minimally absorbed systemically. It does not alter gastrointestinal motility, has no significant effects on normally functioning intestinal ion channels and electrolyte or fluid transport, and has no side effects different from placebo. With regard to CID, these features are further augmented by Canalevia's lack of effects on the absorption and/or metabolism of co-administered chemotherapy drugs, orally or by other routes of administration. Canalevia acts by normalizing the flow of excess ions and water in the intestinal lumen. The flow of excess ions and water into the intestinal lumen is the last step common to the manifestation of acute diarrhea. As a result, we believe Canalevia may be effective in the treatment of acute diarrhea, regardless of cause, including CID and EID.

**Canalevia General Watery Diarrhea in Dogs**

Market Opportunity

Diarrhea is one of the most common reasons for veterinary office visits for dogs and the second most common reason for visits to the veterinary emergency room, yet there are currently no FDA-approved anti-secretory agents we are aware of to treat the indication.

Veterinarians typically treat general watery diarrhea in dogs with antibiotics, probiotics, dietary restrictions and products approved and formulated for humans, such as Imodium and other anti-motility agents, as well as binding agents that absorb water such as Kaopectate and Pepto-Bismol. None of these treatment options address the water loss associated with acute diarrhea. Further, because none of the human products are FDA approved for animal use, veterinarians do not have the benefit of clinical support with respect to efficacy or dosing. Moreover, administering a potentially unpalatable human formulation is often difficult and may lead to further uncertainty of the amount actually ingested by the dog.

We believe that Canalevia is an ideal treatment for general watery diarrhea in dogs because of its demonstrated novel anti-secretory mechanism of action. If approved for use in general watery diarrhea in dogs, we believe Canalevia will be the only FDA-approved anti-secretory agent to treat diarrhea in dogs.

**Equilevia**

The equine athlete business continues to be a major focus area for the animal health side of our business. The demand, particularly in the Middle East, for a "total gut health" product for high performance equine athletes appears to be quite strong, and we believe this is indicative of an unmet medical need. Based on this demand, and with support from studies we conducted in horses with gastric ulcers – a prevalent problem in competing horses – and also horses with diarrhea, we have transitioned development of Equilevia to a create a non-prescription, personalized, premium proprietary product for total gut health in equine athletes. Gut health is of critical importance in horses, as conditions such as colic can lead to the death of an otherwise healthy horse in a matter of hours. Although we are still assessing the size of the opportunity represented by this self-funded program, we expect to begin generating revenue from the sale of Equilevia in the fourth quarter of 2017.

Ulcers are lesions of the lining of the digestive tract and are very common in horses used for many competitive activities. *Croton lechleri*-derived products have been shown to act locally in the gut and have traditional use and rodent model benefit for ulcers, and we have generated clinical data for Equilevia in race horses with ulcers.

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Equine gastric ulcer syndrome ("EGUS") results from both squamous and glandular gastric ulceration. Ulcers can negatively impact the performance of horses which are expected to perform at peak efficiency, including show horses and race horses. We believe a significant market exists for a product that treats both squamous and glandular ulcers in horses without altering stomach pH. According to a 2005 study, 54% of performance horses have both colonic and gastric ulcers and 97% of performance horses have either a gastric (87%) or a colonic (63%) ulcer. Data from the American Horse Council states that there are currently 9.2 million horses in the U.S., a population that includes 844,531 race horses, more than 2.7 million show horses, and more than 3.9 million recreational horses. Data from the Food and Agriculture Organization of the United Nations indicate that there were approximately 5.7 million horses in Europe in 2013 and nearly 60.0 million horses in 2013 worldwide.

In January 2016 we announced positive topline results from the proof-of-concept study we initiated in November 2015 to evaluate the safety and effectiveness of our investigational new animal drug, Equilevia, for the treatment of EGUS in horses.

In this prospective, blinded, randomized, negative controlled study, Standardbred or Thoroughbred racehorses were randomized to one of three groups (10 horses per group) and treated for 28 days: horses in the placebo group received water-filled syringes every 6 hours; those in the TRT5 group received 5 grams of Equilevia divided into 2 doses per day; and those in the TRT40 group received 40 grams of Equilevia divided into 4 doses per day. Strict enrollment criteria required patients to have both squamous (non-glandular) and glandular gastric ulcerations. All horses were examined by gastroscopy (stomach endoscope) by blinded equine investigators on Day 0 (prior to treatment; baseline), and on Day 14 (mid-study), Day 28 (last day of treatment) and Day 35 (7 days after last treatment). Treatment-related adverse events were not observed.

With respect to glandular ulcerations, a statistically significantly greater number of horses in both the TRT40 (89%) and the TRT5 (78%) group had an improvement or a resolution of glandular ulcerations, compared with the placebo (25%) group as soon as Day 14. By Day 35, all of the Equilevia treated horses had experienced improvement or resolution, whereas 25% of horses in the placebo group still had not improved or resolved during the study.

With respect to squamous ulcerations, a non-statistically significant dose-dependent effect was observed with 40% and 33% of horses achieving an improvement or a resolution by Day 14 in the TRT40 and TRT5 groups, respectively, compared with 11% of placebo horses. By Day 35, numerically more horses in the TRT40 (60%) and TRT5 (55%) groups had achieved an improvement or a resolution compared with 33% of placebo horses.

In February 2016 we announced that further analysis of the study results indicated that Equilevia did not alter gastric pH during the trial, or for 7 days after therapy. Gastric pH during therapy was observed to be similar to baseline gastric pH at all measured study time points. Whereas other ulcer treatments (e.g. proton pump inhibitors like omeprazole) rely on a mechanism of action that blocks gastric acid secretion for the treatment and prevention of EGUS, our preliminary data indicate that Equilevia may have advantages. Treatments for EGUS that do not alter gastric pH are important because maintaining low gastric pH is essential for digestion, for gut immunity and first line defense against pathogens, for the absorption of vitamins and minerals, and for potentially other downstream effects.

In April 2016, we announced that standard drug testing in race horses having received Equilevia did not detect any substances commonly disallowed by horse racing authorities. The results of this initial study show that Equilevia may offer horse owners an additional advantage in the competition horse world, where requirements exist for animals to compete free from the effect of any drugs. Future work is being planned to confirm these results. The study also provided visual evidence suggesting that feed does not interfere with the product candidate's local availability in the gut.

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Equilevia may offer horse owners an additional advantage over omeprazole in the competition horse world, where the requirement exists for equine athletes to compete free from the effect of any drugs. International screening limits for horse racing state that omeprazole has a 72-hour detection time. Detection time is defined as the first observed time point at which urine and/or plasma samples collected from a horse are negative for the presence of a specified drug. Because Equilevia acts locally in the gut and is minimally absorbed, it is unlikely that use of this drug product candidate will present any issues related to detection time. We intend to demonstrate that Equilevia is not systemically absorbed in horses, thereby providing a treatment regimen that can continue without mandatory withdrawal prior to competition. Moreover, we also aim to demonstrate that Equilevia can be administered in the presence of feed, another constraint of omeprazole administration.

The U.S. patent for use of omeprazole to treat equine ulcers expired in 2015 thereby subjecting manufacturers of omeprazole to greater competition.

Until recently, treatment recommendations for equine ulcers have not differentiated between squamous and glandular disease. However, a series of recent third-party studies indicate considerably lower healing rates for glandular ulcers with standard of care (e.g. omeprazole). Subclinically, these lesions can compromise athletic performance.

We completed a dose determination study of the target commercial paste formulation of Equilevia in the fourth quarter of 2016. The equine veterinarians who performed the study were blinded to the treatment assignment, and we were also blinded to the data at that time. A full analysis of the study data with scoring of squamous and glandular ulcers has undergone independent, blinded review by Dr. Frank Andrews, DVM, MS, Dipl. ACVIM, Professor and Director of the Equine Health Studies Program at Louisiana State University College of Veterinary Medicine, an equine internist specializing in gastric ulcer disease.

As we announced on March 28, 2017, the third-party review Dr. Andrews conducted of the study data involved viewing gastroscopy videos for all participating horses and evaluating each horse against three separate EGUS grading scales: the McAllister scoring system (which assesses the number and severity of ulcers), the EGUS Council scoring system (which is relevant only for squamous ulcers), and a new visual analog scoring system, relevant for both squamous and glandular ulcers, developed by Dr. Andrews. This study showed consistency in the evaluation of gastric ulcers by the newly developed visual analog scoring system compared to the published McAllister and EGUS Council grading scales, and the visual analog scoring system could be an important tool in providing greater precision in gastric ulcers of differing tissue type, such as glandular lesions.

Our goal is to see Equilevia serve as an important tool for total gut health in high performance equine athletes.

**Crofelemer Cats**

According to the American Veterinary Medical Association, there were approximately 74.0 million cats in the United States in 2012. We estimate that veterinarians see approximately 2.9 million annual cases of acute diarrhea in cats. Veterinarians typically treat acute diarrhea in cats with the same treatments used for dogs, namely antibiotics, probiotics, dietary restrictions and products approved and formulated for humans, such as Imodium and other anti-motility agents, as well as binding agents that absorb water such as Kaopectate and Pepto-Bismol.

We are currently developing a species-specific formulation of crofelemer, Felevia, for cats. We intend to initiate safety and proof-of-concept studies in cats in 2017.

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**Neonorm Calf Helps proactively retain fluids in dairy and beef calves aiding the animals in avoiding debilitating, dangerous levels of dehydration**

Overview

This formulation of Neonorm is an enteric-coated tablet designed to be orally administered to preweaned dairy and beef calves twice daily for three days.

According to the *Dairy 2007* study conducted by the USDA, almost one in four preweaned dairy heifers, or female calves, suffers from diarrhea or other digestive problems. The preweaning period is generally the first 60 days after birth. Scours, diarrhea or other digestive problems are responsible for more than half of all preweaned heifer calf deaths, and result in impaired weight gain and long-term reduction in milk production. We believe that the incidence rate of scours and its corresponding financial impact represent a health and business opportunity and that Neonorm Calf has the potential to effectively meet this need.

A challenge clinical study was completed in May 2014 by researchers from Cornell, and published in 2015 in the official journal of the American Dairy Science Association, *Journal of Dairy Science*. The results of this study suggest that Neonorm Calf can significantly increase the fecal dry matter of neonatal calves with experimentally-induced enterotoxigenic *E. coli* diarrhea, and suggest a potential benefit of Neonorm Calf in supporting weight gain in calves.

In 2014 we launched Neonorm for preweaned calves in the United States under the brand name Neonorm Calf. We do not believe that Neonorm Calf fits within the FDA's definition of an animal drug, food or feed additive. Thus, we do not believe that it is regulated by the FDA at this time. The FDA previously regulated a human-specific formulation as a dietary supplement, rather than as a drug. To support the commercial launch, we completed field studies of Neonorm Calf involving approximately 400 preweaned dairy calves in total with Cornell University and in collaboration with its distributor, Animart.

A further analysis, completed in October 2015, of the above-referenced Cornell study supports a benefit of Neonorm Calf on the optimization of the intestinal microbiome profile in preweaned dairy calves, a potential prebiotic benefit. The microbiome is a community of microorganisms that live normally in the gut and are vital to maintenance of gut health.

We are developing a second generation Neonorm Calf product formulation to be administered in liquid for total head prophylactic management of diarrhea, or scours. In January 2016 we announced the initiation of a placebo-controlled study in conjunction with researchers from Cornell to evaluate the efficacy of the prophylactic use of a second-generation formulation of Neonorm Calf administered in liquid on naturally occurring diarrhea and dehydration in preweaned dairy calves and investigate the possible prebiotic benefit of the product. This double-blinded, randomized study involved 40 Holstein bull calves affected with naturally occurring diarrhea. The study results, announced in June and September of 2016, show that calves under prophylactic administration of Neonorm Calf had significantly lower water content in fecal samples at multiple measurement points, lower incidence of diarrhea, and had fewer fluid therapy interventions. A paper on this study, titled "Prophylactic use of a standardized botanical extract for the prevention of naturally occurring diarrhea in newborn Holstein calves", was published in the official journal of the American Dairy Science Association, *Journal of Dairy Science* a leading peer-reviewed general dairy research journal.

Scours Market Opportunity

Scours refers to watery diarrhea in production animals, including dairy calves, which results from infectious agents that cause the secretion of ions and water into the intestinal lumen. Animals with scours may experience severe dehydration and electrolyte imbalance, which can lead to renal insufficiency, nutritional deficiencies, lower production in dairy cattle and even death. Current therapy

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includes fluid and electrolyte replacement, continuous milk feeding, antibiotics (for calves with systemic involvement (*e.g.*, fever) with an increased risk of bacteremia), non-steroidal anti-inflammatory drug therapy and vaccines.

According to the USDA, there are approximately 9.2 million lactating dairy cows in the United States. We estimate from USDA sources that there were over 11.0 million dairy calves born in 2013. Dairy cows are continuously bred, both to maintain lactation and to produce dairy calves to maintain the herd. Dairy calves are separated from their mothers shortly after birth and raised on commercial milk replacers until weaned at about 60 days of age. Almost one in four, or 23.9%, of dairy heifer calves had diarrhea or other digestive problems according to the USDA *Dairy 2007* study. Scours, diarrhea or other digestive problems are responsible for more than half of all preweaned calf deaths, and result in supportive care and treatment costs, impaired weight gain and long-term reduction in milk production. Of dairy farm operations surveyed in the *Dairy 2007* study, 62.1% used antibiotics for diarrhea or other digestive problems, including preweaned heifer calves not reporting diseases or disorders. Of preweaned calves that were affected by diarrhea or other digestive problems, almost three-fourths, or 74.5%, were treated with an antibiotic.

Our Solution

We believe Neonorm Calf is an ideal solution to aid fluid retention in dairy and beef calves suffering from scours. Neonorm Calf has been formulated and clinically tested to support fluid retention by specifically addressing the normalization of stool formation and ion and water flow in the intestinal lumen of newborn dairy calves with scours. There are an estimated 22.0 million beef calves in the United States, and published sources indicate that approximately 2.4% of beef calves younger than three weeks old suffer from diarrhea. Like Canalevia, Neonorm Calf acts locally in the gut and is minimally absorbed systemically. It does not alter gastrointestinal motility, has no significant effects on normally functioning intestinal ion channels and electrolyte or fluid transport, and has no side effects different from placebo. As a result, stool formation is normalized in a short period of time, weight loss is mitigated, supportive care costs and rehydration therapies such as ORS are reduced, and the risk of mortality is minimized.

Clinical Data

A challenge clinical study was completed in May 2014 by researchers from Cornell, and published in 2015 in the official journal of the American Dairy Science Association, *Journal of Dairy Science*. The results of this study suggest that Neonorm Calf can significantly increase the fecal dry matter of neonatal calves with experimentally-induced enterotoxigenic *E. coli* diarrhea, and suggest a potential benefit of Neonorm Calf in supporting weight gain in calves.

A further analysis, completed in October 2015, of the above-referenced Cornell study supports a benefit of Neonorm Calf on the optimization of the intestinal microbiome profile in preweaned dairy calves, a potential prebiotic benefit. The microbiome is a community of microorganisms that live normally in the gut and are vital to maintenance of gut health.

We recently completed a placebo-controlled study in conjunction with researchers from Cornell to evaluate the herd-wide efficacy of the prophylactic use of a second-generation formulation of Neonorm Calf administered in liquid on naturally occurring diarrhea in preweaned dairy calves and investigate the possible prebiotic benefit of the product. This double-blinded, randomized study involved 40 Holstein bull calves affected with naturally occurring diarrhea. The study results show that calves under prophylactic administration of Neonorm Calf had significantly lower water content in fecal samples at multiple measurement points, lower incidence of diarrhea, and had fewer fluid therapy interventions. The possible beneficial prebiotic mechanism of Neonorm Calf would supplement and is potentially synergistic with the anti-secretory and weight gain benefits of the product.

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Fecal scoring, which was conducted daily during the study period, indicated a significantly lower incidence of diarrhea among Neonorm-treated calves on most treatment days than among calves in the placebo group. The study also assessed the incidence of diarrhea from days 1 to 25 of life. Calves in the Neonorm-treated group experienced a highly significant reduction in the incidence of diarrhea during this period compared to those in the placebo group.

Dehydration was assessed twice daily for all calves in the study. Results showed that severe dehydration requiring the administration of intravenous ("IV") fluid therapy was reduced by approximately 50% in the Neonorm-treated calves. Moreover, overall rescue therapy, requiring either oral or IV fluid administration, for both severe and moderate dehydration, was significantly reduced in the Neonorm-treated animals.

As we announced on February 2, 2017, we have begun entry into the organic market with Neonorm Calf, following listing of Neonorm Calf with an organization that evaluates livestock products in accordance with the U.S. Department of Agriculture (USDA) National Organic Standards on behalf of specified producers in New York state. Additionally, we are applying to have Neonorm Calf listed by the Organic Materials Review Institute (OMRI). OMRI is an international nonprofit organization that determines which input products are allowed for use in organic production and processing. OMRI Listed® products are allowed for use in certified organic operations under the USDA National Organic Program. According to the Organic Trade Association's (OTA) 2016 Organic Industry Survey, the U.S. organic industry posted new records in 2015, with total organic product sales hitting a new benchmark of \$43.3 billion, up 11% from the previous year's record level and outpacing the overall food market's growth rate of 3%. According to OTA, dairy, the second biggest organic food category, accounted for \$6.0 billion in sales, an increase of over 10%, and dairy accounts for 15% of total organic food sales.

Organic livestock production plays a vital role in support of a sustainable and safe farm and food system, both in the U.S. and internationally. According to a report published by Allied Market Research, the global market for organic dairy food and drinks—organic milk, yogurt, cheese, and others—is expected to grow at a compound annual growth rate of 14.25% from 2016 to reach \$36.7 billion by 2022 from \$14.5 billion in 2015. We believe Neonorm Calf will qualify as allowable for use on certified organic dairies throughout the U.S., and we are currently working to obtain additional required listings.

**Neonorm Line Extensions**

We believe that due to Neonorm Calf's mechanism of action and its data in preweaned dairy calves, we will be able to develop and commercialize species-specific formulations of Neonorm for multiple other animal species, such as horses, goats and sheep. We believe that there is an opportunity to target large-scale commercial livestock operations, first in the United States, and later, internationally. In less developed nations, where not only dairy and beef cattle but also buffalo, goat and sheep provide livelihoods for local populations, reducing losses related to diarrhea can provide significant monetary, social and health benefits. Today, these groups are already accessed by distributors with whom we intend to work to extend the reach of Neonorm Calf and line extension products.

In November 2015 we completed an initial proof-of-concept study (NEO101) of Neonorm Foal, our lead non-drug product to promote normal fecal formation and reduce fluid loss in foals, that involved 60 foals. The objective of this randomized, multi-site, blinded, placebo-controlled study was to evaluate the safety and performance of the product for treatment of foals suffering from secretory diarrhea, and the treated animals received Neonorm Foal in combination with a third-party probiotic. In December 2015 we announced positive results for an exploratory, investigator-initiated follow-up study (ARG102) which assessed the safety and performance of Neonorm Foal, without inclusion of a probiotic, in preweaned foals with watery diarrhea. The results of a meta-analysis between the two studies, which both took place in Argentina, demonstrated a significantly higher percentage of foals

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with clinical response and resolution of diarrhea for Neonorm Foal, from either ARG102 or NEO101, compared with the placebo group in NEO101.

During the 72-hour administration period, 35% of foals receiving the placebo in NEO101 were identified as clinical responders, compared with 85% of foals treated with Neonorm Foal in ARG102. For the purposes of both studies, clinical responders were defined as foals that achieved a formed stool by the end of the reported period.

During the 72-hour administration period, resolution of diarrhea was observed in 41% of placebo-treated foals in NEO101 compared with 85% of foals receiving Neonorm Foal in ARG102. For the purposes of both studies, resolution of diarrhea was defined as a foal that produced a formed stool at any point during the reported period.

The reception among users of Neonorm Foal, the anti-diarrheal for newborn horses that we launched in early 2016 with a nationwide campaign offering samples, has been overwhelmingly positive. User feedback regarding Neonorm Calf also continues to be very favorable. Commercialization of these two non-prescription products has provided numerous benefits that we intend to leverage during our expected introductions of high value, first-in-class prescription drug products into the U.S. marketplace and beyond. The commercialization process has allowed us to extend to animals the clinical utility of the novel mechanism of action of *Croton lechleri*-derived anti-secretory products, refine messaging to veterinarians, fine-tune internal processes, forge commercial manufacturing relationships, and develop commercial infrastructure with important distributors relevant to both prescription and non-prescription products.

In December 2015 we conducted the soft launch of Neonorm Foal. We are planning studies of an equine formulation of Neonorm for adult horses with episodic diarrhea. Published studies estimate that there were 9.2 million horses in the United States in 2005. Diarrhea is among the most common clinical complaints in foals. Often, diarrhea occurs in the first 30 days of the foal's life, both from infections and non-infectious causes, such as lactose intolerance and overfeeding. Some cases are severe and life threatening. A majority of foals will exhibit diarrhea at some point within the first two months of life. In adult horses, episodic diarrhea is mostly associated with diseases of the large intestine and damage to the colon or disturbance of colonic function. Typically, diarrhea in horses is treated with fluid replenishment and electrolytes, deworming agents and antibiotics, and intestinal protectants and absorbents, as well as anti-motility agents. To our knowledge there are currently no anti-secretory products approved by the FDA for veterinary use.

**Other Animal Product Candidates and Development**

We have planned multiple clinical studies over the next 12 to 18 months to expand Canalevia and Neonorm to additional species. We believe that we will be successful because:

We have existing safety and efficacy data for our products and product candidates in dogs, dairy calves and/or humans;

each of these products works through the normalization of ion and water flow into the intestinal lumen; and

this physiological pathway is generally present in mammals.

Additionally, we plan to initiate a safety and proof of concept study for Virend in 2017. Both Virend and NP-500 have been through Phase 2 human clinical testing by third parties and studies with combinations of rifaximin and *Croton lechleri* derived products. NP-500 is isolated and purified from a plant indigenous to the southwestern United States, and in traditional medicine, the plant was brewed as a tea and used for the treatment of diabetes and other various illnesses. We are currently developing

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species-specific formulations of NP-500 to treat obesity-related metabolic dysfunction in dogs, Type II diabetes in cats and metabolic syndrome in horses, and have filed three INADs for these indications.

According to a 2013 national survey of veterinarians, approximately 17% of dogs in the United States are obese. Studies show that obesity is more common in elderly dogs, as well as in neutered dogs. Obesity-related metabolic dysfunction manifests in altered lipid profiles, insulin resistance and mild hypertension, which could decrease a dog's lifespan. There are currently no FDA-approved products for the treatment of metabolic syndrome or insulin resistance in dogs. In cats, the prevalence of obesity-related diabetes or Type II diabetes is high and increasing. In horses, insulin resistance is associated with an equine metabolic syndrome characterized by obesity, regional adiposity and hypertriglyceridemia. It is also known to be a risk factor for laminitis. Various studies report the prevalence of insulin resistance as 10% and 28% in horses and ponies, respectively. There are also currently no FDA-approved products for the treatment of metabolic syndrome in horses.

We anticipate that our development activities will benefit from centralized activities, including shared use of the manufacturing and regulatory documentation for chemistry, manufacturing and controls, or CMC. We also anticipate being able to enter into combined clinical research agreements and activities with companion animal clinical trial sites for dogs and cats.

**Sales and Distribution**

As we announced on December 12, 2016, we have signed a distribution agreement with Henry Schein, Inc., the world's largest provider of health care products and services to office-based dental, animal health and medical practitioners, for exclusive distribution of our Neonorm Foal product to all segments of the U.S. equine market. Henry Schein's animal health business, Dublin, Ohio-based Henry Schein Animal Health, employs approximately 900 team members and had 2015 net sales of \$2.9 billion. With 12 strategically positioned, state-of-the-art distribution facilities and 10 inside sales centers nationwide, we believe Henry Schein Animal Health is positioned to bring a broad selection of veterinary products and strategic business solutions to more than 26,000 veterinary professionals nationwide. The agreement became effective on December 9, 2016, and, subject to provisions specified in the agreement, shall continue in force for an initial period of one year. Thereafter, unless either party notifies the other of its intent not to renew the term of the agreement at least 30 days prior to the end of the then current term, the term shall be automatically renewed upon expiration for successive renewal terms of one year.

In September 2014, we launched Neonorm for preweaned dairy calves under the brand name Neonorm Calf in the Upper Midwest region, and expanded the launch nationwide in early 2015. In December 2015 we conducted the soft launch of Neonorm Foal, our non-prescription anti-diarrheal product for newborn horses. We expect to launch Canalevia in 2017 for CID, and for acute diarrhea in early 2018. We intend to continue the development of our focused commercial effort for both the production and companion animal markets. We will focus our commercial efforts on educational activities and outreach to key opinion leaders and decision makers at key regional and global accounts for production animals and high prescriber veterinarians for companion animals. In August 2014, we entered our first regional distribution agreement for the Upper Midwest region, and in September 2014, entered an agreement with a national master distributor, who also distributes prescription products for the companion animal market. In February 2015, we entered a five-year distribution agreement with Biogenesis Bagó for sale and distribution of Neonorm Calf in South America. Biogenesis Bagó is the largest veterinary biotechnology company in Latin America, a region that contained approximately 401 million dairy and beef cattle in 2009 and produces approximately 11% of the world's milk supply. In 2014 Biogenesis Bagó was named "Best Animal Health Company in Latin/South America" by a publication called Animal Pharm. Our distribution agreement provides Biogenesis Bagó with exclusive distribution rights for Neonorm Calf in Argentina, Brazil, Paraguay, Uruguay, and Bolivia. Under the terms of the distribution agreement, we can terminate the agreement



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if Biogenesis Bagó fails to meet annual sales goals for each year of the five-year agreement, and we may revoke exclusivity if Biogenesis Bagó fails to meet guaranteed minimum sales. We also agreed to additional incentive payments if stretch goals are exceeded.

We plan to partner with other leading distributors to deliver our products to customers both in the United States and internationally, and may also explore entering partnerships that include payment of upfront licensing fees for our products and product candidates for markets outside the United States where appropriate. We expects that our current and future partners will have the presence, name recognition, reputation and reach in the veterinary markets and in both key urban and rural centers, as appropriate. We believe this overall approach is scalable and transferable as we expand our commercialization efforts, as well as when we further expand internationally including to resource-constrained countries where food safety issues are emerging global challenges.

**Manufacturing**

The plant material used to manufacture is crude plant latex ("CPL") extracted and purified from *Croton lechleri*, a widespread and naturally regenerating tree in the rainforest that is managed as part of sustainable harvesting programs. The tree is found in several South American countries and has been the focus of long-term sustainable harvesting research and development work. Napo's collaborating suppliers obtain CPL and arrange for the shipment of CPL to Napo's third party contract manufacturer.

Napo's third-party contract manufacturer, Glenmark Pharmaceuticals Ltd., a research-driven, global, integrated pharmaceutical company, processes CPL into crofelemer utilizing a proprietary manufacturing process. The processing occurs at two FDA-approved Glenmark facilities. Additionally, Napo plans to establish a third processing site, which will be operated by Indena S.p.A., a Milan, Italy-based contract manufacturer dedicated to the identification, development and production of high-quality active principles derived from plants, for use in the pharmaceutical, health food and personal care industries. Indena has completed the required technology transfer and has equipment in place for pilot manufacturing.

**Competition**

***Human Health***

There are several significantly larger pharmaceutical companies competing with us in the gastrointestinal segment. These companies include Valeant Pharmaceuticals International, Merck & Co., Inc., and Allergan plc as well as smaller pharmaceutical companies.

*Diarrhea in adult patients living with HIV/AIDS.* We are not aware of any other FDA-approved drugs for the symptomatic relief of diarrhea in HIV/AIDS patients. HIV/AIDS patients also use loperimide and over the counter anti-diarrheal remedies such as Mylanta or Kaopectate to treat their diarrhea, but these medicines affect motility and can result in rebound diarrhea.

*Diarrhea predominant irritable bowel syndrome.* Two drugs were approved in 2015 for the treatment of diarrhea predominant irritable bowel syndrome, Allergan plc's Virbezi and Xifaxan which is marketed by Valeant Pharmaceuticals International. Also, Lotronex was approved by the FDA in 2000 but was withdrawn from the market and later reintroduced in 2002 under a Risk Management Program. With the exception of Lotronex, the sponsors of Verbezi and Xifaxan employ extensive media and print promotion for the commercialization of these products. We are seeking a partner to further the clinical development and commercialization of crofelemer for d-IBS. There are currently numerous trials on going for d-IBS.

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*Pediatric diarrhea.* Acute diarrhea in children is commonly treated by a change in diet, oral rehydration therapy and/or antibiotics, assuming the cause of the diarrhea is bacterial in nature. Children aged 12 and younger are advised not to use anti-motility drugs (loperamide for example) unless directed to do so by a physician. There are recent clinical trials for probiotics and zinc sulfate. Other recent anti-diarrheal studies in children include a safety and tolerability study of Fidaxomicin for C difficile associated diarrhea.

*Cancer related diarrhea.* We are not aware of any FDA-approved drugs specifically indicated for chemotherapy induced diarrhea. A recent Phase IIb trial of elsiglutide for the treatment of chemotherapy induced diarrhea in colorectal cancer patients did not meet statistical significance. Opioids and over the counter drugs are commonly used to treat chemotherapy induced diarrhea, but these drugs affect motility. Certain tyrosine-kinase inhibitor chemotherapy agents have diarrhea as a significant side effect.

*Congenital Diarrheal Disorders and Short Bowel Syndrome.* We are not aware of any FDA-approved drugs specifically indicated for Congenital Diarrheal Disorders and Short Bowel Syndrome.

*Cholera.* We are not aware of any FDA-approved drugs specifically indicated as an anti-secretory agent for use to address the devastating dehydration in cholera patients.

*Irritable Bowel Syndrome (IBS).* If we receive regulatory approval for Mytesi for IBS, we expect to compete with major pharmaceutical and biotechnology companies that operate in the gastrointestinal space, such as Sucampo AG, Takeda Pharmaceuticals, Allergan, Inc., Ironwood Pharmaceuticals, Inc., Synergy Pharmaceuticals Inc., Sebela Pharmaceuticals, Inc. and Salix Pharmaceuticals. Because Mytesi is approved with chronic safety and several of the other agents have safety concerns, there is likely to be an opportunity for a polypharmaceutical approach to long-term management of these patients, removing a direct competitive scenario from Mytesi's potential entry to the marketplace and disease indication.

To our knowledge, there are currently no FDA-approved anti-secretory products, in particular which act locally in the gut with the chronic safety profile of crofelemer, in development or on the market. Crofelemer represents a new tool in gastro-intestinal disease management.

***Animal Health***

The animal health industry is dominated by large independent companies such as Zoetis Inc., a standalone animal health company that was spun out from Pfizer, Inc. in 2013, as well as subsidiaries of large pharmaceutical companies, including Novartis Animal Health Inc., a subsidiary of Novartis International AG., Merck Animal Health, the animal health division of Merck & Co., Inc., Merial Inc., the animal health division of Sanofi S.A., Elanco Animal Health, the animal health division of Eli Lilly and Company, Bayer Animal Health GmbH, a subsidiary of Bayer AG, and Boehringer Ingelheim Animal Health, the animal health division of Boehringer Ingelheim GmbH. There are also animal health companies based in Europe, including Vétquinol S.A., Virbac S.A., Dechra Pharmaceuticals PLC and Ceva Animal Health S.A.

Additionally, smaller animal health companies, such as Aratana Therapeutics, Inc., Kindred Biosciences, Inc., Phibro Animal Health Corporation, Nexvet Biopharma and Parnell Pharmaceuticals Holdings Ltd, recently completed initial public offerings of their stock in the United States and may choose to develop competitive products. We believe that the large human pharmaceutical companies may also decide to spin out their animal health subsidiaries into standalone companies.

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We anticipate that Canalevia, if approved for the indication of general watery diarrhea in dogs, will face competition from various products, including products approved for use in humans that are used extra-label in animals. We are aware that veterinarians typically treat diarrhea in dogs with antibiotics, probiotics, dietary restrictions and products approved and formulated for humans, such as Imodium and other anti-motility agents, as well as binding agents that absorb water, such as Kaopectate and Pepto-Bismol. None of these treatment options address the water loss associated with acute diarrhea. We are not aware of any veterinarians prescribing Mytesi (formerly known as Fulyzaq) extra-label for use in dogs, and the indication of Mytesi is for a disease that does not occur in dogs. Further, because none of the human products are FDA approved for animal use, veterinarians, although allowed to dispense human products for animal use, do not have the benefit of clinical support with respect to efficacy or dosing. Moreover, administering a potentially unpalatable human formulation is often difficult and may lead to further uncertainty of the amount actually ingested by the dog. However, this practice may continue and Canalevia may face competition from these products. Canalevia could also potentially face competition from Mytesi were veterinarians to prescribe it extra-label. Extra-label use is the use of an approved drug outside of its cleared or approved indications in the animal context. All of our potential products could also face competition from new products in development. These and other potential competing products may benefit from greater brand recognition and brand loyalty than our products and product candidates may achieve.

**Distribution and Marketing Agreements**

Napo has agreements in place with BexR, a distributor in Texas and SmartPharma, a marketing and commercialization advisory firm for the distribution, marketing and sale of Mytesi®, its FDA approved drug product for the systematic relief of non-infectious diarrhea in adult patients living with HIV/AIDS on antiretroviral therapy. The agreements compensate these parties with a percentage of net sales, as defined. Payments by Napo to BexR will be a specified percentage of net sales, ranging in the low double digits but in no instance exceeding 20% of net sales, depending on the period in which the sales occur and the amount of such sales. Payments by Napo to SmartPharma will be a specified percentage of net sales, ranging in the low double digits but in no instance exceeding 20% of net sales, depending on the amount of such sales. In addition, under certain circumstances, Napo will be required to pay SmartPharma a termination fee equal to a certain percentage of net sales generated within a specified period after the termination date.

**Business Strategy**

Our goal is to become a leading pharmaceuticals company with first-in-class, sustainably derived products that address significant unmet gastrointestinal medical needs globally. To accomplish this goal, we plan to:

***Expand Mytesi by leveraging our significant gastrointestinal knowledge, experience and intellectual property portfolio.***

Mytesi is a novel, first-in-class anti-secretory agent which has a basic normalizing effect locally on the gut, and this mechanism of action has the potential to benefit multiple disorders. Our Mytesi (crofelemer) product is approved by the U.S. FDA for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. We believe we control commercial rights for Mytesi for all indications, territories and patient populations globally, and we are pursuing a follow-on indication for Mytesi in CRD, an important supportive care indication for patients undergoing primary or adjuvant chemotherapy for cancer treatment. Mytesi is also in development for rare disease indications for infants and children with congenital diarrheal disorders and short bowel syndrome; for IBS (Mytesi has demonstrated benefit to IBS-D patients in published Phase 2 studies); for supportive

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care for IBD; and as a second-generation anti-secretory agent for use in cholera patients. Mytesi has received orphan-drug designation for SBS.

Our management team collectively has more than 100 years of experience in the development of gastrointestinal prescription drug and non-prescription products. This experience covers all aspects of product development, including discovery, preclinical and clinical development, GMP manufacturing, and regulatory strategy. Key members of this team successfully developed Mytesi.

***Establish and expand commercial capabilities in Mytesi sales and marketing efforts.***

We plan to significantly expand Mytesi sales and marketing efforts during the third quarter of 2017. As announced on August 7, 2017, we appointed Pete Riojas, a 29-year pharmaceutical industry veteran, to lead Mytesi sales nationally. We also significantly expanded our internal national salesforce for Mytesi through the hire in key U.S. markets of nine sales representatives experienced in the sale of drugs to HIV physicians and gastroenterologists. Our new sales representatives are based in and will cover New York, Miami, Atlanta, Los Angeles, Houston, San Francisco, New Orleans, Philadelphia/Washington D.C., Chicago, St. Louis and the surrounding regions. All of these regions are key markets for HIV-related drug sales. Six of our new territory managers have been calling on HIV physicians for over 15 years, and others possess extensive experience in drug sales to both gastroenterologists and HIV healthcare providers.

***Strategically sequence the development of follow-on indications of Mytesi and seek geographically-focused licensing opportunities.***

Although it is possible that we may enter into corporate partnering relationships related to Mytesi, our intention would be to retain all commercialization and promotional rights in the U.S., so that we do not become primarily a royalty-collecting organization, and we are opposed to entering into any Mytesi partnering relationship that would require splitting indications. We are seeking to put limited geographically-focused partnerships in place in the near term, while also considering possibilities for a worldwide partnership with a leading global entity in the field of gastrointestinal care and cancer in the long term.

***Strategically plan our portfolio in the animal health space.***

Portfolio planning for the animal health space is of the utmost importance to us, given the wide array of potential species-specific products and because we do not want animal-related research and development activities to divert significant financial resources while we are focusing on growing Mytesi sales and seeking to move our company towards profitability. Additional formulations and additional animal product expenditures will be considered from time to time as part of portfolio planning and prioritization in the context of the combined company. Canalevia is our lead veterinary prescription drug product candidate, intended for treatment of various forms of diarrhea in dogs. Our next expected veterinary product commercial launch will be for Equilevia, a personalized premium proprietary total gut health product for equine athletes, which will be non-prescription.

***Reduce risks relating to product development.***

Risk reduction is a key focus of our product development planning. Mytesi is approved for chronic indication, providing us the ability to leverage this corresponding safety data when seeking approval for planned follow-on indications. Crofelemer manufacturing is being conducted at a new, multimillion-dollar commercial manufacturing facility that has been FDA-inspected and approved. In an effort to reduce risk further, we have implemented the following approach: First, we meet with key opinion leaders, typically at medical conferences as we have already done in 2017 at Digestive Disease Week for IBS and IBD, the American Society of Clinical Oncology annual meeting, and the Multinational

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Association of Supportive Care and Congress. Next, we confirm unmet medical needs with these key opinion leaders, and discuss the practicality of patient enrollment and trial implementation. We then generate protocols to discuss with the FDA, seeking, when possible, special protocol assessments. Our goal is to have derisked the program as much as we believe we possibly can by the time we start devoting funds to a clinical trial. We believe this approach will lead to better long-term outcomes for our products in development.

**Manufacturing**

The plant material used to manufacture Canalevia, Neonorm and related products is crude plant latex, or CPL, extracted and purified from *Croton lechleri*, a widespread and naturally regenerating tree in the rainforest that is managed as part of sustainable harvesting programs. The tree is found in several South American countries and has been the focus of long-term sustainable harvesting research and development work. Our collaborating suppliers obtain CPL and arrange for the shipment of CPL to our third-party contract manufacturer. CPL will also be shipped to us for manufacturing after we establish our own API manufacturing capability.

Our third-party contract manufacturer will process CPL into both crofelemer, the API in Canalevia, and the botanical extract used in both Neonorm Calf and Neonorm Foal. Canalevia will be manufactured by the same process used to manufacture the API that was used in the animal safety studies and the human studies in support of the approval of Mytesi (formerly known as Fulyzaq). Napo has also licensed this intellectual property to third parties in connection with its licenses related to the development and commercialization of crofelemer for human use. While we believe these third parties have developed their own proprietary manufacturing specifications pursuant to their license agreements, such third-party intellectual property is unknown to us, and is not part of the intellectual property that we intend to use for the manufacture of API in its licensed field of use. Similarly, the manufacture of Neonorm depends only on technology licensed from Napo. The license grant specifically excludes intellectual property rights developed pursuant to a prior collaboration agreement between Napo and Glenmark, the manufacturer of the API in Mytesi (formerly known as Fulyzaq). In May 2014 and June 2014, and as amended in February 2015, we entered into binding memorandums of understanding with Indena S.p.A. to negotiate a definitive commercial supply agreement for the manufacture of the API in Canalevia and the botanical extract in Neonorm. We have furnished equipment to Indena S.p.A. for use in a facility that will be dedicated to the manufacture of crofelemer and the botanical extract.

In December 2015, Indena delivered 360 kilos of the standardized botanical extract to us. We currently own enough of the Neonorm standardized botanical extract to formulate a combination of approximately one million treatments of Neonorm Calf or Neonorm Foal.

Pursuant to the memorandums of understanding as amended, we agreed to pay Indena S.p.A. the following fees in connection with the establishment of its manufacturing arrangement:

a start-up fee equal to €500,000, payable in two equal installments, both of which were paid in May 2015;

fees associated with the technology transfer and manufacturing process adaptation equal to €620,000 for API which was paid in May and July 2015;

fees for the design and set up of a dedicated suite qualified for pharmaceutical and veterinary products equal to €170,000 which was paid in May 2015;

deliverables fees equal to €500,000, €250,000 of which was paid in December 2015, and €250,000 of which was payable by the end of March 2016, with the understanding that these fees will be credited against payments agreed to under the future commercial supply agreement; and

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a €300,000 bonus fee payable in two equal installments, the first of which was paid in March 2015, with the remainder paid by the end of March 2016.

We have made all contractual payments to Indena as of March 31, 2016. In March 2015, Indena S.p.A. agreed to delay payment of the fees payable by the end of March 2015 until the earlier of April 30, 2015 or the completion of our initial public offering. In July 2015 and December 2015 Indena S.p.A. agreed to delay payment of certain fees payable until March 2016. In June 2014, as contemplated by the memorandums of understanding, we also issued Indena S.p.A. a warrant to acquire 16,666 shares of our common stock at an exercise price per share equal to 90% of the initial public offering price, which expires in June 2019.

In September, 2015 we entered a distribution agreement with Glenmark. With the execution of the agreement, we intend to use Glenmark as our primary manufacturer of crofelemer for animal health use. Our agreement with Glenmark supplements our previously announced manufacturing agreement with Indena S.p.A. for the standardized botanical extract in Neonorm Calf and Neonorm Foal. We intend to eventually use Indena as an alternative supplier for crofelemer.

In October 2015, we announced that we signed a crofelemer formulation development and manufacturing contract with Patheon Pharmaceuticals Inc. ("Patheon"), a leading global provider of drug development and delivery solutions to the global pharmaceutical and biopharma industries. Under the terms of the contract, Patheon will provide enteric-coated crofelemer tablets for us for use in animals. The tablets were used in our pivotal efficacy trial for Canalevia, which began in the fourth quarter of 2015.

Patheon is the manufacturer of Mytesi (formerly known as Fulyzaq), a human-specific, enteric-coated formulation of crofelemer that was approved by the FDA in 2012 for the symptomatic relief of noninfectious diarrhea in adults with HIV/AIDS on antiretroviral therapy. Members of our management team developed crofelemer while working at Napo where the drug was initially developed.

We also plan to enter agreements with third parties for the formulation of the API and botanical extracts into finished products to be used for planned studies and commercialization.

We plan to ensure that the facilities of our third-party contract manufacturers that will manufacture our API and botanical extract, as well as formulate our finished products, comply with cGMP and other relevant manufacturing requirements.

**Proprietary Library of Medicinal Plants**

We possess a proprietary library of more than 2,300 medicinal plants.

**Intellectual Property**

**Trademarks**

We plan to market all of our products under a trademark or trademarks we select and we will own all rights, title and interest, including all goodwill, associated with such trademarks. Mytesi is a registered trademark owned by Napo.

**License Agreements**

***License Agreement with Glenmark Pharmaceuticals Limited***

In 2005 Napo entered into a collaboration agreement with Glenmark Pharmaceuticals Limited (the "Glenmark Collaboration Agreement") for the development of crofelemer for the indications of for HIV/ AIDS diarrhea, pediatric diarrhea and adult acute infectious diarrhea in approximately 140 countries outside of the United States, Japan, most EU countries and Japan. The Glenmark

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Collaboration Agreement provides for royalties to be paid to Napo based upon net sales of crofelemer derived products in the licensed territories. Annual royalty payments will be a specified percentage of net sales, ranging from the high single digits to the low double digits but in no case exceeding 15% of net sales, depending on the annual amount of net sales.

Glenmark has obtained marketing approval for the crofelemer derived product for control and symptomatic relief of diarrhea in patients living with HIV/AIDs in two countries in Africa and two in South America. Two of these four countries have also approved the crofelemer derived product for control and symptomatic relief of diarrhea in patients with acute infectious diarrhea. Napo has not received any royalty income from these approvals nor is it aware of any sales made by Glenmark in its licensed territories.

***Termination, Asset Transfer and Transition Agreement***

On September 19, 2017 (the "Transfer Date"), Napo entered into the Termination, Asset Transfer and Transition Agreement (the "Glenmark Transition Agreement") with Glenmark. The Glenmark Transition Agreement supersedes the Glenmark Collaboration Agreement and returns to Napo certain rights which Napo licensed to Glenmark pursuant to the Glenmark Collaboration Agreement related to the development and commercialization of crofelemer for certain specified human indications in India and 140 other countries largely in developing regions (the "Transferred Assets").

As a result of the execution of the Glenmark Transition Agreement, we, through Napo, now control commercial rights for Mytesi for all indications, territories and patient populations globally, and also hold commercial rights to the existing regulatory approvals for crofelemer in Brazil, Ecuador, Zimbabwe and Botswana.

In consideration for Glenmark's assignment and transfer of the Transferred Assets to Napo, Napo agreed to pay Glenmark in cash, within 45 days after receipt by Napo, 25% of any payment that Napo receives from a third party to whom Napo grants a license or sublicense or with whom Napo partners in respect of, or sells or otherwise transfers any of the Transferred Assets, subject to certain limitations, until Glenmark has received a total of \$7 million. As additional consideration for the assignment and transfer of the Transferred Assets, Napo agreed (i) to enter into, within 90 days after the Transfer Date, a manufacturing and supply agreement with Glenmark for crofelemer, which will be manufactured at either or both of Glenmark's facilities in India and (ii) to transfer and assign to Glenmark all right, title and interest in and to certain required dedicated equipment used to manufacture crofelemer located at Glenmark's Ankleshwar facility, subject to certain limitations.

***License Agreement with Luye Pharmaceuticals, Inc.***

In 2005, Napo entered into a license agreement with Luye Pharmaceuticals ("Luye") for the development of crofelemer for the indications of HIV/AIDS diarrhea, pediatric diarrhea and adult acute infectious diarrhea for the People's Republic of China including Macao and Hong Kong. The license agreement provided for Napo to receive royalties on net sales of crofelemer derived products. Annual royalty payments will be a specified percentage of net sales, ranging from the low single digits to low double digits but in no case exceeding 15% of net sales, depending on the annual amount of net sales. To date, Luye has not developed crofelemer for any indications in its licensed territory and the Company has not received any royalty income from Luye. In 2010, Napo amended the license agreement to provide Napo the opportunity to sub-license rights granted to Luye under the license agreement, including providing commercial rights to Napo, thereby expanding Napo's control of commercial rights to all human indications of crofelemer.

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***License Agreement with Insmmed Incorporated***

In 2007, Napo entered into a license agreement with Insmmed Incorporated ("Insmmed"), pursuant to which Insmmed granted Napo a perpetual, world-wide license to use Insmmed's patent and other intellectual property rights to Masoprocal in the field of use relating to diabetes, cardiac disease, hypertension, vascular disease, metabolic disease, Syndrome X and all other clinical syndromes related to insulin resistance, but excluding all rights in the field of use to all indications relating to the field of oncology, which were retained by Insmmed. Under the terms of the agreement, Napo made an upfront payment to Insmmed upon execution of the agreement and will make additional payments to Insmmed ranging from the low six figures to \$1,000,000 upon the achievement of certain milestones. In addition, Napo is required to make royalty payments to Insmmed, which will be a specified percentage of net sales, ranging from the low single digits to high single digits, depending on the annual amount of net sales and the geographical location of such sales. Napo's obligation to make royalty payments continues until the longer of (a) the maximum length of time that Masoprocal is protected by a licensed patent and (b) five years from the date upon which Napo receives FDA approval of the new drug application or foreign equivalent for any Masoprocal product or Masoprocal product formulation developed, manufactured and commercialized by or for Napo or Insmmed, subject to certain limitations described therein.

***License Agreement with Elanco US Inc.***

As we announced on January 31, 2017, we signed an agreement with Elanco US Inc., a subsidiary of Eli Lilly and Company, to license, develop, co-promote, and commercialize Canalevia, our drug product candidate under investigation for treatment of acute diarrhea and CID in dogs. The agreement grants Elanco exclusive global rights to Canalevia for use in companion animals. On November 1, 2017, Elanco notified the Company of its intention to terminate the agreement, effective January 30, 2018. On the effective date of termination of the agreement, all licenses granted by us to Elanco under the agreement will be revoked and the rights granted thereunder revert back to us.

**Patent Portfolio**

***Napo***

Napo owns a portfolio of patents and patent applications covering formulations of and methods of treatment with proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp., including Mytesi (crofelemer). The patent family related to International Patent publication WO1998/16111 relates to enteric protected formulations of proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp., including crofelemer, and methods of treating watery diarrhea using these enteric-protected formulation. There are three U.S. patents in this family, including, US 7,323,195, which has a term until at least June 7, 2018, US 7,341,744, which has a term until at least January 11, 2018, and US 8,574,634, which has a term until at least January 11, 2018. The United States Patent and Trademark Office (USPTO) issued on December 16, 2006, a notice of recalculation of the patent term adjustment for US 7,341,744 for 842 days, for an expiration date of February 5, 2019; however, the USPTO has not issued a certificate of correction to correct the patent term adjustment accorded to this patent. In addition, on February 20, 2017, Napo has filed a Request for Reconsideration of the patent term adjustment of US 7,341,744, requesting recalculation resulting in 1032 days or, alternatively, 980 days of patent term adjustment. Napo has elected to extend the term of US 7,341,744 under 35 U.S.C. 156, and the United States Patent and Trademark Office has issued a Notice of Final Determination that the patent term extension for US 7,341,744 is 1075 days. Based upon the January 11, 2018 expiration date, the patent would be extended to June 2021, to account for regulatory delay in obtaining human marketing approval for crofelemer. Napo has requested that the USPTO not issue the final Patent Term Extension certificate until final resolution of the number of days of patent term adjustment accorded to US 7,341,744. Patent protection for enteric protected formulations of



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crofelemer and methods of use has also been obtained outside the United States, including in Australia, Korea, Mexico, New Zealand and Taiwan, with terms extending until October 14, 2017 in these jurisdictions.

Napo additionally owns a family of patents arising from International Patent Application Publication WO2012058664 that cover methods of treating HIV associated diarrhea and HAART associated diarrhea with proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp., including crofelemer. In the U.S., there are two issued patents, US 8,962,680 and US 9,585,868, both of which expire October 31, 2031 and one pending application. Outside the U.S., patent protection for methods of treating HIV associated diarrhea has been obtained in Australia, Japan, Kenya, Kazakhstan, Russia, Ukraine, South Africa and Zimbabwe, with expiration dates of October 31, 2031, and Napo has pending applications in Brazil, Canada, China, Europe, Hong Kong, India, Japan, Mexico, and Malaysia. Napo also has patent families related to methods of treating diarrhea-predominant irritable bowel syndrome, constipation-predominant irritable bowel syndrome, and inflammatory bowel disease, familial adenomatous polyposis and colon cancer, with proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp., including crofelemer. In particular, for diarrhea-predominant irritable bowel syndrome, Napo has 1 issued US patent, which expires February 9, 2027, and 1 pending application, issued patents in Australia, Japan, South Korea, Mexico, New Zealand, Singapore, and Taiwan and pending applications in Bangladesh, Bolivia, Canada, Chile, Europe, Gulf States, Mexico, Panama, Peru, Paraguay, Thailand, and Taiwan, all of which are estimated to expire April 30, 2027; for constipation-predominant irritable bowel syndrome, Napo has 3 issued US patents, with terms of at least April 30, 2027, patents in Australia, Europe, Mexico, New Zealand, Singapore and pending applications in Canada, and India, all of which are estimated to expire April 30, 2027; and for inflammatory bowel disease, familial adenomatous polyposis and/or colon cancer, Napo has 1 issued US patent, which has an expiration date of October 9, 2029 and 1 pending application, issued patents in Australia, Europe and a pending application in Canada, which have estimated expiration dates of April 30, 2027.

Napo also co-owns with Glenmark, issued patents in India, South Africa and Eurasia patents that expire August 24, 2030, and cover a method of manufacturing with proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp., including crofelemer). Napo holds two US patents covering a formulation of NP-500 (nordihydroguaiaretic acid (NDGA)) and its use in treating a metabolic disorder that have terms until April 23, 2031 Napo has filed a PCT provisional application for the treatment of Chemotherapy induced diarrhea (CID) with crofelemer.

***Jaguar***

We have exclusive rights in the veterinary field to an international patent family related to International Patent Application WO1998/16111 as set forth above in the disclosure of the Napo patent portfolio. The patents and patent applications in this family are directed to enteric protected formulations of proanthocyanidin polymers isolated from *Croton* spp or *Calophyllum* spp. (such as crofelemer and Neonorm), and methods of treating watery diarrhea using the enteric protected formulations for both human and veterinary uses. As such, the patents and patent applications of this family cover certain formulations of crofelemer, including Canalevia, as well as the standardized botanical extract in Neonorm, and methods of treating diarrhea using these formulations.

Certain Napo patents and patent applications, which cover both human and veterinary uses, were previously licensed by Napo to Salix for certain fields of human use. On March 4, 2016, Napo and Salix settled litigation and all rights to crofelemer and Mytesi (formerly known as Fulyzaq) were returned to Napo and the collaboration agreement between Salix and Napo (the "Salix Collaboration Agreement"), was terminated. Napo has the responsibility to file, prosecute and maintain the Napo Patents. There are three issued Napo Patents in the United States that cover, collectively, enteric protected

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formulations of proanthocyanidin polymers isolated from *Croton spp.* and methods of treating watery diarrhea using the enteric protected formulations for both human and veterinary uses.

We have filed and have currently three applications pending under the PCT, and seven U.S. non-provisional patent applications relating to veterinary uses of *Croton* proanthocyanidin polymer compositions, including crofelemer, Neonorm and Canalevia, and product combinations under development. These applications are directed to treatment of watery diarrhea in newborn and young animals, including methods of improving mortality and weight gain in newborn animals, treatment of stress-induced diarrhea in animals, and treatment of watery diarrhea caused by salmonella in animals. These applications also focus on the treatment of diarrhea in companion animals such as dogs and cats. In addition, an application has been submitted for the treatment of ulcers and related symptoms in animals with an emphasis on ulcers in horses. An application has also been filed on a prebiotic effect of crofelemer in bovine and other animal species based on research findings that indicate a prebiotic enhancement of the gut bacteria in animals. One other patent application has been filed combining crofelemer with rifaximin, a non-absorbed antibiotic for the treatment of bacteria induced diarrhea in multiple animal species. Applications have been filed relating to treatment of porcine epidemic virus in piglets and treatment of diarrhea in livestock with a formulation that is not enteric protected. Patents that may issue based upon these applications should have terms that extend until at least May 2035.

**Government Regulation**

***Human Health Business***

The FDA and comparable regulatory authorities in state and local jurisdictions and in other countries impose substantial and burdensome requirements upon companies involved in the clinical development, manufacture, marketing and distribution of prescription drugs such as those Napo is developing. These agencies and other federal, state and local entities regulate, among other things, the research and development, testing, manufacture, quality control, safety, effectiveness, labeling, storage, record keeping, approval, advertising and promotion, distribution, post-approval monitoring and reporting, sampling and export and import of Napo's drug product candidates. To comply with the regulatory requirements in each of the jurisdictions in which Napo is seeking to market and subsequently sell its prescription products, Napo is establishing processes and resources to provide oversight of the development, approval processes and launch of its products and to position those products in order to gain market share.

***U.S. Government Regulation***

In the United States, the FDA approves and regulates drugs under the Federal Food, Drug, and Cosmetic Act ("FDCA"), and its implementing regulations.

The process of obtaining regulatory approvals and the subsequent compliance with applicable federal, state, local and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending NDAs, withdrawal of an approval, imposition of a clinical hold, issuance of warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties.

The process required by the FDA before a drug may be marketed in the United States generally involves the following:

completion of pre-clinical laboratory tests, animal studies and formulation studies in compliance with the FDA's good laboratory practice, or GLP, regulations;

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submission to the FDA of an investigational new drug application, or IND, which must become approved before human clinical trials may begin;

approval by an institutional review board, or IRB, of the study protocol and informed consent forms for the clinical site before each trial may be initiated. Multiple sites may necessitate the involvement of multiple IRBs and submissions;

performance of adequate and well-controlled human clinical trials in accordance with good clinical practice, or GCP, requirements to establish the safety and efficacy of the proposed drug product for each indication;

submission to the FDA of an NDA which would include the study reports of the clinical trials, chemistry and manufacturing of the active pharmaceutical ingredient and the final dosage form as well as other required sections to be included in the NDA;

satisfactory completion of an FDA advisory committee review, if applicable;

satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product is produced to assess compliance with current good manufacturing practice, or cGMP, requirements and to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity; and

FDA review and approval of the NDA.

*Pre-clinical Studies*

Pre-clinical studies include laboratory evaluation of the drug product's chemistry, toxicity and formulation, as well as animal studies to assess potential safety and efficacy. An IND sponsor must submit the results of the pre-clinical tests, together with manufacturing information, analytical data and any available clinical data or literature, among other things, to the FDA as part of an IND. Some pre-clinical testing may continue even after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to one or more proposed clinical trials and places the clinical trial on a clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

*Clinical Trials*

Clinical trials involve the administration of the investigational new drug to human subjects pursuant to a clinical protocol, under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent in writing for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives or endpoints of the trial, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA under the IND. In addition, an IRB at each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on their [www.clinicaltrials.gov](http://www.clinicaltrials.gov) website.

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

Phase 1: The drug is initially introduced into healthy human subjects or patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution,

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excretion and, if possible, to gain an early indication of its effectiveness depending on the endpoints set forth in the protocol.

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

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

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events occur. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

*Special Protocol Assessment*

The special protocol assessment, or SPA, process is designed to facilitate the FDA's review and approval of drugs by allowing the FDA to evaluate issues related to the adequacy of certain clinical trials, including Phase 3 clinical trials that can form the primary basis for a drug product's efficacy claim in an NDA. Upon specific request by a clinical trial sponsor, the FDA will evaluate the protocol and respond to a sponsor's questions regarding, among other things, primary efficacy endpoints, trial conduct and data analysis, within 45 days of receipt of the request.

The FDA ultimately assesses whether the protocol design and planned analysis of the trial are acceptable to support regulatory approval of the product candidate with respect to effectiveness of the indication studied. All agreements and disagreements between the FDA and the sponsor regarding an SPA must be clearly documented in an SPA letter or the minutes of a meeting between the sponsor and the FDA.

Even if the FDA agrees to the design, execution and analyses proposed in protocols reviewed under the SPA process, the FDA may revoke or alter its agreement under the following circumstances:

public health concerns emerge that were unrecognized at the time of the protocol assessment;

the director of the review division determines that a substantial scientific issue essential to determining safety or efficacy has been identified after testing has begun;

a sponsor fails to follow a protocol that was agreed upon with the FDA; or

the relevant data, assumptions, or information provided by the sponsor in a request for SPA change, are found to be false statements or misstatements, or are found to omit relevant facts.

A documented SPA may be modified, and such modification will be deemed binding on the FDA review division, except under the circumstances described above, if FDA and the sponsor agree in writing to modify the protocol and such modification is intended to improve the study.

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*Marketing Approval*

Assuming successful completion of the required clinical testing, the results of the pre-clinical studies and clinical trials, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of a NDA requesting approval to market the product for one or more indications. In most cases, the submission of a NDA is subject to a substantial application user fee. Under the Prescription Drug User Fee Act ("PDUFA"), guidelines that are currently in effect, the FDA has a goal of ten months from the date of "filing" of a standard NDA for a new molecular entity to review and act on the submission. This review typically takes twelve months from the date the NDA is submitted to FDA because the FDA has approximately two months to make a "filing" decision.

In addition, under the Pediatric Research Equity Act of 2003 ("PREA"), as amended and reauthorized, certain NDAs or supplements to an NDA must contain data that are adequate to assess the safety and effectiveness of the drug for the claimed indications in all relevant pediatric subpopulations; this would include information which supports dosing and administration for each pediatric subpopulation for which the product is safe and effective. The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults or full or partial waivers from the pediatric data requirements.

The FDA may also require submission of a risk evaluation and mitigation strategy, or REMS, plan to ensure that the benefits of the drug outweigh its risks. The REMS plan could include medication guides, physician communication plans, assessment plans, and/or elements to assure safe use, such as restricted distribution methods, patient registries, or other risk minimization tools.

The FDA may also require other information as part of the NDA filing such as an environmental impact statement. The FDA can waive some or delay compliance with some of these requirements.

The FDA conducts a preliminary review of all NDAs within the first 60 days after submission, before accepting them for filing, to determine whether they are sufficiently complete to permit substantive review. The FDA may request additional information rather than accept a NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA reviews a NDA to determine, among other things, whether the drug is safe and effective and whether the facility in which it is manufactured, processed, packaged or held meets standards designed to assure the product's continued safety, quality and purity.

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

Before approving an NDA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving a NDA, the FDA may inspect one or more clinical trial sites to assure compliance with GCP requirements.

After evaluating the NDA and all related information, including the advisory committee recommendation, if any, and inspection reports regarding the manufacturing facilities and clinical trial sites, the FDA may issue an approval letter, or, in some cases, a complete response letter. A complete response letter must contain a statement of specific items that prevent the FDA from approving the

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application and will also contain conditions that must be met in order to secure final approval of the NDA and may require additional clinical or pre-clinical testing in order for FDA to reconsider the application. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. If and when those conditions have been met to the FDA's satisfaction, the FDA will typically issue an approval letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications.

Even if the FDA approves a product, it may limit the approved indications for use of the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, Phase 4 clinical trials, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution and use restrictions or other risk management mechanisms under a REMS, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-marketing studies or surveillance programs. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes, and additional labeling claims, are subject to further testing requirements and FDA review and approval.

*Post-Approval Requirements*

Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims are subject to prior FDA review and approval. New secondary indications must be supported by clinical trials or data. There also are continuing, annual user fee requirements for any marketed products and the establishments at which such products are manufactured, as well as new application fees for supplemental applications with clinical data.

The FDA may impose a number of post-approval requirements as a condition of approval of an NDA. For example, the FDA may require post-marketing testing, including Phase 4 clinical trials, and surveillance to further assess and monitor the product's safety and effectiveness after commercialization.

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

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

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of distribution or other restrictions under a REMS program. Other potential consequences include, include, but are not limited to:

A US Holder will calculate the amortization of bond premium for a Foreign Currency Debt Security in the applicable non-US currency. Amortization deductions attributable to a period will reduce interest payments in respect of that period, and therefore are translated into US dollars at the spot rate of exchange used for those interest payments. Non-US currency exchange gain or loss will be realized with respect to amortized premium on a Foreign Currency Debt Security based on the difference between the spot rate of exchange at which the amortization deductions were translated into US dollars and the spot rate of exchange on the date such US Holder acquired the Foreign Currency Debt Security.

The amount realized with respect to a sale, exchange, redemption or other disposition of a Foreign Currency Debt Security generally will be the US dollar value of the payment received, determined on the date of disposition of such Foreign Currency Debt Security (using the spot rate of exchange on such date). However, with respect to Foreign Currency Debt Securities that are treated as traded on an established securities market, such amount realized will be determined using the spot rate of exchange on the settlement date in the case of (i) a US Holder that is a cash method taxpayer or (ii) a US Holder that is an accrual method taxpayer that elects such treatment. This election may not be changed without the consent of the IRS. Gain or loss that is recognized generally will be ordinary income or loss to the extent it is attributable to fluctuations in currency exchange rates between the date of purchase and the date of sale, exchange, redemption or other disposition. Such non-US currency gain (or loss), together with any non-US currency gain (or loss) realized on such disposition in respect of accrued interest or OID, will be recognized only to the extent of the total gain (or loss) realized by such US Holder on the sale, exchange, redemption or other disposition of the Foreign Currency Debt Security. Any gain (or loss) realized by a US Holder not treated as non-US currency gain (or loss) generally will be capital gain or loss (subject to the discussion above regarding Short-Term Debt Securities).

A US Holder that determines its amount realized in connection with the sale, exchange, redemption or other disposition of a Foreign Currency Debt Security by reference to the spot rate of exchange on the date of such sale, exchange, redemption or other disposition (rather than on the settlement date) may recognize additional non-US currency gain or loss upon receipt of non-US currency from such sale, exchange, redemption or other disposition.

A US Holder will recognize an amount of non-US currency gain or loss on a sale or other disposition of any non-US currency equal to the difference between (i) the amount of US dollars, or the fair market value in US dollars of any other property, received in such sale or other disposition and (ii) the tax basis of such non-US currency. A US Holder generally will have a tax basis in non-US currency received from a sale, exchange, redemption or other disposition of a Foreign Currency Debt Security equal to the US dollar value of such non-US currency on the date of receipt.

A debt security that provides for payments in more than one currency generally will be treated as a "contingent payment debt instrument", and the special rules applicable to such instruments will be described in the applicable prospectus supplement or term sheet.

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***Aggregation Rules***

The Treasury Regulations relating to OID contain special aggregation rules stating in general that, subject to certain exceptions, debt instruments issued in the same transaction or related transactions to a single purchaser may be treated as a single debt instrument with a single issue price, maturity date, yield to maturity and stated redemption price at maturity for purposes of the OID rules. Under certain circumstances, these provisions could apply to a US Holder that purchases debt securities from more than one series of debt securities.

***Medicare Tax***

In addition to regular US federal income tax, certain US Holders that are individuals, estates or trusts are subject to a 3.8% tax on all or a portion of their "net investment income", which may include all or a portion of their interest income (including accrued OID) and net gain from the sale, exchange, redemption or other disposition of a debt security.

***Backup Withholding and Information Reporting***

Backup withholding and information reporting requirements generally apply to interest (including OID) and principal payments made to, and the proceeds of sales by, certain non-corporate US Holders. A US Holder not otherwise exempt from backup withholding generally can avoid backup withholding by providing a properly executed IRS Form W-9. Any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against the US Holder's US federal income tax liability, provided the required information is timely furnished to the IRS.

***Disclosure Requirements for Certain Holders Recognizing Significant Losses***

A US Holder that participates in any "reportable transaction" (as defined in the Treasury Regulations) must attach to its US federal income tax return a disclosure statement on IRS Form 8886. Each US Holder should consult its own tax advisor regarding the possible obligation to file IRS Form 8886 reporting non-US currency exchange loss arising from the debt securities or any amounts received with respect to the debt securities.

***Disclosure Requirements for Specified Foreign Financial Assets***

Individual US Holders (and certain US entities specified in US Treasury Department guidance) who, during any taxable year, hold any interest in any "specified foreign financial asset" generally will be required to file with their US federal income tax returns certain information on IRS Form 8938 if the aggregate value of all such assets exceeds certain specified amounts. "Specified foreign financial asset" generally includes any financial account maintained with a non-US financial institution and may also include the debt securities if they are not held in an account maintained with a financial institution. Substantial penalties may be imposed, and the period of limitations on assessment and collection of US federal income taxes may be extended, in the event of a failure to comply. Each US Holder should consult its own tax advisor regarding the possible application of this filing requirement.

**Australian Taxation**

*THE FOLLOWING IS A SUMMARY OF THE AUSTRALIAN WITHHOLDING TAX TREATMENT UNDER THE INCOME TAX ASSESSMENT ACTS OF 1936 AND 1997 OF AUSTRALIA (TOGETHER, "THE AUSTRALIAN TAX ACT") AT THE DATE OF THIS PROSPECTUS OF PAYMENTS OF INTEREST BY WESTPAC ON THE DEBT SECURITIES AND CERTAIN OTHER MATTERS RELEVANT TO HOLDERS OF DEBT SECURITIES ("HOLDERS").*



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*THE FOLLOWING SUMMARY IS NOT EXHAUSTIVE AND, IN PARTICULAR, DOES NOT DEAL WITH THE POSITION OF CERTAIN CLASSES OF HOLDERS (INCLUDING, WITHOUT LIMITATION, AUSTRALIAN RESIDENTS, NON-RESIDENTS THAT HOLD THE DEBT SECURITIES THROUGH A PERMANENT ESTABLISHMENT IN AUSTRALIA, DEALERS IN SECURITIES, OR CUSTODIANS OR THIRD PARTIES THAT HOLD THE DEBT SECURITIES ON BEHALF OF ANY PERSON). NOR DOES IT DEAL WITH DEBT SECURITIES ISSUED BY WESTPAC FROM A BRANCH OUTSIDE AUSTRALIA, OR WITH DUAL CURRENCY/PARTLY PAID OR INDEXED DEBT SECURITIES. IF SUCH DEBT SECURITIES ARE ISSUED, THEIR AUSTRALIAN TAXATION TREATMENT WILL BE SUMMARISED IN THE RELEVANT FINAL TERMS/APPLICABLE PROSPECTUS SUPPLEMENT OR TERM SHEET.*

*THE FOLLOWING SUMMARY IS A GENERAL GUIDE AND SHOULD BE TREATED WITH APPROPRIATE CAUTION. IT IS NOT INTENDED TO BE, NOR SHOULD IT BE CONSTRUED AS, LEGAL OR TAX ADVICE TO ANY PARTICULAR HOLDER. PROSPECTIVE HOLDERS SHOULD BE AWARE THAT THE PARTICULAR TERMS OF ISSUE OF ANY SERIES OF DEBT SECURITIES MAY AFFECT THE TAX TREATMENT OF THAT AND OTHER SERIES OF DEBT SECURITIES. HOLDERS SHOULD CONSULT THEIR PROFESSIONAL ADVISERS.*

***Australian interest withholding tax ("IWT")***

Generally, payments of principal and interest on the debt securities made by Westpac to a Holder that is not a resident of Australia for Australian tax purposes (a "Non-Resident") (other than one deriving the interest in carrying on business in Australia at or through a permanent establishment in Australia) will not be subject to Australian taxes or duties other than IWT at a rate of 10% of the amount of an interest payment. However, IWT will not be payable if an exemption applies.

For IWT purposes, "interest" is defined to include amounts in the nature of, or paid in substitution for, interest and certain other amounts. Any premium or issue discount would be interest for these purposes.

There are also specific rules that can apply to treat a portion of the purchase price of the debt securities as interest for IWT purposes when debt securities that are originally issued at a discount, or with a maturity premium, or which do not pay interest at least annually, are sold by a Non-Resident (other than one holding the debt securities as part of a business carried on by it at or through a permanent establishment in Australia) to:

a resident of Australia for Australian tax purposes (a "Resident") that does not acquire them in carrying on business at or through a permanent establishment in a country outside Australia; or

a Non-Resident that acquires them in carrying on business in Australia at or through a permanent establishment in Australia.

***Exemption from IWT under section 128F of the Australian Tax Act ("section 128F")***

Interest on the debt securities will be exempt from IWT if the requirements of section 128F are satisfied in relation to the debt securities.

Westpac proposes to issue the debt securities in a manner which will satisfy the requirements of section 128F.

The exemption from IWT available under section 128F is not intended to apply to related party loans. In particular, in order for that exemption to apply, Westpac must not have known or had reasonable grounds to suspect, at the time of their issue, that any of the debt securities, or an interest in the debt securities, were being or would later be acquired either directly or indirectly by an Offshore Associate of Westpac (other than one acting in the capacity of a dealer, manager or underwriter in

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relation to the placement of the debt securities or in the capacity of a clearing house, custodian, funds manager or responsible entity of a registered scheme (as defined in the Corporations Act 2001 of Australia)).

In addition, the exemption from IWT available under section 128F will not apply if, at the time of an interest payment in respect of the debt securities, Westpac knew or had reasonable grounds to suspect that the recipient of the payment was an Offshore Associate of Westpac (other than one receiving the payment in the capacity of a clearing house, paying agent, custodian, funds manager or responsible entity of a registered scheme (as defined in the Corporations Act 2001 of Australia)).

For these purposes, an Offshore Associate means an associate (as defined in section 128F) of Westpac that is either:

a Non-Resident that does not acquire the debt securities and does not receive all payments under them in carrying on business in Australia at or through a permanent establishment in Australia; or

a Resident that acquires the debt securities and receives payments under them in carrying on business at or through a permanent establishment in a country outside Australia.

Accordingly, if you are an Offshore Associate of Westpac, you should not acquire any of the debt securities.

***Payment of additional amounts because of a deduction or withholding in respect of IWT***

If Westpac is, at any time, compelled by law to deduct or withhold an amount in respect of IWT, then it must, subject to certain exceptions, pay such additional amounts as may be necessary in order to ensure that the aggregate amounts received by the Holders after such deduction or withholding equal the amounts that would have been received by them had no such deduction or withholding been required.

It is noted that Westpac will not be obliged to pay such additional amounts on account of IWT which is payable by reason of the Holder being an associate (as defined in section 128F) of Westpac.

***Withholding for failure to provide Tax File Number ("TFN") / Australian Business Number ("ABN")***

Westpac is required to deduct and withhold tax from payments of interest at a rate that is currently 49% for the 2014-15, 2015-16 and 2016-17 income years (and, under current law, will be reduced to 47% following the 2016-17 income year) on the debt securities unless a TFN or, in certain circumstances, an ABN has been provided to Westpac by the Holder, or the Holder has supplied Westpac with proof of some other relevant exemption.

Provided that the requirements of section 128F have been satisfied with respect to the debt securities, the TFN / ABN withholding rules will not apply to payments to Holders that are Non Residents and do not hold the debt securities in carrying on business in Australia at or through a permanent establishment in Australia.

Westpac will not be obliged to pay additional amounts on account of taxes deducted or withheld on payments made in respect of debt securities presented for payment by a Holder that could lawfully avoid (but has not so avoided) such deduction or withholding by complying with any statutory requirements or making a declaration of non-residence or other claim or filing for exemption.

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*Other Australian withholding taxes*

*Non-resident withholding tax*

Under section 12-315 of Schedule 1 to the Taxation Administration Act 1953 of Australia ("TAA"), regulations may be made that require amounts to be withheld on account of tax liabilities of Non-Residents from certain payments that are made by an Australian entity to such Non-Residents.

These rules do not currently apply to payments in relation to the debt securities. However, the possible application of any future regulations to payments received by Non-Residents in respect of the debt securities will need to be monitored.

*Supply withholding tax*

Payments in respect of the debt securities will be able to be made free and clear of the "supply withholding tax" imposed under section 12-190 of Schedule 1 to the TAA.

*Other Australian tax matters*

*Gains on disposal of debt securities by Non-Residents*

Non-Residents that have never held their debt securities in the course of carrying on business at or through a permanent establishment within Australia will not be subject to Australian income tax on gains realized by them on the sale or redemption of the debt securities provided that such gains do not have an Australian source. A gain arising on the sale of debt securities by a Non Resident Holder to another Non Resident where the debt securities are sold outside Australia and all negotiations are conducted, and documentation executed, outside Australia would not generally be regarded as having an Australian source.

*Garnishee directions*

The Commissioner of Taxation for Australia may give a direction under section 255 of the Australian Tax Act or section 260-5 of Schedule 1 to the TAA or any similar provision requiring Westpac to deduct or withhold from any payment to any other party (including any Holder) any amount in respect of tax payable by that other party. If Westpac is served with such a direction, Westpac intends to comply with that direction and make any deduction or withholding required by that direction.

*Goods and services tax ("GST")*

Neither the issue, nor the receipt, of the debt securities will give rise to a liability for GST in Australia on the basis that the supply of the debt securities will comprise either an "input taxed financial supply" or (in the case of a supply to a Non-Resident Holder outside Australia) a "GST-free supply". Furthermore, neither the payment of principal or interest by Westpac, nor the disposal or redemption of the debt securities, would give rise to any GST liability in Australia.

*Estate duties*

No debt securities will be subject to death, estate or succession duties imposed by Australia, or by any political subdivision or authority therein having power to tax, if held at the time of death.

*Stamp duties*

No ad valorem stamp, issue, registration or similar taxes are payable in Australia on the issue or transfer of any debt securities.

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**PLAN OF DISTRIBUTION**

We may sell the debt securities from time to time in one or more transactions. We may sell securities pursuant to the registration statement to or through agents, underwriters, dealers or other third parties or directly to one or more purchasers or through a combination of any of these methods. In some cases, we or the dealers acting with us or on behalf of us may also purchase securities and reoffer them to the public. We may also offer and sell, or agree to deliver, securities pursuant to, or in connection with, any option agreement or other contractual arrangement.

Agents whom we designate may solicit offers to purchase the securities.

We will name any agent involved in offering or selling securities, and disclose any commissions that we will pay to the agent, in the applicable prospectus supplement or term sheet.

Unless we indicate otherwise in the applicable prospectus supplement or term sheet, agents will act on a best efforts basis for the period of their appointment.

Agents may be deemed to be underwriters under the Securities Act of any of the securities that they offer or sell.

We may use an underwriter or underwriters in the offer or sale of the securities.

We will execute an underwriting agreement with any underwriter or underwriters at the time that we reach an agreement for the sale of the securities.

We will include the names of the specific managing underwriter or underwriters, as well as the names of any other underwriters, and the terms of the transactions, including the compensation the underwriters and dealers will receive, in the applicable prospectus supplement or term sheet.

The underwriters will use the applicable prospectus supplement or term sheet to sell the securities.  
We may use a dealer to sell the securities.

If we use a dealer, we, as principal, will sell the securities to the dealer.

The dealer will then sell the securities to the public at varying prices that the dealer will determine at the time it sells the securities.

We will include the name of the dealer and the terms of the transactions with the dealer in the applicable prospectus supplement or term sheet.

We may solicit directly offers to purchase the securities, and we may directly sell the securities to institutional or other investors. We will describe the terms of direct sales in the applicable prospectus supplement or term sheet.

We may engage in at the market offerings into an existing trading market in accordance with Rule 415(a)(4) of the Securities Act.

We may indemnify agents, underwriters and dealers against certain liabilities, including liabilities under the Securities Act. Agents, underwriters and dealers, or their affiliates, may be customers of, engage in transactions with or perform services for us, in the ordinary course of business.

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We may authorize agents and underwriters to solicit offers by certain institutions to purchase the securities at the public offering price under delayed delivery contracts.

If we use delayed delivery contracts, we will disclose that we are using them in the prospectus supplement or term sheet and will tell you when we will demand payment and delivery of the securities under the delayed delivery contracts.

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These delayed delivery contracts will be subject only to the conditions that we describe in the prospectus supplement or term sheet.

We will describe in the applicable prospectus supplement or term sheet the commission that underwriters and agents soliciting purchases of the securities under delayed contracts will be entitled to receive.

Until the distribution of the securities is completed, rules of the SEC may limit the ability of underwriters and other participants in the offering to bid for and purchase the securities. As an exception to these rules, the underwriters in certain circumstances are permitted to engage in certain transactions that stabilize the price of the securities. Such transactions consist of bids or purchases for the purpose of pegging, fixing or maintaining the price of the securities. If the underwriters create a short position in the securities in connection with the offering by selling more securities than are set forth on the cover page of the applicable prospectus supplement or in the term sheet, the underwriters may reduce that short position by purchasing securities in the open market. The underwriters also may impose a penalty bid on certain underwriters. This means that if the underwriters purchase the securities in the open market to reduce the underwriters' short position or to stabilize the price of the securities, they may reclaim the amount of the selling concession from the underwriters who sold those securities as part of the offering. In general, purchases of a security for the purpose of stabilization or to reduce a short position could cause the price of the security to be higher than it might be in the absence of such purchases. The imposition of a penalty bid might also have an effect on the price of a security to the extent that it were to discourage resales of the security.

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**WHERE YOU CAN FIND MORE INFORMATION**

We file annual and other reports and other information with the SEC under the Securities Exchange Act of 1934, as amended, which we refer to as the Exchange Act. This information may be read and copied at the Public Reference Room of the SEC at 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 these public reference facilities. The SEC maintains an Internet site, <http://www.sec.gov>, which contains reports, proxy and information statements and other information regarding issuers that are subject to the SEC's reporting requirements.

You may request a copy of any filings (excluding exhibits) referred to above and in "Incorporation of Information We File with the SEC" at no cost by contacting us at the following address: Westpac Banking Corporation, New York Branch, 575 Fifth Avenue, 39th Floor, New York, New York 10017-2422, Attention: Branch Manager. Telephone requests may be directed to such person at (212) 551-1905.

This prospectus is part of a registration statement that we have filed with the SEC relating to the debt securities to be offered. This prospectus does not contain all of the information we have included in the registration statement and the accompanying exhibits and schedules in accordance with the rules and regulations of the SEC, and we refer you to the omitted information. The statements this prospectus makes pertaining to the content of any contract, agreement or other document that is an exhibit to the registration statement necessarily are summaries of their material provisions and do not describe all exceptions and qualifications contained in those contracts, agreements or documents. You should read those contracts, agreements or documents for information that may be important to you. The registration statement, exhibits and schedules are available at the SEC's Public Reference Room or through its Internet site.

**INCORPORATION OF INFORMATION WE FILE WITH THE SEC**

The SEC allows us to incorporate by reference the information we file with them, which means:

incorporated documents are considered part of this prospectus;

we can disclose important information to you by referring you to those documents; and

information that we file with the SEC will automatically update and supersede this prospectus and previously incorporated information.

We incorporate by reference the documents listed below which were filed with the SEC under the Exchange Act:

our annual report on Form 20-F for the financial year ended September 30, 2015; and

the information contained in Exhibit 1 to our report on Form 6-K dated November 10, 2015.

We also incorporate by reference each of the following documents that we file with the SEC after the date of this prospectus until this offering is completed:

reports filed under Sections 13(a) and (c) of the Exchange Act, including reports on Form 6-K if and to the extent specified in such report as being incorporated by reference in this prospectus; and

any reports filed under Section 15(d) of the Exchange Act.

You should assume that the information appearing in this prospectus is accurate as of the date of this prospectus only. Our business, financial condition and results of operations may have changed since that date.





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**ENFORCEABILITY OF FOREIGN JUDGMENTS IN AUSTRALIA**

Westpac is a company incorporated in Australia under the Australian Corporations Act and registered in New South Wales, having its registered office at Level 20, Westpac Place, 275 Kent Street, Sydney, New South Wales 2000, Australia. In order to enforce a final, unsatisfied and conclusive judgment for the payment of a fixed or readily calculable sum of money rendered by any New York State or United States federal court having jurisdiction under its own domestic laws, and within whose jurisdiction Westpac was carrying on business at the time of commencement of the proceedings in which such judgment was rendered, with respect to any liability of Westpac with respect to any securities, it is necessary for the judgment creditor to bring separate proceedings as a new cause of action based on such judgment in the courts of competent jurisdiction of New South Wales or Australia against Westpac. Subject to the matters set forth under the heading "Description of the Debt Securities Events of Default, Notice and Waiver Senior Debt Securities," those courts could reasonably be expected in the circumstances to give conclusive effect to such judgment for the purpose of the proceedings. Westpac has expressly submitted to the jurisdiction of New York State and United States federal courts sitting in The City of New York for the purpose of any suit, action or proceedings arising out of the offering and sale of any securities. Westpac has appointed its New York branch, 575 Fifth Avenue, 39th Floor, New York, New York 10017-2422, Attention: Branch Manager, as its agent upon whom process may be served in any such action.

All of the directors and executive officers of Westpac, and the independent accountants named herein, reside outside the United States. Substantially all or a substantial portion of the assets of all or many of such persons are located outside the United States. As a result, it may not be possible for holders of securities to effect service of process within the United States upon such persons. In addition, it may not be possible for holders of securities to enforce against such persons judgments obtained in United States courts predicated upon the civil liability provisions of federal securities laws of the United States. Westpac has been advised by its Australian counsel, King & Wood Mallesons, that there is doubt as to the enforceability in Australia, in original actions or in actions for enforcement of judgments of United States courts, of civil liabilities predicated upon the federal securities laws of the United States.

**CURRENCY OF PRESENTATION AND EXCHANGE RATES**

We publish our consolidated financial statements in Australian dollars.

The following table sets forth, for Westpac's financial years indicated, the high, low, average and period-end noon buying rates in New York City for cable transfers of Australian dollars as certified for customs purposes by the Federal Reserve Bank of New York, expressed in US dollars per A\$1.00. Westpac's fiscal year ends on September 30 of each year.

Financial Year	At Period End	Average Rate(1)	High	Low
2008	0.7904	0.9065	0.9797	0.7831
2009	0.8824	0.7400	0.8824	0.6073
2010	0.9640	0.9003	0.9714	0.8172
2011	0.9744	1.0318	1.1026	0.9594
2012	1.0388	1.0371	1.0806	0.9453
2013	0.9342	0.9885	1.0579	0.8901
2014	0.8737	0.9155	0.9705	0.8715
2015	0.7020	0.7781	0.8904	0.6917
2016(2)	0.7034	0.7084	0.7328	0.7025

(1) The average of the noon buying rates on the last day of each month or portion thereof during the period.

(2) Through November 6, 2015.

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Regulations in Australia restrict or prohibit payments, transactions and dealings with assets having a proscribed connection with certain countries or named individuals or entities subject to international sanctions or associated with terrorism.

**VALIDITY OF SECURITIES**

Debevoise & Plimpton LLP, our New York counsel, will pass, on our behalf, on the validity of the debt securities described in this prospectus with respect to New York law. King & Wood Mallesons, our Australian counsel, will pass, on our behalf, on the validity of the debt securities with respect to Australian law. Debevoise & Plimpton LLP may rely on the opinion of King & Wood Mallesons on matters of Australian law.

**EXPERTS**

The financial statements and management's assessment of the effectiveness of internal control over financial reporting (which is included in Management's Report on Internal Control Over Financial Reporting), incorporated in this prospectus by reference to the Annual Report on Form 20-F of Westpac Banking Corporation for the year ended September 30, 2015, have been so incorporated in reliance on the report of PricewaterhouseCoopers, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting. PricewaterhouseCoopers is a member of the Institute of Chartered Accountants in Australia.

**LIMITATION ON INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM'S LIABILITY**

The liability of PricewaterhouseCoopers (an Australian partnership which we refer to as PwC Australia) with respect to claims arising out of its audit report described under "Experts" above, is subject to the limitations set forth in the Professional Standards Act 1994 of New South Wales, Australia, which we refer to as the Professional Standards Act, and The Institute of Chartered Accountants in Australia (NSW) Scheme adopted by The Institute of Chartered Accountants in Australia on October 8, 2014 and approved by the New South Wales Professional Standards Council pursuant to the Professional Standards Act, which we refer to as the NSW Accountants Scheme. For matters occurring on or prior to October 7, 2014, the liability of PwC Australia may be subject to the limitations set forth in predecessor schemes. The current NSW Accountants Scheme expires on October 7, 2019.

The Professional Standards Act and the NSW Accountants Scheme may limit the liability of PwC Australia for damages with respect to certain civil claims arising in, or governed by the laws of, New South Wales directly or vicariously from anything done or omitted to be done in the performance of its professional services for us, including, without limitation, its audits of our financial statements. The extent of the limitation depends on the timing of the relevant matter and is:

in relation to matters occurring on or after October 8, 2013, a maximum liability for audit work of A\$75 million; or

in relation to matters occurring on or prior to October 7, 2013, to the lesser of (in the case of audit services) ten times the reasonable charge for the service provided and a maximum liability for audit work of A\$75 million.

The limitations do not apply to claims for breach of trust, fraud or dishonesty.

In addition, there is equivalent professional standards legislation in place in other states and territories in Australia and amendments have been made to a number of Australian federal statutes to limit liability under those statutes to the same extent as liability is limited under state and territory laws by professional standards legislation. Accordingly, liability for acts or omissions by PwC Australia in Australian states or territories other than New South Wales may be limited in a manner similar to that



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in New South Wales. These limitations of liability may limit recovery upon the enforcement in Australian courts of any judgment under US or other foreign laws rendered against PwC Australia based on or related to its audit report on our financial statements. Substantially all of PwC Australia's assets are located in Australia. However, the Professional Standards Act and the NSW Accountants Scheme have not been subject to judicial consideration and therefore how the limitation might be applied by the courts and the effect of the limitation on the enforcement of foreign judgments are untested.

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**US\$4,000,000,000**

**Westpac Banking Corporation**

**(ABN 33 007 457 141)**

**US\$750,000,000 1.650% Notes due May 13, 2019**

**US\$1,250,000,000 2.100% Notes due May 13, 2021**

**US\$1,500,000,000 2.850% Notes due May 13, 2026**

**US\$250,000,000 Floating Rate Notes due May 13, 2019**

**US\$250,000,000 Floating Rate Notes due May 13, 2021**

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**PROSPECTUS SUPPLEMENT**

**May 9, 2016**

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*Joint Book-Running Managers*

**BofA Merrill  
Lynch**

**Citigroup**

**Goldman, Sachs  
& Co.**

**J.P. Morgan**

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