2018
ANNUAL
REPORT

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Dear Stockholders,

2018 was a pivotal year for Innovate Biopharmaceuticals as we began our first year as a public company and laid the groundwork for the first ever Phase 3 clinical trial for celiac disease. Celiac disease is an autoimmune disease which affects approximately 1% of most of the world's population, including more than 3 million patients in the U.S., and currently has no approved treatment. Growth in awareness and diagnosis of celiac disease have contributed to improved understanding of the disease and the need for a pharmaceutical therapy for this underserved patient population.

In 2018, we also furthered our understanding of the molecular biology of our lead drug, larazotide acetate, which has a unique mechanism of action that re-normalizes the gut-epithelial barrier and the gut-liver axis. We believe that larazotide has potential applications in several autoimmune and metabolic diseases, including type 1 diabetes mellitus, non-alcoholic steatohepatitis (NASH), chronic kidney disease, and inflammatory bowel diseases (Crohn's disease and ulcerative colitis). Larazotide is based on gut-restricted peptides which re-normalize the intestinal-epithelial barrier, a key gateway to multiple diseases. This gateway to inflammation in a variety of autoimmune, metabolic and CNS diseases is the connection from the gut to the organ affected, such as the gut-liver connection in NASH, gut-brain connection in Parkinson's disease, and the gut-pancreas connection in type 1 diabetes. Inflammatory modulators including peptides, metabolites and others, secreted by the microbiome, the bacteria residing in the gut, and other sources are able to pass thru a leaky intestinal barrier (a layer of epithelial cells lining the gut) leading to dysfunction of the immune system and inflammation. Although the intestinal barrier has been studied over time and implicated in a variety of diseases, its molecular regulation is still not well understood, and larazotide, our lead drug, is the only known therapeutic that has been shown in studies to re-normalize this leaky intestinal barrier.

Recently, research developments have shown links to changes in the microbiome of cancer patients to their responsiveness to immunotherapies utilizing checkpoint inhibitors, including anti-PD-1/PDL-1antibodies and anti-CTLA-4 antibody. Only a minority of patients, less than 25%, respond to checkpoint inhibitors. Innovate is pursing research collaborations to elucidate how regulation of the intestinal barrier by larazotide could prevent translocation of various factors from the gut to the vasculature and the tumor, thereby potentially augmenting checkpoint inhibitors and converting non-responders to responders.

We are also evaluating larazotide in preclinical models to treat NASH. NASH represents a rapidly growing health concern affecting an estimated 3-5% of the U.S. population. Studies have shown that NASH patients have higher intestinal permeability. To execute our development strategy, we believe we have assembled an expert team of pharmaceutical executives, consultants and key scientific opinion leaders with an accomplished track record of product development and bringing important, novel medicines to patients.

In closing, 2018 was a truly memorable year for Innovate on all fronts. This would not have been possible without your ongoing support. As we focus our efforts in 2019, our commitment is to continue developing innovative medicines for delivery to those who remain in need; patients are waiting, and we will work continuously to serve them.

Sandeep Laumas, M.D.
Executive Chairman, Chief Executive Officer and Director

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

(Mark One)

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2018
OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to _____

Commission file number **001-37797**

INNOVATE BIOPHARMACEUTICALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**27-3948465**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*

8480 Honeycutt Road, Suite 120
Raleigh, North Carolina 27615
(Address of principal executive offices, including zip code)
(919) 275-1933
(Registrant's telephone number, including area code)

SECURITIES REGISTERED PURSUANT TO SECTION 12(b) OF THE ACT:

Title of each class	Name of each exchange on which registered
Common Stock $0.0001 Par Value	The Nasdaq Stock Market LLC

SECURITIES REGISTERED PURSUANT TO SECTION 12(g) OF THE ACT: None

Indicate by check mark if the registrant is a well-known seasoned issuer as defined in Rule 405 of the Securities Act. Yes ☐ No ☑

Indicate by check mark if the issuer is not required to file reports pursuant to Section 13 or 15(d) of the Exchange Act. Yes ☐ No ☑

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☑ No ☐

Indicate by check mark if the disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of the Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or an amendment to this 10-K. ☐

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

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☑

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☑

The aggregate value of common stock held by non-affiliates of the registrant as of June 29, 2018, the last business day of the registrant's most recently completed second fiscal quarter, was approximately $313 million (based on the last reported closing sale price on the Nasdaq Capital Market on that date of $23.57 per share).

As of March 13, 2019, the registrant had 26,794,534 shares of common stock, par value $0.0001 per share, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this annual report on Form 10-K incorporates information by reference from the registrant's definitive proxy statement to be filed with the Securities and Exchange Commission pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended, within 120 days after the close of the registrant's fiscal year.

FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains 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"). When used in this report, the words "believe," "may," "could," "will," "estimate," "continue," "anticipate," "intend," "target," "expect," "plan," "indicate," "seek," "should," "would" and similar expressions are intended to identify forward-looking statements, though not all forward-looking statements contain these identifying words. All statements other than statements of historical fact are statements that could be deemed forward-looking statements.

These forward-looking statements are based on our current expectations and beliefs and involve significant risks and uncertainties that may cause our actual results, performance, prospects and opportunities in the future to differ materially from those expressed or implied by such forward-looking statements. These risks and uncertainties include, among other things, risks related to our limited operating history; our need for substantial additional funding; the lengthy, expensive and uncertain nature of the clinical trial process; results of earlier studies and trials not being predictive of future trial results; our need to attract and retain senior management and key scientific personnel; our reliance on third parties; our ability to manage our growth; potential delays in commencement and completion of clinical studies; our ability to obtain and maintain effective intellectual property protection; and other risks described with these in greater detail in the "Risk Factors" section of this Annual Report on Form 10-K. These forward-looking statements are made as of the date of this Annual Report on Form 10-K and we assume no obligation to update or revise them to reflect new events or circumstances except as required by law.

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PART I

Item 1. Business.

Merger of Monster Digital, Inc. and Innovate Biopharmaceuticals Inc.

On January 29, 2018, Monster Digital, Inc. ("Monster") and privately held Innovate Biopharmaceuticals Inc. ("Private Innovate") completed a reverse recapitalization in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated July 3, 2017, as amended (the "Merger Agreement"), by and among Monster, Monster Merger Sub, Inc. ("Merger Sub") and Private Innovate, which changed its name in connection with the transaction to IB Pharmaceuticals Inc. ("IB Pharmaceuticals"). Pursuant to the Merger Agreement, Merger Sub merged with and into IB Pharmaceuticals with IB Pharmaceuticals surviving as the wholly owned subsidiary of Monster (the "Merger"). Immediately following the Merger, Monster changed its name to Innovate Biopharmaceuticals, Inc. ("Innovate"). In connection with the closing of the Merger, Innovate's common stock began trading on the Nasdaq Capital Market under the ticker symbol "INNT" on February 1, 2018. Prior to the Merger, Monster was incorporated in Delaware in November 2010 under the name "Monster Digital, Inc."

Except as otherwise noted or where the context otherwise requires, as used in this report, the words "we," "us," "our," the "Company" and "Innovate" refer to Innovate Biopharmaceuticals, Inc. as of and following the closing of the Merger on January 29, 2018 and, where applicable, the business of Private Innovate prior to the Merger. All references to "Monster" refer to Monster Digital, Inc. prior to the closing of the Merger.

Overview

Prior to the Merger, Monster's primary business focus was the design, development and marketing of premium products under the "Monster Digital" brand for use in high-performance consumer electronics, mobile products and computing applications.

After the Merger, we are a clinical-stage biopharmaceutical company developing novel medicines for autoimmune and inflammatory diseases with unmet medical needs. Our pipeline includes drug candidates for celiac disease, nonalcoholic steatohepatitis (NASH), alcoholic steatohepatitis (ASH), Crohn's disease (CD) and ulcerative colitis (UC). Our lead program, INN-202 (larazotide acetate or larazotide) is entering Phase 3 registration trials for celiac disease, an unmet medical need, targeted to start in the first half of 2019. INN-202 has the potential to be the first-to-market therapeutic for celiac disease, which affects an estimated 1% of the North American population or approximately 3 million individuals. Celiac patients have no treatment alternative other than a strict lifelong adherence to a gluten-free diet, which is difficult to maintain and can be deficient in key nutrients. Additionally, current FDA labeling standards allow up to 20 parts per million (ppm) of gluten in "gluten-free" labeled foods, which contains enough gluten to cause celiac symptoms in many patients, including abdominal pain, abdominal cramping, bloating, gas, headaches, ataxia, ''brain fog'' and fatigue. Long-term ramifications of celiac disease include enteropathy associated T-cell lymphoma (EATL), osteoporosis and anemia.

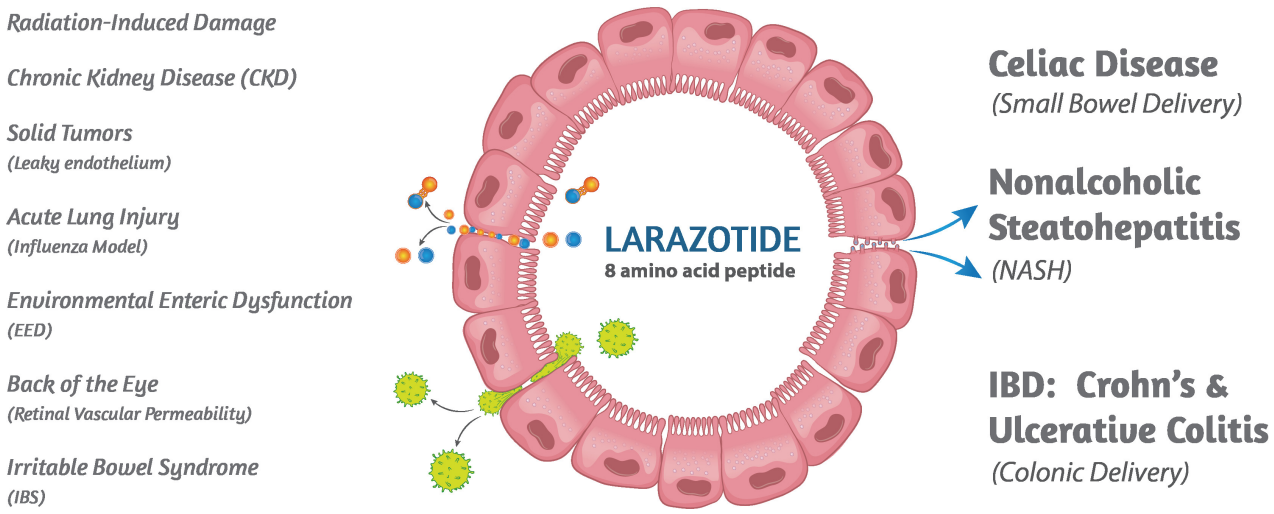

Figure 1: Larazotide's mechanism of action is applicable to multiple diseases.

Larazotide is an 8-amino acid peptide formulated into an orally administered capsule and has been tested in nearly 600 celiac patients with statistically significant improvement in celiac symptoms. The FDA has granted larazotide Fast Track Designation for celiac disease. Larazotide's safety profile has been similar to placebo mainly due to its lack of systemic absorption into blood circulation. Additionally, larazotide's mechanism of action as a tight junction regulator is a new approach to treating autoimmune diseases, such as celiac disease. Multiple pre-clinical studies have shown larazotide causes a reduction in permeability across the intestinal epithelial barrier, making it the only drug candidate known to us which is in clinical trials with this mechanism of action. Increased intestinal permeability underlies several diseases in addition to celiac disease, including NASH, ASH, Crohn's disease, ulcerative colitis and irritable bowel syndrome-diarrhea predominant (IBS-D), among others (Figure 1). We are engaging in multiple research collaborations to expand larazotide's clinical indications with a shorter time to proof-of-concept.

Celiac Disease (CeD)

With the release of the Phase 2b trial data in 342 celiac patients at the 2014 Digestive Disease Week conference, larazotide became the first and the only drug for the treatment of celiac disease (published data), which met its primary efficacy endpoint with statistical significance. The Phase 2b data showed statistically significant (p=0.022) reduction in abdominal and non-GI (headache) symptoms as measured by the CeD PRO. After a successful End-of-Phase 2 meeting with the FDA, which confirmed the regulatory path forward, we expect to launch the Phase 3 registration program during the first half of 2019 with topline data expected in 2020. We recently entered into an agreement with a clinical research organization to facilitate the completion of start-up activities for our Phase 3 clinical trials in celiac disease.

Larazotide is being investigated as an adjunct to a gluten-free diet for celiac patients who continue to experience symptoms despite adhering to a gluten-free diet. Due to the difficulty of maintaining a gluten-free diet due to lack of easy access to and the higher cost of gluten-free foods, contamination from gluten as well as social pressures, it is estimated that more than half the celiac population experiences multiple, potentially debilitating, symptoms per month. A study from the UK indicates that more than 70% of patients diagnosed with celiac disease consume gluten either intentionally or inadvertently (Hall et al. 2013).

Non-alcoholic Steatohepatitis (NASH)

Larazotide is also being tested as a therapy for NASH in pre-clinical models. NASH is an unmet disease affecting approximately 5%-6% of the U.S. adult population. There are several drugs in development for NASH; however, to our knowledge, none have larazotide's mechanism of action. We are developing a proprietary formulation of larazotide, INN-217, for efficient delivery to the large intestine. INN-217 has the potential to reduce the transport of lipopolysaccharide (LPS), which

is produced by gram negative bacteria in the gut and translocated from the intestinal lumen to the liver via the portal circulation. Several studies have shown a link between NASH and increased levels of LPS, which translocates across an inflamed, "leaky" epithelial barrier to the liver thus directly damaging liver cells. INN-217 can potentially decrease the flux of LPS across the leaky epithelial barrier, which is known to play an important role in the pathogenesis of NASH. Since none of the NASH drugs in development currently directly target reduction of intestinal permeability, INN-217 has the potential to affect NASH alone as well as work synergistically with other late stage NASH drugs in development, which are primarily focused on metabolic and fibrosis targets including farnesoid X receptor (FXR) and acetyl-CoA carboxylase (ACC).

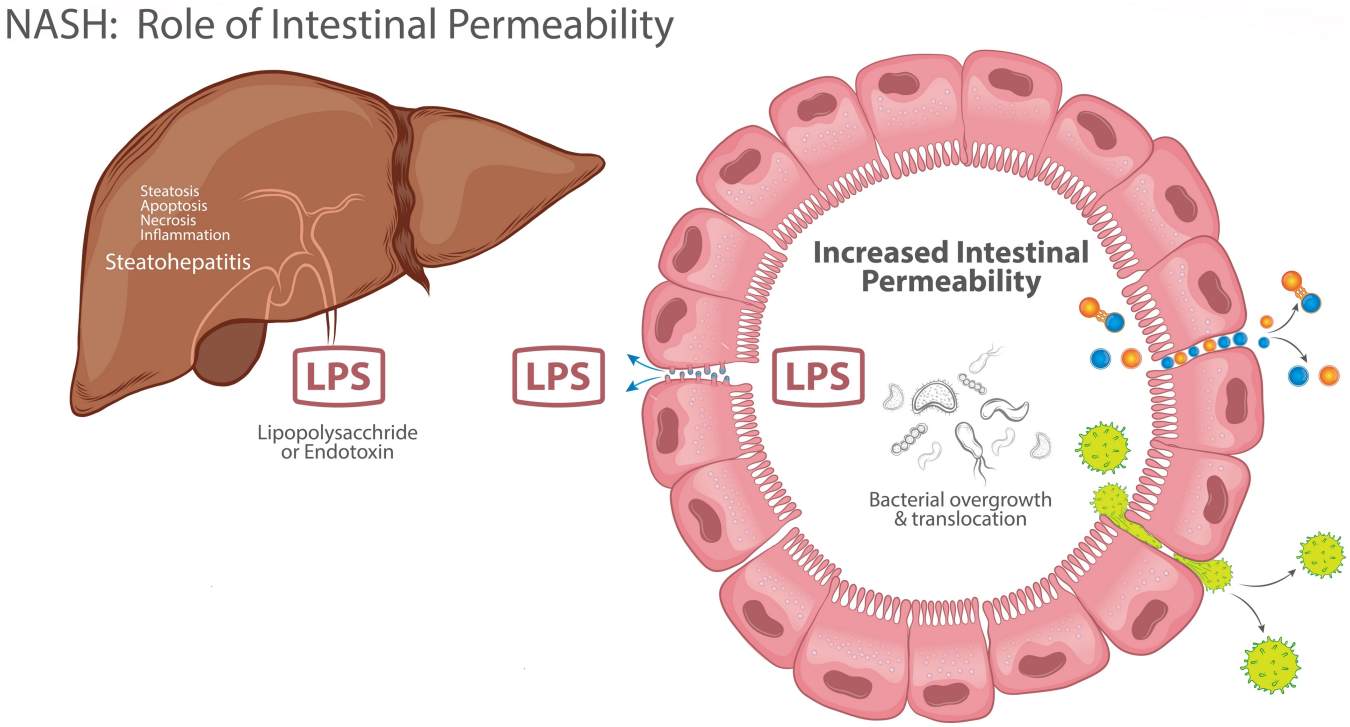

Figure 2: LPS (lipopolysaccharide) is a toxin produced by intestinal bacteria and translocates via the leaky epithelial barrier to the liver and damage liver cells. Thus, LPS has been implicated in the pathogenesis of NASH.

Alcoholic Steatohepatitis (ASH)

Alcoholic liver disease (ALD) is a spectrum of chronic liver disease ranging from steatosis, alcoholic steatohepatitis (ASH), liver fibrosis, cirrhosis and ultimately hepatocellular carcinoma (HCC). About 10 % of chronic alcoholics end up with chronic liver disease. Not all patients with steatosis go on to develop steatohepatitis, as several factors are involved. Oxidative stress and inflammatory cytokines have been implicated in addition to metabolic products of alcohol and/or intestinal barrier dysfunction. Due to a dysfunctional barrier, the intestinal immune system is exposed to various antigens and pathogen-associated molecular patterns (PAMPs) which translocate to the liver via the portal vein interacting with hepatocytes and other liver cells. Previous work has shown the small intestine of chronic drinkers has increased intestinal permeability which remains even up to 2 weeks after cessation of alcohol. Enlarged intracellular spaces between the epithelial cells in the intestinal mucosa of cirrhotics, and metabolites of alcohol, such as acetaldehyde, have been shown to disrupt tight junction proteins in *in vitro* and *in vivo* models. Endotoxin or lipopolysaccharide has been implicated in liver injury in early alcohol-induced liver injury in mouse models.

Due to larazotide's effect on decreasing intestinal permeability and its well-established safety profile, Innovate is investigating whether larazotide could have a beneficial affect on ASH. With directed delivery of larazotide to various parts of the intestine, it may be able to be used to blunt exposure of metabolic toxins and alcohol metabolites to the liver in these patients. We believe that larazotide has the potential to beneficially affect ASH.

Ulcerative Colitis (UC)

INN-108 is in development for the treatment of mild-to-moderate UC. INN-108 is expected to be delivered orally using an azo-bonded pro-drug approach linking mesalamine or 5-ASA (5-amino salicylic acid) to 4-APAA (approved as Actarit in Japan in 1994 for the treatment of rheumatoid arthritis). After having completed a successful Phase 1 trial at currently approved doses of mesalamine, INN-108 is expected to enter a proof-of-concept Phase 2 trial. The azo-bond protects INN-108 (Figure 13) from the low pH in the stomach, allowing it to transit to the colon where the UC lesions are primarily located. In the colon, the azo bond is broken enzymatically by azoreductases, leading to the separation of mesalamine and 4-APAA which has a synergistic anti-inflammatory effect. Although the majority of patients present with mild-to-moderate UC, the focus of drug development has been in moderate-to-severe UC with little innovation or drug development for mild-to-moderate UC. The mainstay of treatment for mild-to-moderate UC continues to be various oral reformulations of mesalamine such as Shire's Lialda (approved 2007) and Pentasa (approved 1993), Allergan's Asacol HD (approved 2008) and Valeant/Salix's Apriso (approved 2008).

Acute Radiation Proctitis (ARP)

We are exploring INN-108 as a potential intervention for acute radiation proctitis (ARP) due to its unique anti-inflammatory benefits. Radiation injury to the lower intestine is correlated with cancer treatments to the rectum, anus, prostate, bladder and other genitourinary areas. The rectum and sigmoid colon are often affected. Caused by direct mucosal damage due to radiation exposure, ARP symptoms include tenesmus, urgency, mucus discharge, diarrhea and less often, bleeding. If the exposure has affected the genitourinary tract or small bowel, further complications can include small bowel obstruction, bacterial overgrowth, fistulas, urethral stenosis and cystitis.

To our knowledge, there have been no large, randomized, double-blind placebo-controlled trials with rigor in order to advance treatments of ARP to registration status with regulatory authorities. Most care is supportive with hydration and antidiarrheal medications. Butyrate enemas have been reasoned to increase time to healing. In one of the only randomized trials of this type, although small, but placebo-controlled and blinded, balsalazide was shown to prevent or reduce symptoms in patients undergoing radiation therapy for prostate cancer. Balsalazide is one of a class of aminosalicylates with a similar delivery to INN-108. They are both chemically similar to sulfasalazine, lacking the sulfa moiety in favor of a less antigenic carrier. Because of INN-108's described potency compared with sulfasalazine and balsalazide's positive effects in ARP, a clinical development plan for INN-108 in ARP could be explored in order to test a hypothesis of two active anti-inflammatory moieties acting at the site of mucosal damage.

Magnetic Resonance Cholangiopancreatography (MRCP)

We also own the global rights to INN-329, a proprietary formulation of secretin, a peptide hormone which is used to improve visualization in magnetic resonance cholangiopancreatography (MRCP) procedures. Secretin is a 27-amino acid long hormone which rapidly stimulates release of pancreatic secretions, thus improving visualization of the pancreatic ducts during imaging procedures.

Our Strategy

Our goal is to become a leading biopharmaceutical company by developing novel therapeutics that have the potential to transform current treatment paradigms for patients and to address unmet medical needs. We are currently pursuing the development of drugs for autoimmune and inflammatory diseases that target established biological pathways. The critical components of our strategy are as follows:

- ***Advance INN-202 (larazotide) for celiac disease into Phase 3 clinical trials.*** Our highest clinical priority is to initiate the Phase 3 trials for larazotide for the treatment of celiac disease. We had a successful End-of-Phase 2 meeting with the FDA in 2017. With the guidance and agreement reached with the FDA, we plan to initiate our Phase 3 trials during the first half of 2019. We recently completed an initial feasibility review of more than 200 potential investigative sites and pre-selected 122 potential investigational sites to participate in the upcoming study. We entered into an agreement with a clinical research organization to facilitate completion of start-up activities for our Phase 3 clinical trials in celiac disease.
- ***Accelerate development of INN-217 (larazotide) for NASH.*** Increased intestinal permeability leads to LPS translocation to the liver and is one of the key recognized pathogenic factors in NASH. Larazotide's mechanism of action to decrease intestinal permeability could thus have a therapeutic effect in NASH. We plan to develop larazotide

alone and in combinations with select NASH therapies in development with the potential for a synergistic therapeutic benefit. We are continuing evaluation of larazotide in various pre-clinical models of NASH.

- ***Further evaluation of larazotide for the treatment of ASH.*** Building on previous research showing increased intestinal permeability may cause microbial translocation of toxic products into circulation of the bloodstream, we are expanding our work in alcoholic liver disease. Initial *in-vitro* data suggests the potential use of larazotide in alcoholic liver diseases pre-clinical models. We recently entered into a research collaboration with Massachusetts General Hospital, Harvard Medical School, to explore larazotide in established models for the treatment of ASH.
- ***Further the study INN-108 for ulcerative colitis***. A Phase 1 trial in the U.S. with 24 subjects had been completed. We plan to initiate the proof of concept Phase 2 trials for INN-108 for the treatment of mild-to-moderate UC, subject to receipt of financing.
- ***Seek partnerships to commercialize late stage pipeline drugs.*** With large addressable markets, such as celiac disease and NASH, we plan to seek out partners with established presences and histories of successful commercialization.
- ***Leverage and protect our existing intellectual property portfolio and secure patents for additional indications.*** We intend to continue to expand our intellectual property, grounded in securing composition of matter patents and method of use patents for newer indications. We plan to develop new formulations for the product candidates for other indications and improved performance of existing indications.
- ***In-license additional intellectual property and pipeline drugs to expand our presence in the treatment of autoimmune and inflammatory diseases***. In addition to broadening our current pipeline through indication expansion, we continue to explore expansion of our product pipeline through in-licensing, strategic partnerships and product acquisitions. As we continue to explore in-licensing opportunities, we expect that future pipeline expansion decisions will be based on the unmet medical needs in autoimmune and inflammatory disease areas including, but not limited to, celiac disease and NASH, the commercial opportunity and the ability to rapidly develop and commercialize a product candidate.
- ***Leverage the expertise of our management team and network of scientific advisors and key opinion leaders***. We are led by a strong management team that has been involved in a broad spectrum of R&D activities leading to successful outcomes, including FDA approvals and drug launches. We will continue to leverage the collective experience and talent of our management team, network of leading scientific experts and key opinion leaders to strategize and implement our development and eventually our commercialization strategy.
- ***Out-license our non-core assets/indications and establish research collaborations***. From time to time, we review our internal research priorities and therapeutic focus areas and may decide to out-license non-core assets/indications that arise from current and future available data. We may seek research collaborations that leverage the capabilities of our core assets to monetize and expand upon the breadth of opportunities that may be accessible through our drug candidates. We have initiated research collaborations with Dr. O. Colin Stine of the University of Maryland at Baltimore to study larazotide's corrective effect on the dysfunctional intestinal barrier and the dysfunctional microbiome in various diseases and a research collaboration with Dr. James Nataro of the University of Virginia, Charlottesville, to study larazotide's effect on Environmental Enteric Dysfunction.
- ***Outsource capital intensive operations***. We plan to continue to outsource capital intensive operations, including most clinical development and all manufacturing operations of our product candidates and to facilitate the rapid development of our pipeline by using high quality specialist vendors and consultants in a capital efficient manner.

Our Drug Product Pipeline

Our current pipeline is focused on clinical stage assets with large markets and unmet medical needs. We continue to leverage additional proof-of-concept work for larazotide to expand into additional indications, including NASH, Crohn's disease and ulcerative colitis. The following table summarizes key information about our pipeline of drug product candidates to date (Table 1):

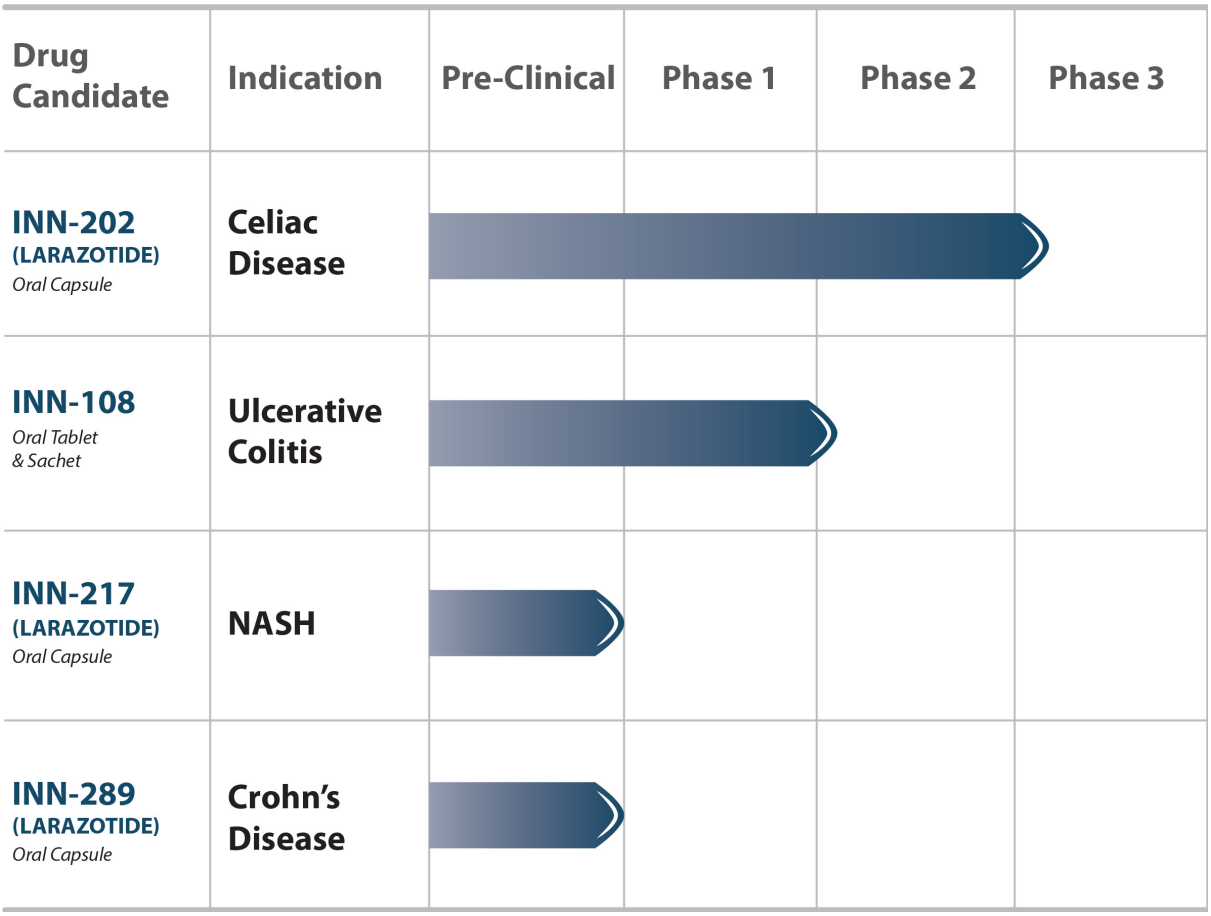

Table 1: Our key pipeline products are clinical stage and address large markets with chronically dosed therapies.

INN-202 (Larazotide) for Celiac Disease

Larazotide is being developed for the treatment of celiac disease and has successfully completed a Phase 2b trial showing statistically significant reduction in abdominal and non-GI (headache) symptoms. We are planning to launch the Phase 3 trials in the first half of 2019.

Larazotide is an orally administered, locally acting, non-systemic, synthetic 8-amino acid (Figure 3), tight junction regulator being investigated as an adjunct to a gluten-free diet in celiac disease patients who still experience persistent GI symptoms despite being on a gluten-free diet. Because of larazotide's lack of absorption into the blood circulation, we believe that fewer complications, if any, are likely to develop for individuals taking chronically dosed lifetime medication.

The larazotide drug product is an enteric coated drug product formulated as enteric coated multiparticulate beads filled into hard gelatin capsules for oral delivery. The enteric coating is designed to allow the bead particles to bypass the stomach and release larazotide upon entry into the small intestine (duodenum). A mixed bead formulation is used to allow partial release of larazotide upon entry into the duodenum and to release the remaining larazotide approximately 30 minutes later. In clinical trials, larazotide has been dosed 15 minutes before meals allowing time for its effect in the small bowel before exposure to gluten.

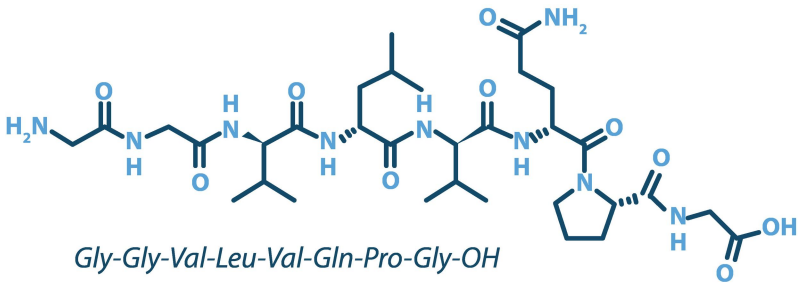

Figure 3: Larazotide acetate is an 8-amino acid peptide in an oral capsule using a proprietary formulation

Larazotide's Mechanism of Action

In research studies supportive of the mechanism of action, larazotide has been shown to stimulate recovery of mucosal barrier function via the regulation of tight junctions both *in vitro* and *in vivo*, including in a celiac disease mouse model (Gopalakrishnan, 2012). In doing so, it is proposed that larazotide reduces the symptoms associated with celiac disease.

In several autoimmune diseases, this increased intestinal permeability or paracellular leakage allows increased exposure to a triggering antigen and a consequent inflammatory response, the characteristics of which are determined by the particular disease and the genetic makeup of the individual. A new paradigm for autoimmune diseases is that there are three contributing factors to the development of disease:

1. A genetically susceptible immune system that allows the host to react abnormally to an environmental antigen;
2. An environmental antigen that triggers the disease process; and
3. The ability of the environmental antigen to interact with the immune system.

Larazotide regulates tight junction opening triggered by both gluten and inflammatory cytokines, thus reducing uptake of gluten. Larazotide also disrupts the intestinal permeability-inflammation loop and has been shown to reduce symptoms associated with celiac disease.

Larazotide's Dose Response

Previously published *in vitro* work using Caco-2 cells has shown a linear dose response for larazotide in reducing permeability of the epithelial barrier by tightening the leaky tight junctions (Gopalakrishnan, 2012). In several clinical trials, larazotide has exhibited clinical benefit by reducing celiac symptoms at lower doses while inhibition of this activity occurs at the higher doses. To better understand this observation, Dr. Anthony Blikslager from North Carolina State University evaluated the pharmacology of larazotide at the luminal surface of the small intestine in an *ex vivo* porcine model. A section of the porcine intestine was ligated, placed in an Ussing chamber while changes in permeability were measured by electrical resistance. Multiple experiments demonstrated that following an ischemic insult causing increased intestinal permeability, full length larazotide is capable of restoring intestinal wall integrity to that of the non-ischemic control. Subsequently, it was discovered that a specific aminopeptidase located within the brush borders of the intestinal epithelium cleaves larazotide into two fragments which lack either one or both N-terminus glycine (G) residues (**GG** VLVQPG). Both cleaved fragments, GVLVQPG and VLVQPG, do not decrease intestinal permeability. Moreover, when these two fragments are administered in combination with the active full-length larazotide, they inhibit larazotide's activity to restore intestinal wall integrity or reduce permeability. These data demonstrate that higher doses of larazotide lead to local buildup of breakdown fragments, which then compete with and block activity of larazotide after threshold concentration is reached. The *in vitro* experiments using Caco-2 monolayers did not show the same pharmacology and dose response because they lack the brush border and therefore lack the aminopeptidase which cleaves larazotide. These data also provide an explanation for the clinical observations of an optimal lower dose of larazotide, which avoids the reservoir of competing inactive fragments generated at high doses of larazotide.

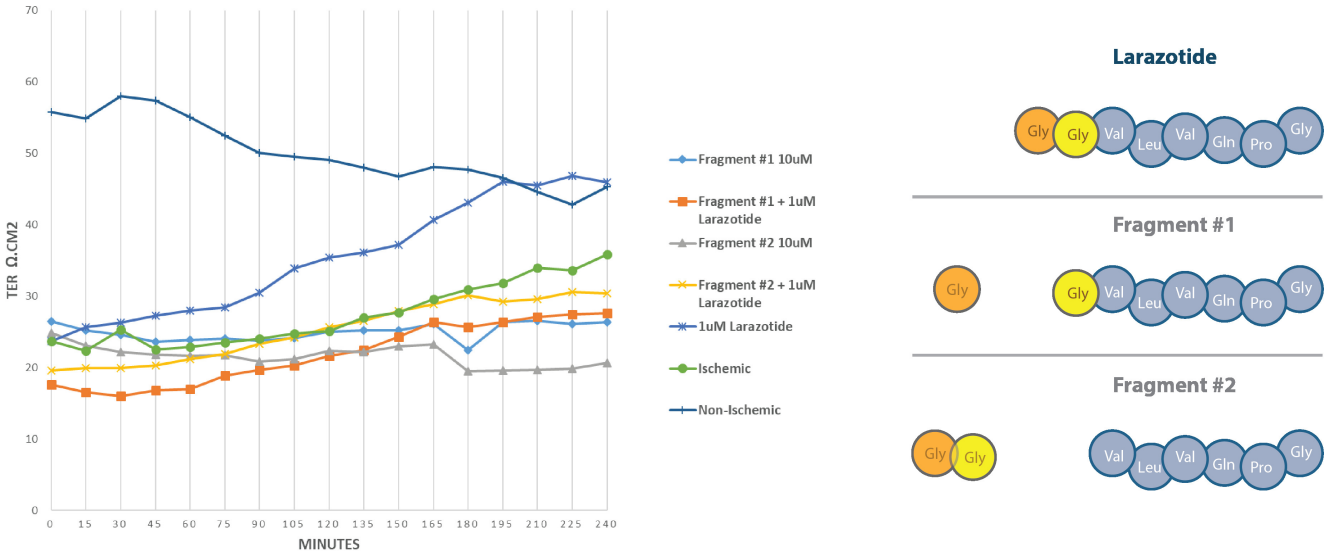

Figure 4: An aminopeptidase in the brush border cleaves larazotide into two fragments; fragment #2 acts as an inhibitor of larazotide

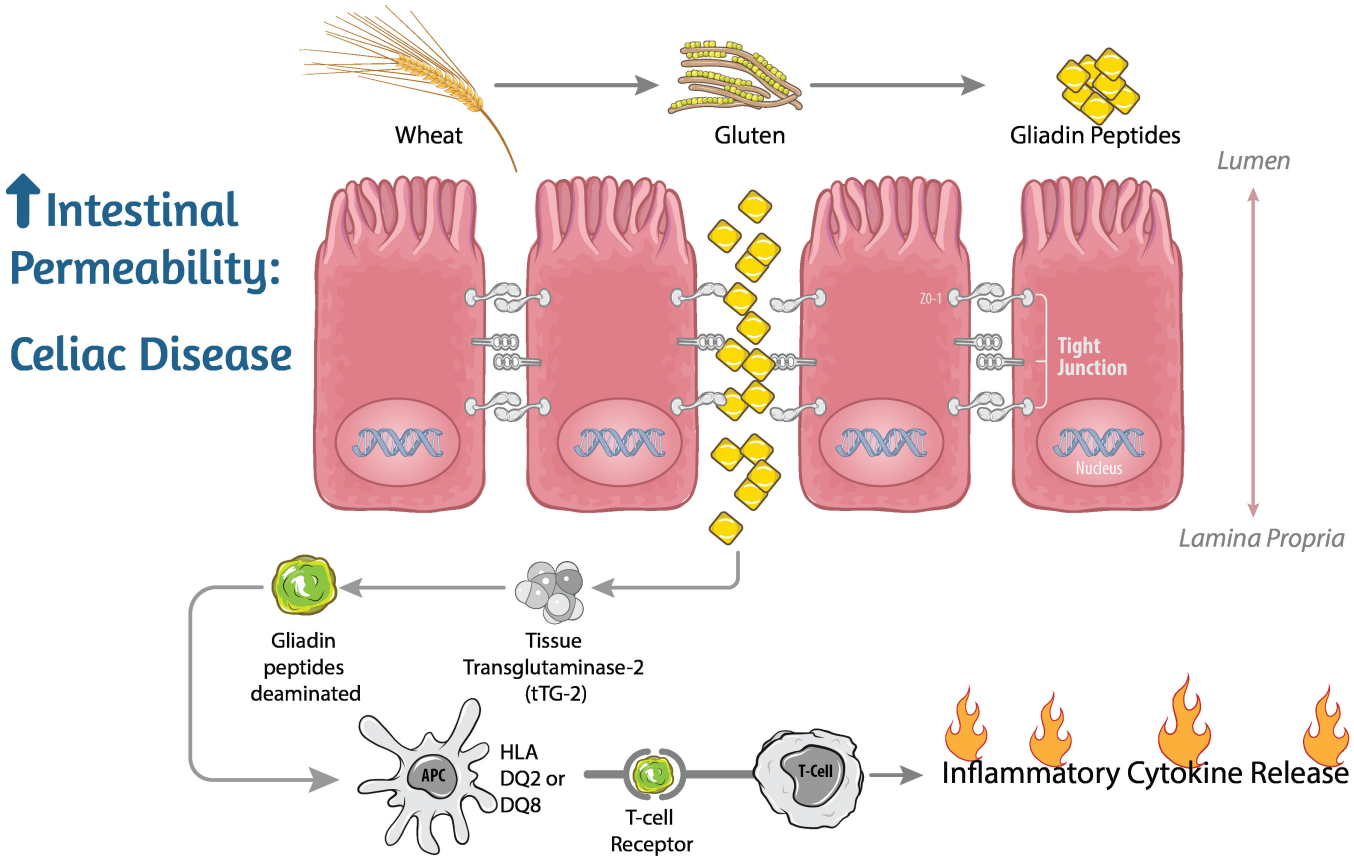

Figure 5: Illustrative effect of gluten ingestion. Breakdown to gliadin peptides which can cross a "leaky" epithelial barrier in the small bowel thus activating the intestinal-inflammatory loop and leading to symptoms and villous atrophy.

As we further instigate larazotide's dose response, we are also exploring larazotide analogs and derivatives by which we may be able to offer a longer acting molecule with a traditional dose response to improve efficacy. A molecule that would be resistant to proteolytic degradation. We continue to work with our academic collaborators to further investigate.

The Intestinal Barrier, Tight Junctions and Intestinal Permeability

The intestine is one of the largest interfaces between a person and his or her environment and an intact intestinal barrier is essential in maintaining overall health. An important function of the intestinal barrier is to regulate the trafficking of macromolecules between the environment and the host. Together with gut-associated lymphoid tissue and the neuroendocrine network, the intestinal epithelial barrier controls the equilibrium between tolerance and immunity to non-self antigens. When the finely tuned trafficking of macromolecules is dysregulated, both intestinal and extra-intestinal autoimmune disorders can occur in genetically susceptible individuals (Figure 5).

Transcellular fluxes (through the cell membrane) allow nutrients and small molecules to enter the cell from the luminal side of the intestine and exit on the serosal side (internal milieu). Paracellular fluxes (between cells) in contrast are limited by size and charge constraints imposed by the tight junctions between epithelial cells. The paracellular pathway is the key regulator of intestinal permeability to larger more complex macromolecules that may be immunogenically significant.

Intestinal epithelial cells adhere to each other through junction complexes. The tight junction, also referred to as zonula occludens, represents the major barrier to diffusion within the paracellular space between intestinal cells. Multiple proteins that make up the tight junction have been identified including occludin, claudin family members and junctional adhesion protein (JAM). These interact with cytosolic proteins (ZO-1, ZO-2 and ZO-3) that function as adaptors between the tight junction proteins and actin and myosin contractile elements within the cell. Acting together, they open and close the paracellular junctions between cells. It is now apparent that tight junctions are dynamic structures that are involved in developmental, physiological and pathological processes.

The role of tight junction dysfunction in the pathogenesis of autoimmune diseases is under active investigation. Many autoimmune populations have increased intestinal permeability and it is believed that this may play a fundamental role in the development of autoimmunity. In susceptible populations, the opening of tight junctions between intestinal epithelial cells may lead to exposure to oral antigens via paracellular transport and a consequent autoimmune response. A wide range of gastrointestinal and systemic inflammatory diseases are associated with abnormal intestinal permeability including celiac disease, type 1 diabetes, inflammatory bowel diseases (Crohn's disease and UC) and ankylosing spondylitis.

Summary of Key Clinical Trials using Larazotide in Celiac Disease

Larazotide has been administered to humans in seven clinical trials. These include three Phase 1 trials: (two trials in healthy subjects and a Phase 1b proof of concept (POC) trial in subjects with celiac disease), two Phase 2 gluten challenge studies in subjects with controlled celiac disease and additionally two Phase 2 trials in subjects with active celiac disease (Table 2). After the Phase 1 studies, larazotide was tested to explore which endpoint would be suitable for celiac disease. After looking at permeability changes in the gut, which turned out to be highly variable in a large trial setting and then mucosal healing, which likely requires a longer-term study, symptom reduction showed the most consistent and reliable reduction both in a gluten challenge and a ''real-life'' trial. Importantly, after exposure in nearly 600 subjects, the safety profile of larazotide remained similar to placebo due to its lack of absorption into the bloodstream, which we believe is an important advantage for a chronically dosed drug.

The initial Investigational New Drug Application (IND) for the treatment of celiac disease was filed with the FDA by Alba Therapeutics Corporation (Alba) on 12 August 2005 for the use of larazotide acetate (INN-202). The IND was transferred from Alba to Innovate effective March 8, 2016. During the course of the seven clinical studies, 5 patients experienced a serious adverse event, of which 2 received placebo and 3 received larazotide. These events included inflammation of the gallbladder, gall stones, depression, allergic reaction to penicillin and appendicitis. We do not believe that any of these events were considered related to treatment with study medication.

Trial	Study Date	Clinical Trial	No. of Subjects
-001	2005	Phase 1: Single Escalating Doses in Healthy Volunteers	24
-002	2005-06	Phase 1b: Multiple Dose POC in Celiac Patients – Gluten Challenge	21
-003	2006	Phase 1: Multiple Escalating Dose in Volunteers	24
-004	2006-07	Phase 2a: Multiple Dose POC in Celiac Patients Gluten Challenge 2 weeks	86
-006	2008	Phase 2b: Dose Ranging, in Celiac Patients Gluten Challenge, 6 weeks	184
-011	2008-09	Phase 2b: POC and Dose Ranging in Active Celiac Patients	105
-06B	2008	Phase 2b: Similar to -006, in Celiac Patients	42
-012	2011-13	Phase 2b: Multiple dose in Celiac patients with Symptoms on a Gluten-Free Diet	342

Table 2: Significant drug exposure in the subjects in multiple clinical trials consistently showed a safety profile similar to placebo, which we believe is an important advantage for chronic lifetime administration.

Clinical Trial ('006) Results Revealed Key Insight into Symptom Reduction as a Primary Endpoint

A Phase 2b study with a gluten challenge (CLIN1001-006) was conducted in 184 subjects with well-controlled celiac disease on a gluten-free diet. Subjects were randomized to one of four treatment groups, (placebo, 1 mg, 4 mg, or 8 mg larazotide) and asked to take treatment 15 minutes prior to each meal (TID). Subjects remained on their gluten-free diets throughout the duration of the trial except for nine hundred (900) mg of gluten that was taken with each meal. The trial results revealed key insights into how to move the program forward by focusing on reduction of symptoms. The 1-mg dose prevented the development of gluten-induced symptoms as measured by GSRS (a patient-reported outcome (PRO) devised and validated by AstraZeneca) and all drug treatment groups had lower anti-transglutaminase antibody levels than the placebo group. Results of pre-specified secondary endpoints suggest that larazotide reduced antigen exposure as manifested by reduced production of anti-tissue transglutaminase (tTG) levels and immune reactivity towards gluten and gluten-related gastrointestinal symptoms in subjects with celiac disease undergoing a gluten challenge.

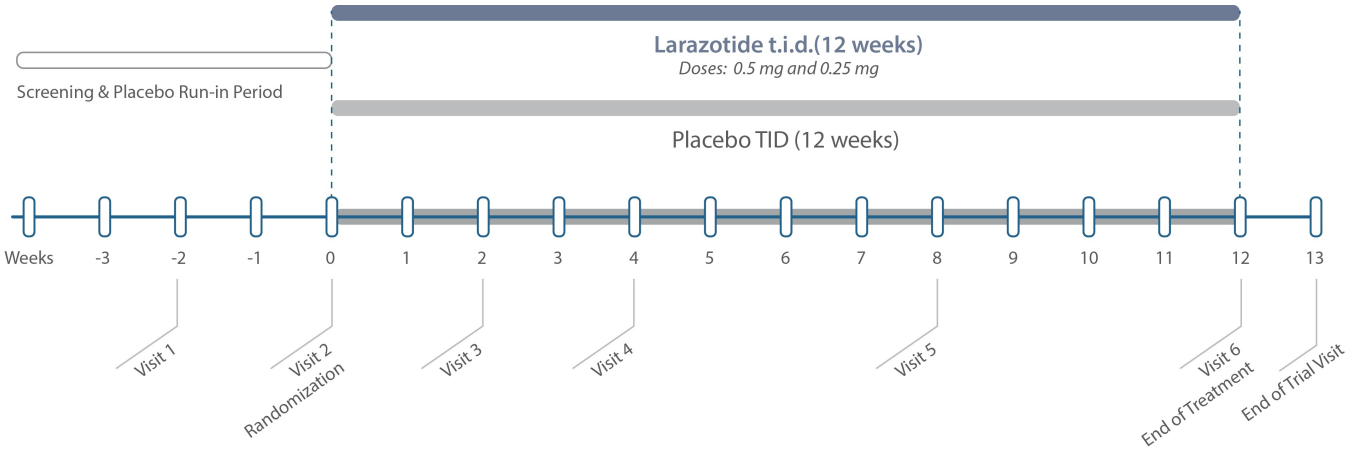

Figure 6: The overall trial designs for Phase 2b and Phase 3 are similar with a screening period followed by 12 weeks of randomization to larazotide vs. placebo.

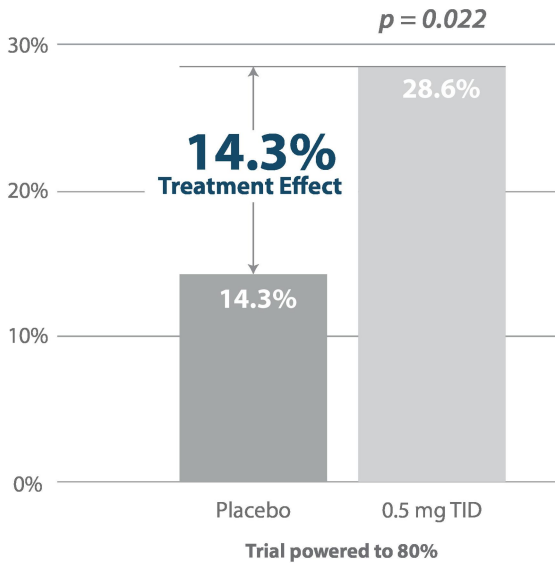

Figure 7: Responder Rate Analysis: Larazotide is the only drug in development for celiac disease to meet its primary endpoint with statistical significance (shown above) as measured by GSRS and the copyrighted CeD PRO (celiac disease patient reported outcome), an FDA-agreed upon primary endpoint for Phase 3. Source: Gastroenterology 2015; 148:1311–1319; p. 1315

Clinical Trial (‘012) Met the Primary Endpoint with Statistical Significance (CeD-GSRS/CeD PRO)

The purpose of the ‘012 study was to assess the efficacy (reduction and relief of signs and symptoms of celiac disease) of 3 different doses of larazotide (0.5 mg, 1 mg and 2 mg TID) versus placebo for the treatment of celiac disease in adults as an adjunct to a gluten-free diet. Larazotide or placebo was administered TID, 15 minutes prior to each meal. After a screening period, subjects were asked to continue following their current gluten-free diets into a placebo run-in phase for 4 weeks after which they were randomized to drug versus placebo. Subjects maintained an electronic diary capturing: daily symptoms celiac disease patient reported outcome (CeD-PRO), weekly symptoms (CeD-GSRS), bowel movements (BSFS) and a self-reported daily general well-being assessment.

The primary endpoint of average on-treatment CeD GSRS score throughout the treatment period was met at the 0.5 mg TID dose. In addition, a number of pre-specified secondary and exploratory endpoints, such as symptomatic days and symptom-free days, collectively demonstrated that a dose of 0.5 mg TID was superior to placebo and higher doses of larazotide. No difference was observed between the two higher dose levels (1 mg and 2 mg TID) or placebo, suggesting a narrow dose range around the 0.5 mg dose, which also seems to correlate with pre-clinical data.

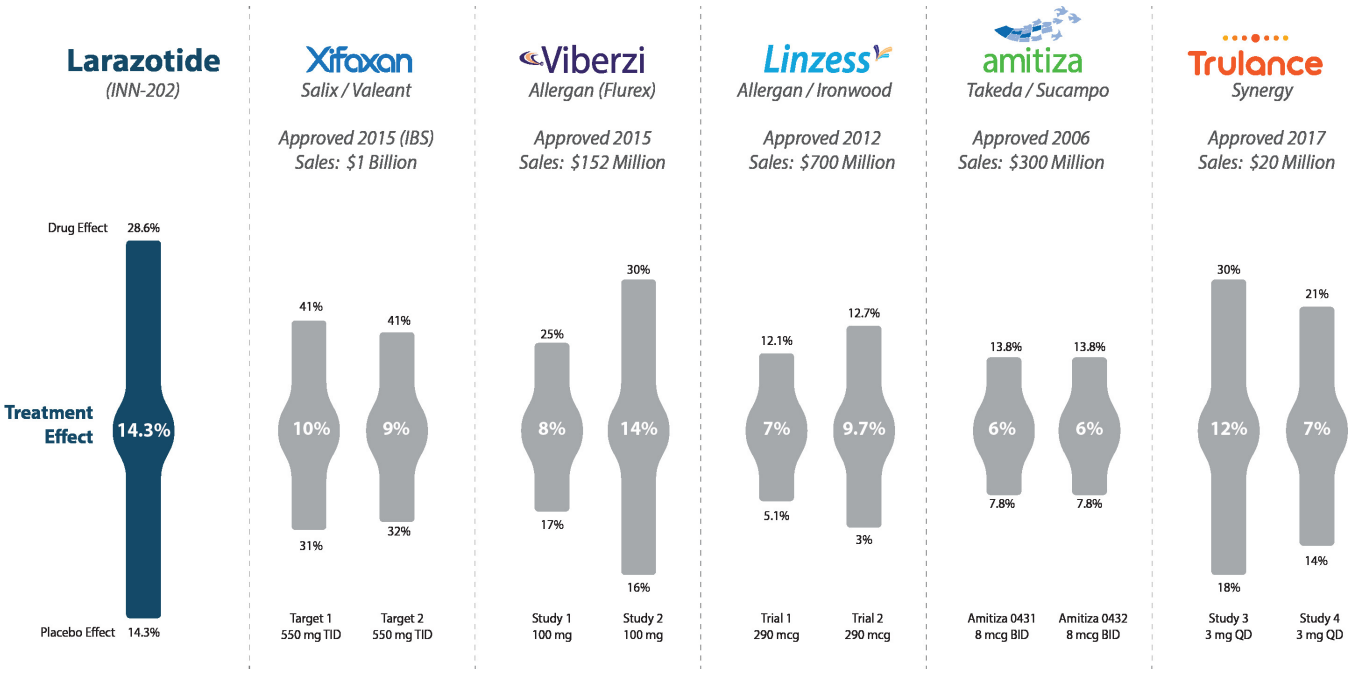

Figure 8: Treatment effect of larazotide from the Phase 2b trial ('012) compared to approved IBS/CIC drugs with varying treatment effects mostly in the mid to high single digit range. Source: Gastroenterology 2015; 148:1311–1319; p. 1315 and FDA Drug Labels

The CeD PRO, a copyrighted PRO created specifically for celiac disease and wholly owned by us, showed a statically significant (p=0.022) treatment effect of 14.3% (drug responder rate minus placebo responder rate). Although to our knowledge there are no celiac drugs approved as a comparator, the treatment effect was greater than several other GI dugs approved for IBS and chronic idiopathic constipation (CIC) which use a similar clinical trial design (Figure 8).

Path Forward to Phase 3 Trials

After a successful End-of-Phase 2 meeting with the FDA, agreements were reached on the key aspects of the Phase 3 clinical trials. The FDA agreed on using the previously validated CeD PRO as the primary endpoint with two doses of larazotide which bracket the range of efficacy in previous trials. Two Phase 3 trials with a size of approximately 900 patients each would allow for more than a 90% power to replicate the Phase 2b trial results. Most other criteria, such as inclusion, exclusion and site selection/coordination, are expected to remain similar to the '012 Phase 2b trial.

We recently completed an initial feasibility review of over 200 potential investigative sites and pre-selected 122 potential investigational sites for participation in the upcoming Phase 3 clinical trials. We entered into an agreement with a clinical research organization to facilitate completion of start-up activities in our Phase 3 clinical trials in celiac disease.

About Celiac Disease

Celiac disease is a genetic autoimmune disease triggered by the ingestion of gluten-containing foods such as wheat, barley and rye. Individuals with celiac disease have increased intestinal permeability, commonly referred to as ''leaky'' gut. This allows macromolecules that normally remain on the luminal side of the intestine to pass through to the serosal side through tight junctions via paracellular diffusion (Figure 9). In the case of celiac disease, this permeability may allow gluten break-down products, the triggering antigens of celiac disease, to reach gut-associated lymphoid tissue (GALT), initiating an inflammatory response. Celiac disease is characterized by chronic inflammation of the small intestinal mucosa that may result in diverse symptoms, malabsorption, atrophy of intestinal villi and a variety of clinical manifestations.

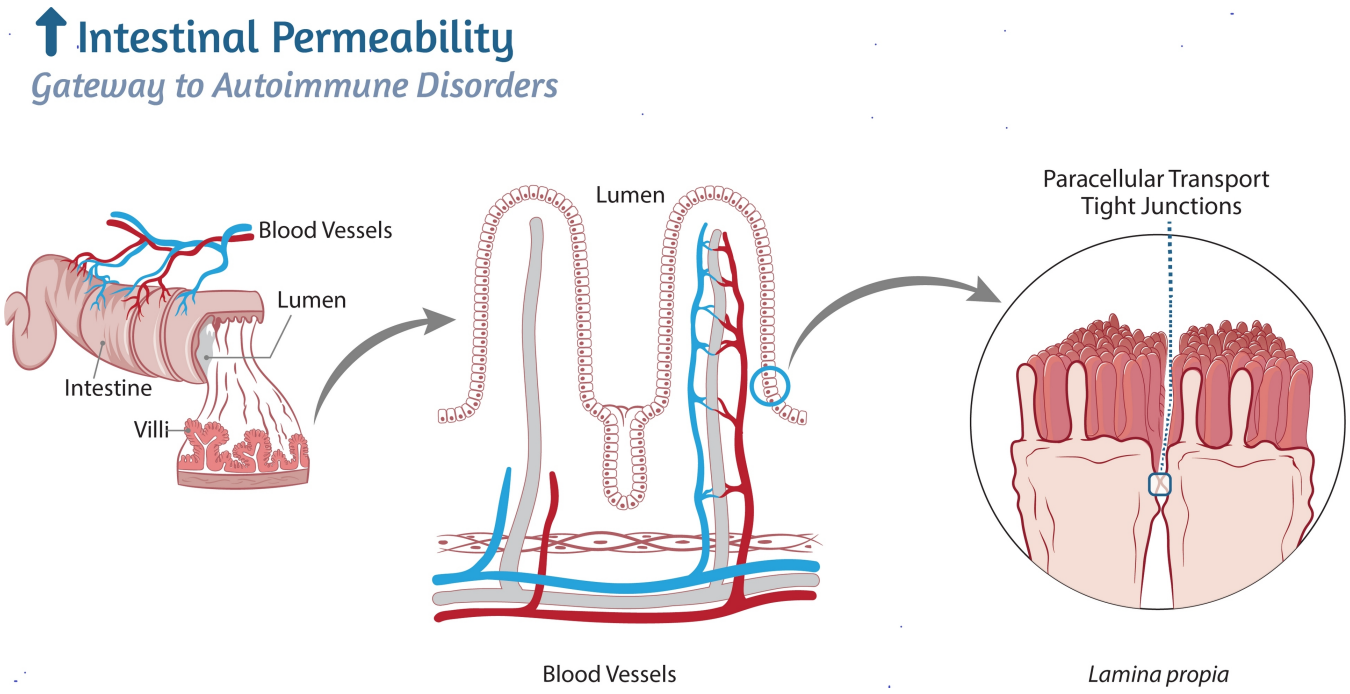

Figure 9: The epithelial barrier separates the intestinal content from the immune system (lamina propria) and the vasculature.

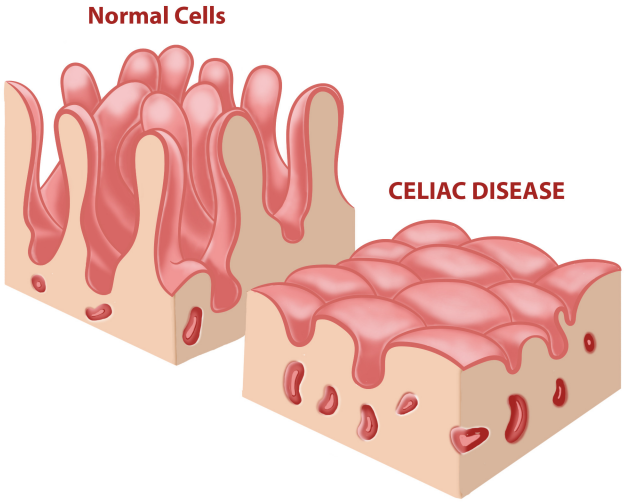

Figure 10: Intestinal villi atrophy in celiac patients, a characteristic finding upon biopsy of the small intestine.

Large Population — Unmet Need (no drug approved); Serious Long-Term Consequences

Celiac disease affects an estimated 1% of the Western population (Dubé, 2005). Currently, there are no therapeutics available to treat celiac disease and the current management of celiac disease is a life-long adherence to a gluten-free diet. Changes in dietary habits are difficult to maintain and foods labeled as gluten-free may still contain small amounts of gluten (up to 20 ppm per FDA labeling standards). Dietary compliance is imperfect in a large fraction of patients (Rostom, 2006) and difficult to adhere to on an ongoing basis (Green, 2007). In a survey conducted in the United Kingdom non-adherence to the gluten-free diet was found to be as high as 70% (Hall, 2013).

There are serious long-term consequences to exposure to gluten in patients with celiac disease, including the risk of developing osteoporosis, stomach, esophageal, or colon cancers and T-cell lymphoma (Green 2003, Green 2007). The continuous

GI symptoms often result in significant morbidity with a substantial reduction in quality of life. In addition, not all patients respond to a gluten-free diet. Patients diagnosed with celiac disease may continue to have or re-develop symptoms despite being on a gluten-free diet (Rostom 2006). This suggests a need for a therapeutic agent for the treatment of celiac disease (Green, 2007; Hall, 2013).

Celiac disease represents a model of an autoimmune disorder in which the following elements are known:

1. The triggering environmental factor is glutenin or gliadin, the proline, glutamine and glycine rich glycoprotein fractions of gluten;
2. There is a close genetic association with HLA haplotypes DQ2 and/or DQ8; and
3. A highly specific humoral autoimmune response occurs.

Genetics of Celiac Disease

The high incidence of celiac disease in first degree relatives of celiac patients (10 − 15%) and high concordance rate in monozygotic twins (80%) suggest a strong genetic component. Gliadin deamidation by tissue transglutaminase (tTG) enhances the recognition of gliadin peptides by human leukocyte antigen (HLA) DQ2 and DQ8 T cells in genetically predisposed subjects, which in turn may initiate the cascade of autoimmune reactions responsible for mucosal destruction. This interaction implies that gliadin and/or its breakdown peptides in some way cross the intestinal epithelial barrier and reach the *lamina propria* of the intestinal mucosa where they are recognized by antigen-presenting cells. The enhanced paracellular permeability of individuals with celiac disease would allow passage of macromolecules through the paracellular spaces with resulting autoimmune inflammation. There is a strong genetic predisposition to celiac disease, with major risk associated with HLA DQ2 (approximately 95% of celiac disease patients) and HLA-DQ8 (approximately 5% of celiac disease patients). The prevalence of celiac disease in the U.S. is estimated to be approximately 1%; however approximately 30% of the general U.S. population is HLA DQ2 positive (Figure 11), indicating that additional factors are involved in the development of celiac disease.

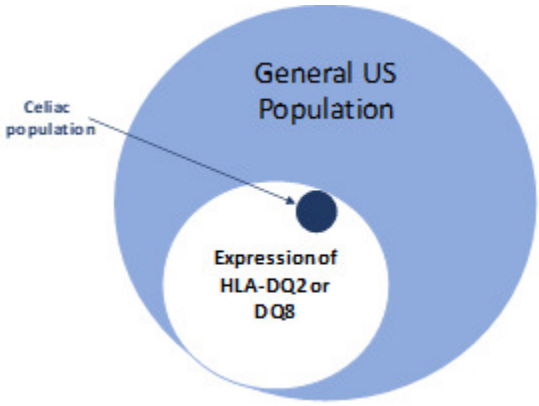

Figure 11: Distribution of HLA-DQ2/DQ8 in the general US population and in celiac disease. Source: J. Clin. Invest. 2007 Jan 2;117(1):41.

In celiac disease, an inflammatory reaction occurs in the intestine that is characterized by infiltration of immune cells in the *lamina propria* and epithelial compartments with chronic inflammatory cells and progressive architectural changes to the mucosa. Both adaptive and innate branches of the immune system are involved. The adaptive response is mediated by gluten-reactive CD4+ T cells in the *lamina propria* that recognize gluten-derived peptides when presented by the HLA class II molecules DQ2 or DQ8. The CD4+ T cells then produce pro-inflammatory cytokines such as interferon gamma. This results in an inflammatory cascade with the release of cytokines, anti-tTG antibodies, T cells and other tissue-damaging mediators leading to villous injury and crypt hyperplasia in the intestine. Anti-human tissue transglutaminase (anti-tTG) antibodies are also produced, which form the basis of serological diagnosis of celiac disease.

Anti-tTG Antibodies: Highly Sensitive and Specific Blood-based ELISA Diagnostic Test

The current approach for diagnosis of celiac disease is to use anti-tissue transglutaminase-2 (tTG-2) antibody tests as an initial screen with definitive diagnosis from biopsy of the small intestine mucosa. The diagnosis of celiac disease is confirmed by demonstration of characteristic histologic changes in the small intestinal mucosa, which are scored based on criteria initially put forth by Marsh and later modified. In 2012, the European Society of Pediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Guidelines allowed symptomatic children with serum anti-tTG antibody levels ≥10 times upper limit of normal to avoid duodenal biopsies after positive human leukocyte (HLA) test and serum anti-endomysial antibodies.

The need for multiple clinical and laboratory findings to diagnose celiac disease makes monitoring disease progression difficult. International guidelines give standardized definitions and criteria for the diagnosis of celiac disease, however there are not clear standards for follow-up and monitoring of treatment. This is particularly true for celiac patients diagnosed as adults, who respond differently and less completely to a gluten-free diet than do celiac patients diagnosed as children. It is not clear who should perform follow-up of patients with celiac disease and at what frequency but the American College of Gastroenterology suggests that an annual follow-up seems reasonable. Recommendations for monitoring disease progression include assessing symptoms and dietary compliance and repeating serology tests. Markers of celiac disease progression and improvement that are both validated and provide a timely assessment of disease activity are lacking.

Role of Tissue Transglutaminase in Celiac Disease

Anti-tTG-2 antibodies are produced in the small-intestinal mucosa (Picarelli et al. 1996), where they can bind tTG-2 present in the basement membrane and around blood vessels and form deposits characteristic of the disease. tTG-2 has been implicated in a variety of human disorders including several neurodegenerative conditions and cancer. Transglutaminases (TGs) were first discovered in the 1950s and are a family of enzymes which catalyze Ca2+-dependent post-translational modification of proteins. Of the seven isoforms discovered so far, all share the same basic four-domain tertiary structure, with minor variations, although their catalytic mechanism is conserved, resembling that of the cysteine proteases. tTGs cause transamidation, esterification and hydrolysis, all of which lead to post-translational modifications in the target proteins. Characteristically, tTG's mediate selective protein cross-linking by forming covalent isopeptide linkages between two target proteins. The resulting cross-linked products in many cases have high molecular masses and are unusually resistant to proteolytic degradation and mechanical strain. As in the case of the gliadin fragments in celiac disease, they are able to pass thru the leaky paracellular pathway from the lumen to the *lamina propria*, where the immune cells reside and are then activated.

Gliadin fragments, in addition to being rich in proline, also have high glutamine content, which makes them suitable substrates for tTG-2, which targets glutamine residues. For augmented DQ2/8 binding, the conversion of glutamine residues to glutamic acid is catalyzed by tTG-2 as a deamidation reaction. After deamidation, the gliadin peptides become highly negatively charged in key anchor positions, thereby increasing their affinity to the HLA molecules. CD4+ T cells recognize the deamidated gliadin peptides bound to the HLA DQ2 or DQ8 molecules by their T cell receptors, thus activating intestinal inflammation leading to villous atrophy.

Gluten and Food Labeling

Gluten is a complex molecule contained in several grains such as wheat, rye and barley. Gluten can be subdivided into two major protein subgroups according to its solubility in alcohol and aqueous solutions. These subclasses consist of gliadins, soluble in 40 − 70% ethanol and glutenins which are large, polymeric molecules insoluble in both alcohol and aqueous solutions. The gliadins and glutenins can be further subdivided into groups according to their molecular weight. Glutenins can be subdivided into low and high molecular weight proteins, while the gliadin protein family contains α-, β-, γ- and ω- types. Both glutenins and gliadins are characterized by a high amount of prolines (20%) and glutamines (40%) that protect them from complete degradation in the gastrointestinal tract and make them difficult to digest. Currently 31 nine-amino acid peptide sequences in the prolamins of wheat and related species have been defined as being celiac toxic or celiac ''epitopes.'' These epitopes are located in the repetitive domains of the prolamins, which are proline and glutamine-rich and the high levels of proline make the peptide resistant to proteolysis. In addition, the prolamin-reactive T cells also recognize these epitopes to a greater extent when specific glutamine residues in their sequences have been deamidated to glutamic acid by tTG-2. The immunodominant sequence after wheat challenge corresponds to a well-characterized 33 residue peptide from α-gliadin, ''33-mer,'' that is resistant to gastrointestinal digestion (with pepsin and trypsin) and was initially identified as the major celiac toxic peptide in the gliadins.

The FDA finalized a standard definition of ''gluten-free'' in August 2013. As of August 5, 2014, all manufacturers of FDA-regulated packaged food making a gluten-free claim must comply with the guidelines outlined by the FDA (*www.fda.gov/gluten-*

freelabeling). A ‘‘gluten free’’ claim still allows up to 20 ppm of gluten which leads to more than 100mg/day and up to 500 mg/day of gluten exposure. Due to the presence of gluten in foods, beer, liquor, cosmetics and household products, exposure is difficult to completely avoid and due to cross-contamination, celiac patients have increased risks of exposure to gluten, which can cause symptoms more frequently.

CNS	Endocrine	Oncology/Heme	Skin	Other
Headaches	Type 1 Diabetes	Enteropathy associated T-cell lymphoma (EATL)	Dermatitis herpetiformis	Rheumatoid arthritis (RA)
Gluten ataxia	Autoimmune Thyroid	Anemia	Alopecia areata	Reduced bone Density
Peripheral neuropathies	Addison’s disease		Vitiligo	Sjogren’s syndrome

Table 3: Diseases associated with celiac disease

Non-GI Manifestations of Celiac Disease and Co-Morbidities

Headache, Gluten Ataxia: Nervous System Manifestation of Celiac Disease. The association between celiac disease and neurologic disorders has been supported by numerous studies over the past 40 years. While peripheral neuropathy and ataxia have been the most frequently reported neurologic extra-intestinal manifestations of celiac disease, a growing body of literature has established headache as a common presentation of celiac disease as well. The exact prevalence of headache among patients ranges from about 30% to 60% (Lebwohl, 2016).

Dermatitis herpetiformis: Skin Manifestation of Celiac Disease. Dermatitis herpetiformis (DH) is an inflammatory cutaneous disease characterized by intensely pruritic polymorphic lesions with a chronic-relapsing course, first described by Duhring in 1884. The only treatment for achieving and maintaining permanent control of DH is a strict lifelong adherence to a gluten-free diet. It appears in approximately 25% of patients with celiac disease of all ages, however mainly in adults and is a characteristic clinical presenting symptom.

INN-217: Non-alcoholic steatohepatitis (NASH) and The Microbiome

NASH is a growing epidemic affecting approximately 5% to 6% of the general population. An additional 10% to 20% of the general population who ingest little (< 70 g/week for females and <140 g/week for males) to no alcohol are characterized with fat accumulation in the liver, without inflammation or damage, a condition called nonalcoholic fatty liver disease (NAFLD). The progression of fatty liver to NAFLD to NASH to cirrhosis is a serious condition which has no approved FDA treatment. Evidence supporting a role for the gut-liver axis in the pathogenesis of NAFLD/NASH has been accumulating over the past 20 years. LPS or endotoxin translocation is thought to be a primary cause of downstream signaling in the liver causing inflammation and damage. NASH is associated with increased gut permeability caused by disruption of intercellular tight junctions in the intestine allowing LPS from bacteria to pass into the portal circulation to the liver directly damaging hepatocytes. LPS constitutes the outer leaflet of the outer membrane of most gram-negative bacteria. LPS is comprised of a hydrophilic polysaccharide and a hydrophobic component known as lipid A which is responsible for the major bioactivity of endotoxin. When released and translocated into the bloodstream from the gut, LPS can cause a variety of cytokine activity and inflammation in the host.

The disrupted barrier along with an altered microbiome in the gut contribute to NASH as recently demonstrated by a group from Emory University, Rahman *et. al.*, in *Gastroenterology* (2016). Knockout mice missing the junctional adhesion molecule A (JAM-A) (*F11r-/-*), which have a defect in the intestinal epithelial barrier thus making it “leaky,” develop more severe steatohepatitis. JAM-A is a component of the tight junction complex that regulates intestinal epithelial paracellular permeability. *F11r-/-* mice therefore have leaky tight junctions that allow for translocation of gut bacteria to peripheral organs. By restoring the leaky tight junctions, larazotide could potentially have a beneficial therapeutic effect by blocking translocation of bacterial toxins via the paracellular pathway and may also help normalize the dysbiotic microbiome found in NASH.

According to a marketing and research firm, GlobalData, the market for NASH therapeutics is expected to grow significantly. GlobalData estimates that the market in the United States, France, Germany, Italy, Spain, the United Kingdom and Japan for such therapeutics will be approximately $25.3 billion by 2026. We expect that this market could be addressed by larazotide INN-217, however we are unable to estimate what portion until the effect of larazotide in this population has been studied in clinical trials to better understand the specific patient-type in NASH that may derive benefit.

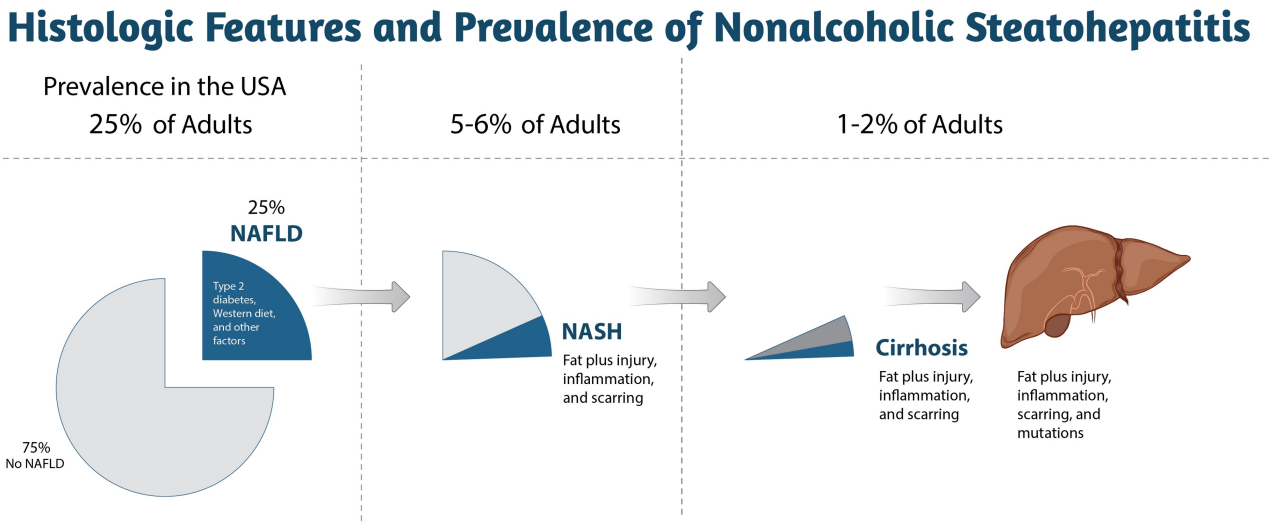

Figure 12: Growing NASH population up to 5%-6% of adults in the US alone.

INN-289: Crohn's disease: chronic disease with need for oral therapeutics

Innovate is working on a proprietary formulation of larazotide for Crohn's disease, INN-289. Animal data has shown the effect of larazotide on disease attenuation in an IL-10 knockout mouse model (Arrieta, 2009), which has been well established and used for several drug development programs. Larazotide was placed in the drinking water of the mice at a low dose (0.1 mg/ml) or high dose (1.0 mg/ml) during the period from 4 to 17 weeks of age. Results were compared to wild type mice, IL-10 knockout mice with no treatment and IL-10 knockout mice treated with probiotics. Intestinal and colonic permeability was significantly reduced in the high dose larazotide treatment group, but not in the untreated IL-10 knockout group. Larazotide treatment caused a reduction in all tissue markers of colonic inflammation (IFNγ and TNFα) and in histological inflammation.

Other Indications using Larazotide's Mechanism of Action

Larazotide for Environmental Enteric Dysfunction (EED): Positive in vitro Data;

Environmental enteric dysfunction (EED) is a rare pediatric tropical disease in the U.S. and Europe, however, more than 165 million children in developing countries in Africa and Asia suffer from it. As per section 524 of the Federal Food, Drug and Cosmetic Act (FD&C) Act, EED would likely fall under "Current List of Tropical Disease" number 'S,' thus making a drug approved for EED in the U.S. potentially eligible for a Priority Review Voucher.

The histological presentation of EED is very similar to celiac disease with villous atrophy and chronic inflammation of the small bowel and the pathogenesis of EED is linked to increased intestinal permeability. We have tested larazotide against some of the pathogens commonly found in EED (unpublished) and found positive *in vitro* results which will need to be confirmed in animal models before starting a clinical trial in EED.

INN-108: Mild-to-Moderate Ulcerative Colitis

INN-108 is in development for mild-to-moderate UC and is expected to enter a proof-of-concept Phase 2 trial, subject to receipt of additional financing. UC is an IBD that affects more than 1.25 million people in the major markets of the United States, France, Germany, Italy, Spain, the United Kingdom and Japan and is characterized by inflammation and ulcers in the colon and rectum. UC is a chronic disease that can be debilitating and sometimes lead to life-threatening complications. While poorly understood, a multitude of environmental factors and genetic vulnerabilities are thought to lead to the dysregulation of the immune response via a defective epithelial barrier. Although the majority of patients present with mild-to-moderate UC which can progress to severe UC, the focus of drug development has been in moderate-to-severe UC with little innovation or drug development for mild-to-moderate UC. The mainstay of treatment for mild-to-moderate UC remains various oral reformulations of mesalamine or 5-ASA (5-amino salicylic acid) such as Shire's Lialda (approved 2007) and Pentasa (approved 1993), Allergan's Asacol HD (approved 2008) and Valeant/Salix's Apriso (approved 2008).

The initial IND was filed with the FDA by Nobex Corporation on May 15, 2003 for the use of APAZA (INN-108) for the treatment of ulcerative colitis. The IND was then transferred from Seachaid Corporation to Innovate effective March 19, 2014. Two Phase 1 studies in healthy subjects and patients with ulcerative colitis were conducted by Nobex with INN-108. No serious adverse events were reported during either study.

INN-108 uses an azo-bonded pro-drug approach linking mesalamine to 4-APAA. Mitsubishi Pharma developed 4-APAA as Actarit in Japan which was approved in 1994 for rheumatoid arthritis. IBD drugs were all originally approved for RA, from the oldest 5-ASA, sulfasalazine, to the latest biologics, Humira and Enbrel. 4-APAA has more than two decades of safety data as a standalone drug and has an mechanism of action which is differentiated from mesalamine though the ultimate effect for both is anti-inflammatory (Figure 13). Taken orally as a tablet, the azo-bond protects INN-108 from the low pH in the stomach, thus allowing it to transit to the colon where the UC lesions are located. In the colon, the azo bond is broken enzymatically leading to the release of mesalamine and 4-APAA which have a synergistic anti-inflammatory effect. With the addition of 4-APAA, which is not approved in the U.S. or EU, to the already approved mesalamine, the synergistic effect could lead to superior clinical efficacy over the currently approved oral mesalamines.

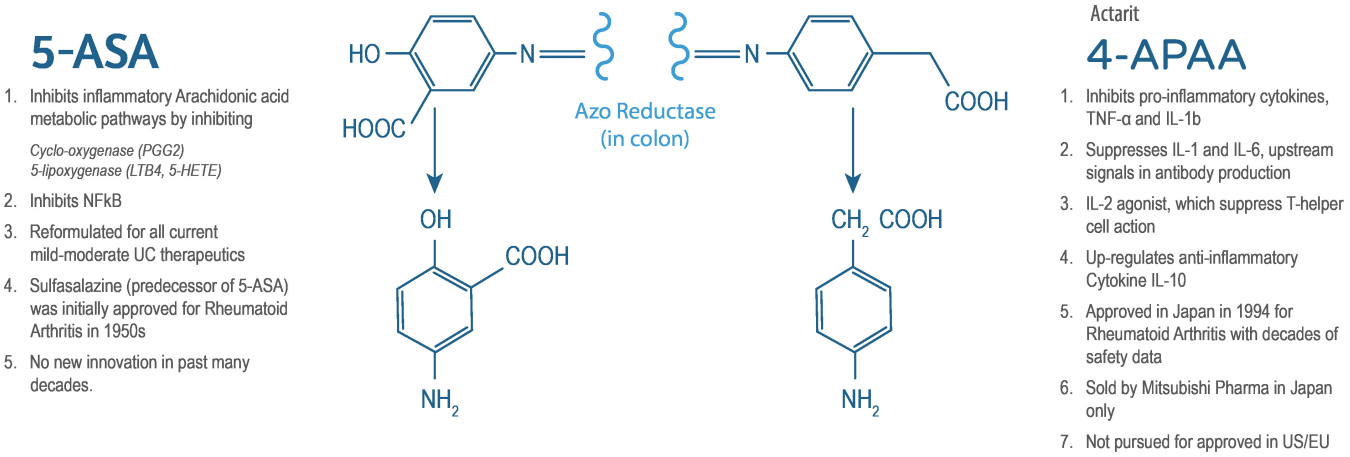

Figure 13: 4-APAA is covalently bonded to 5-ASA via a high energy azo-bond which is only enzymatically cleaved in the colon. The anti-inflammatory effect of each of 5-ASA and 4-APAA via different pathways which could lead to a potential synergistic anti-inflammatory effect as seen in animal studies.

INN-108: UC Animal Model Data Shows Synergy between 4-APAA and Mesalamine

The effects of chronic treatment with INN-108 on *Clostridium difficile* toxin A — induced colitis of the colon is shown in Figure 14. Orally administered INN-108 was significantly more potent than sulfasalazine or 4-APAA alone (McVey, 2005).

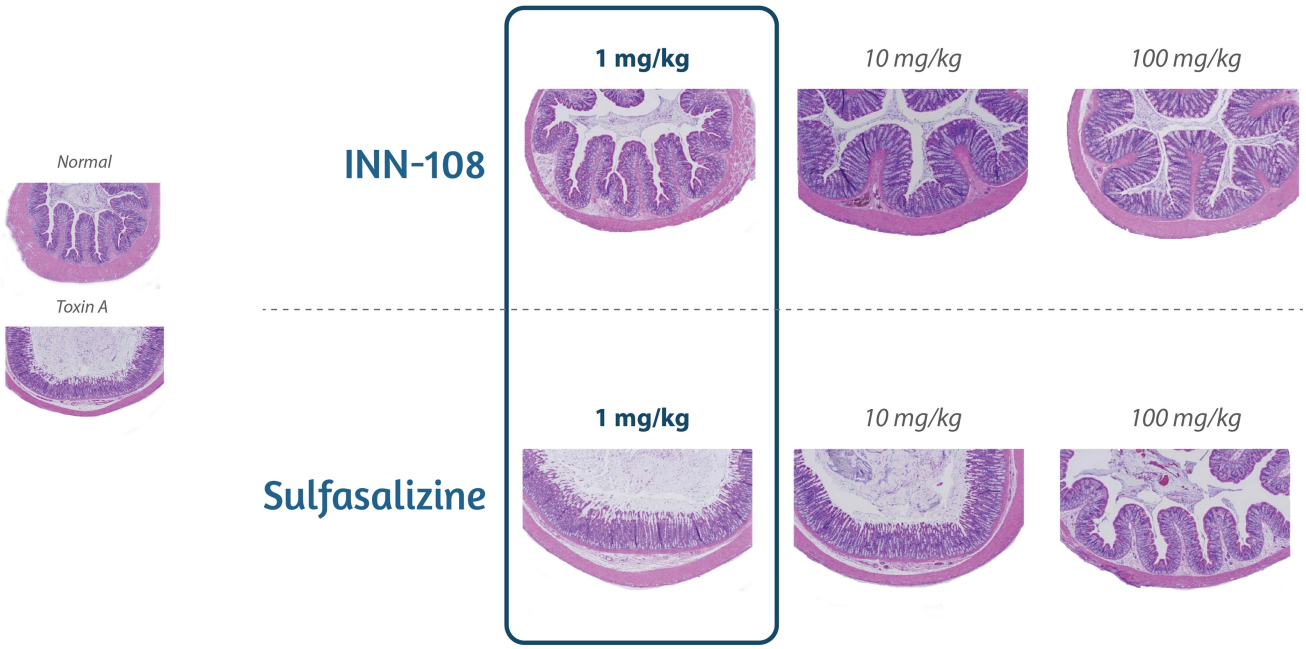

Figure 14: A rat UC model using toxin A induced-colitis as the insult leads to sloughing of the colonic epithelium with increasing doses. Using sulfasalazine vs. INN-108 to protect against the toxin A injury showed INN-108 was significantly more potent that sulfasalazine. Source: McVey DC et al. Digestive Diseases and Sciences. 2005 Mar 1;50(3):565-73.

INN-108 Clinical Development Pathway

After completing two Phase 1 studies, the first of which was conducted between June 2003 and July 2003, and the second of which was conducted between February 2004 and June 2004, a profile was established with dosing of mesalamine and 4-APAA at 2 grams each for a total of 4 grams three times a day.

The typical dose of the various approved mesalamine formulations range from 1.5g to 2.4g per day, thus INN-108's mesalamine content is within the established approved dose range. The addition of 4-APAA is thought to improve the efficacy above mesalamine, which would allow INN-108 to be used either after or instead of current mesalamines. In a Phase 2 trial, we plan to compare INN-108 to mesalamine seeking to demonstrate a greater clinical effect than mesalamine alone.

Ulcerative Colitis: Lack of Innovation in New Drug Development for Past Several Decades

Conventional therapies broadly inhibit mechanisms involved in the inflammatory process and are commonly used to effectively treat patients experiencing a mild-to-moderate form of the disease. For mild-to-moderate UC, oral mesalamine has an established efficacy and safety profile. However, gastroenterologists cite the need for new therapies for mild-to-moderate UC.

Patients who do not respond to mesalamine are typically eventually transitioned to biologics. The primary targets for biologics have been to control the immune response and inflammatory cascade, by inhibiting or downregulating molecules such as TNF-α, NF-κB, IL-1β and IFN1-γ. We believe INN-108 bridges the gap between mesalamine and biologics by its mechanism of action of both inhibiting the inflammatory process and down-regulating the cytokines.

About Ulcerative Colitis

UC is a chronic intermittent relapsing inflammatory disorder of the large intestine and rectum. While poorly understood, a multitude of environmental factors and genetic vulnerabilities are thought to lead to the dysregulation of the immune response via a defective epithelial barrier. As a result, chronic inflammation and ulceration of the colon occurs. UC is specific to the colon and affects only the mucosal lining of the colon. Common symptoms of UC include diarrhea, bloody stools and abdominal pain. The majority of patients are intermittent in their disease course, in that they experience a relapse among periods of remission. However, some patients experience only a single episode of the disease prior to maintaining remission whereas other patients are chronically symptomatic and may require a proctocolectomy to treat their condition.

History of Drug Development in Mild-to-Moderate Ulcerative Colitis

The original compound used in UC was sulfasalazine (Azulfidine), a conjugate of 5-ASA linked to sulfapyridine by an azo bond, which is split into the two molecules by bacterial azoreductases in the colon. The 5-ASA component or mesalamine is the active therapeutic moiety of sulfasalazine, with sulfapyridine thought to have little if any therapeutic effect. Sulfapyridine, however, is the cause of most of the significant adverse side effects of sulfasalazine.

This led to the development of other 5-ASA preparations utilizing azo chemistry to deliver high concentrations of mesalamine or 5-ASA to the colon by preventing early absorption of the drug in the small intestine. Such preparations include olsalazine (Dipentum), consisting of two molecules of 5-ASA bonded together by an azo bond and balsalazide (Colazal), consisting of 5-ASA azo bonded to an inert carrier (4-aminobenzoyl-β-alanine). The efficacy of these newer oral forms of 5-ASA is comparable to that of sulfasalazine, but they are better tolerated. However, some side effects persist which prevent wider use. In each of these preparations, the only active moiety is mesalamine or 5-ASA, an anti-inflammatory agent.

INN-329: Magnetic Resonance Cholangiopancreatography

INN-329 is a proprietary formulation of secretin, a peptide hormone which is used to improve visualization in magnetic resonance cholangiopancreatography (MRCP) procedures. Secretin is a 27-amino acid long hormone which rapidly stimulates release of pancreatic secretions, thus improving visualization of the pancreatic ducts during imaging procedures. Secretin has also been tested in a variety of central nervous system conditions such as autism, though currently approved only for pancreatic function testing and imaging with endoscopic retrograde cholangiopancreatography (ERCP). We acquired the assets of secretin from Repligen Corporation in December 2014.

The initial IND and was filed with the FDA by Repligen on July 29, 2005 for MRCP. The IND was transferred from Repligen to Innovate in January 2015. The New Drug Application (NDA) for MRCP was filed with the FDA on December 21, 2011 and was transferred to Innovate in January 2015.

MRCP has been used for more than 20 years as a non-invasive tool for imaging pancreatic ducts. With the addition of secretin pancreatic secretions are increased leading to significantly improved visualization of the pancreatic ducts for detection of abnormalities, including pancreatic cancer. The gold standard for pancreatic duct imaging had been ERCP, an expensive and invasive procedure with complications such as pancreatitis (3 − 5%), bleeding (1 − 2%), perforation (1%), infection (1 − 2%) and death (1/250). More than a half-million ERCP procedures are performed annually in the U.S. and as the role of ERCP diminishes for screening, it will further the need for approval of secretin for S-MRCP. We expect to repeat a Phase 3 trial with a partner, if and when secured, as per previous discussion with the FDA to look at improvement in visualization of the pancreatic duct via MRCP with and without secretin.

Our Intellectual Property

We strive to protect the proprietary technology that we believe is important to our business, including our product candidates and our processes. We seek patent protection in the United States and internationally for our product candidates, their methods of use and processes of manufacture and any other technology to which we have rights, as appropriate. Additionally, we have licensed the rights to intellectual property related to certain of our product candidates, including patents and patent applications that cover the products or their methods of use or processes of manufacture. The terms of the licenses are described below under the heading "Licensing Agreements." The patent families related to the intellectual property covered by the licenses include 23 U.S. patents and 126 foreign patents with expiration dates ranging from 2019 to 2031. We also rely on trade secrets that may be important to the development of our business.

Our success will in part depend on the ability to obtain and maintain patent and other proprietary rights in commercially important technology, inventions and know-how related to our business, the validity and enforceability of our patents, the continued confidentiality of our trade secrets and our ability to operate without infringing the valid and enforceable patents and proprietary rights of third parties. We also rely on continuing technological innovation and in-licensing opportunities to develop and maintain our proprietary position.

We cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications we may own or license in the future, nor can we be sure that any of our existing patents or any patents we may own or license in the future will be useful in protecting our technology and products. For this and more comprehensive risks related to our intellectual property, please see "Risk Factors—Risks Related to Our Intellectual Property."

CeD PRO: Copyrighted Primary Endpoint for Celiac Disease Tested in a Successful Clinical Trial

The patient reported outcome (PRO) primary end point for celiac disease (CeD PRO) was developed based on FDA guidance and is copyrighted in the United States effective October 13, 2011. The copyright registration is in effect for 95 years from the year of first publication or 120 years from the year of creation, whichever expires first. If the drug is approved by the FDA and is the first drug to be approved for celiac disease, Innovate believes that the PRO will become the standard for assessing efficacy in celiac disease. Competitor companies seeking to use a PRO to establish efficacy in this indication would either need to develop their own PRO or would be required to license the CeD PRO from Innovate, thus providing an additional barrier to competitor entry into the marketplace.

Strategic Collaborations and License Agreements

We have entered into collaboration agreements with several academic institutions and other contract research organizations to investigate pre-clinical studies for the use of our product candidates in potential other indications or to further broaden our understanding of the current indications.

Licensing Agreements

License with Alba Therapeutics Corporation

In February 2016, we entered into a license agreement (the "Alba License") with Alba Therapeutics Corporation ("Alba") to obtain an exclusive worldwide license to certain intellectual property relating to larazotide and related compounds.

Our initial area of focus for this asset relates to the treatment of celiac disease. We now refer to this program as INN-202. The license agreement gives us the rights to (i) patent families owned by University of Maryland, Baltimore (UMB) and licensed to Alba, (ii) certain patent families owned by Alba and (iii) one patent family that is jointly owned. In connection with the Alba License, we also entered into a sublicense agreement with Alba under which Alba sublicensed the UMB patents to us (the "Alba Sublicense").

As consideration for the Alba License, we agreed to pay (i) a one-time, non-refundable fee of $0.4 million at the time of execution and (ii) set payments totaling up to $151.5 million upon the achievement of certain milestones in connection with the development of the product, which milestones include the dosing of the first patient in the Phase 3 clinical trial, acceptance and approval of the New Drug Application, the first commercial sale and the achievement of certain net sales targets. The last milestone payment is due upon the achievement of annual net sales of INN-202 in excess of $1.5 billion. Upon the first commercial sale of INN-202, the license becomes perpetual and irrevocable. The term of the Alba Sublicense, for which we paid a one-time, non-refundable fee of $0.1 million, extends until the earlier of (i) the termination of the Alba License, (ii) the termination of the underlying license agreement, or (iii) an assignment of the underlying license agreement to us. After we make the first milestone payment after the dosing of the first patient in the Phase 3 clinical trial and are able to demonstrate sufficient financial resources to complete the trial, we have the exclusive option to purchase the assets covered by the license.

The foreign patents covering the composition-of-matter for the larazotide peptide expire in 2019. The Alba Therapeutics patent estate nevertheless provides product exclusivity for INN-202 in the U.S. until June 4, 2031, not including patent term extensions that may apply upon product approval.

Significant patents in the INN-202 patent estate include issued patents in the U.S. for methods of treating celiac disease with larazotide, (US Patents 8,034,776 and 9,279,807), of which the last to expire has a term to July 16, 2030.

Other significant patents include the larazotide formulation patent family, which has three issued U.S. patents as well as 39 filings outside the U.S. (31 issued). The significant patents in the INN-202 patent estate formulation patent family includes patents covering the composition-of-matter (US Patent 9,265,811) and corresponding methods of treatment (US Patents 8,168,594 and 9,241,969) for the larazotide formulation, with the last to expire patent having an expiration in the U.S. of June 4, 2031.

License with Seachaid Pharmaceuticals, Inc.

In April 2013, we entered into a license agreement (the "Seachaid License") with Seachaid Pharmaceuticals, Inc. ("Seachaid") to further develop and commercialize the licensed product, the compound known as APAZA. This program is now referred to as INN-108 by us.

The license agreement gives us the exclusive rights to (i) commercialize products covered by the patents owned or controlled by Seachaid related to the composition, formulation or use of any APAZA compound in the territory that includes the U.S., Canada, Japan and most countries in Europe and (ii) use, research, develop, export and make products worldwide for the purposes of such commercialization.

As consideration for the Seachaid License, we agreed to pay a one-time, non-refundable fee of $0.2 million at the earlier of the time we meet certain financing levels or 18 months following the execution of the agreement and set payments totaling up to $6.0 million upon the achievement of certain milestones in connection with the development of the product, filing of the New Drug Application, the first commercial sale and payments ranging from $1.0 million to $2.5 million based on the achievement of certain net sales targets. There are future royalty payments in the single digits based on achieving sales targets and we are required to pay Seachaid a portion of any sublicense revenue. The royalty payments continue for each licensed product and in each applicable country until the earlier of (i) the date of expiration of the last valid claim for such products to expire or (ii) the date that one or more generic equivalents if such product makes up 50 percent or more of sales in the applicable country. The term of the Seachaid License extends on a product-by-product and country-by-country basis until the expiration of the royalty period for the applicable product in the applicable country.

The INN-108 patent estate includes issued patents for:

(i.) immunoregulatory compounds and derivatives and methods of treating diseases therewith, of which the last to expire has a term to December 17, 2021 (in the U.S.) and August 28, 2021 (in Europe);

(ii.) methods and compositions employing 4-aminophenylacetic acid, of which the last to expire has a term to August 29, 2021 (in the U.S.) and March 22, 2025 (in Europe);

(iii.) 5-ASA derivatives having anti-inflammatory and antibiotic activity, of which the last to expire has a term to August 29, 2021 (in the U.S.) and August 28, 2021 (in Europe); and

(iv.) synthesis of azo bonded immunoregulatory compounds, of which the last to expire has a term to May 31, 2028 (in the U.S.) and July 7, 2025 (in Europe).

The INN-108 patent estate includes also provisional patent applications for pharmaceutical compositions, delivery compositions, methods of prophylaxis and methods of treatment. These patent applications have not yet been issued; therefore, it is impossible to know the expiration date of any intellectual property that might result from these applications.

Asset Purchase Agreement

In December 2014, we entered into an Asset Purchase Agreement (the "Asset Purchase Agreement") with Repligen Corporation ("Repligen") to acquire Repligen's RG-1068 program for the development of secretin for the pancreatic imaging market and MRCP procedures. We now refer to this program as INN-329. As consideration for the Asset Purchase Agreement, we agreed to make a non-refundable cash payment on the date of the agreement and future royalty payments consisting of a percentage between five and fifteen of annual net sales, with such royalty payment percentage increasing as annual net sales increase. The royalty payments are made on a product-by-product and country-by-country basis and the obligation to make the payments expires with respect to each country upon the later of (i) the expiration of regulatory exclusivity for the product in that country or (ii) ten years after the first commercial sale in that country. The royalty amount is subject to reduction in certain situations, such as the entry of generic competition in the market.

Manufacturing and Supply

We contract with third parties for the manufacturing of all of our product candidates, including INN-108, INN-202 and INN-329, for pre-clinical and clinical studies and intend to continue to do so in the future. We do not own or operate any manufacturing facilities and we have no plans to build any owned clinical or commercial scale manufacturing capabilities. We believe that the use of contract manufacturing organizations (CMOs) eliminates the need to directly invest in manufacturing facilities, equipment and additional staff. Although we rely on contract manufacturers, our personnel or consultants have extensive manufacturing experience overseeing CMOs.

As we further develop our molecules, we expect to consider secondary or back-up manufacturers for both active pharmaceutical ingredient and drug product manufacturing. To date, our third-party manufacturers have met the manufacturing requirements for our product candidates in a timely manner. We expect third-party manufacturers to be capable of providing sufficient quantities of our product candidates to meet anticipated full-scale commercial demands but we have not assessed these capabilities beyond the supply of clinical materials to date. We currently engage CMOs on a ''fee for services'' basis based on our current development plans. We plan to identify CMOs and enter into longer term contracts or commitments as we move our product candidates into Phase 3 clinical trials.

We believe alternate sources of manufacturing will be available to satisfy our clinical and future commercial requirements; however, we cannot guarantee that identifying and establishing alternative relationships with such sources will be successful, cost effective, or completed on a timely basis without significant delay in the development or commercialization of our product candidates. All of the vendors we use are required to conduct their operations under current Good Manufacturing Practices, or cGMP, a regulatory standard for the manufacture of pharmaceuticals.

Commercialization

We own or control exclusive rights to all three of our product candidates in the markets of the United States, France, Germany, Italy, Spain, the United Kingdom and Japan. We plan to pursue regulatory approvals for our products in the United States and the European Union and may independently commercialize these products in the United States. In doing so, we may engage strategic partners to assist with the sales and promotion of our products.

Our anticipated commercialization strategy in the United States would target key prescribing physicians, including specialists such as gastroenterologists, as well as provide patients with support programs to ensure product access. Outside of the United States, we plan to seek partners to commercialize our products via out-licensing agreements or other similar commercial arrangements.

Competition

The pharmaceutical industry is highly competitive and characterized by intense and rapidly changing competition to develop new technologies and proprietary products. Our potential competitors include both major and specialty pharmaceutical companies worldwide. Our success will be based in part on our ability to identify, develop and manage a portfolio of product candidates that are safer and more effective than competing products.

The competitive landscape in celiac disease is currently limited, which we believe is due to lack of significant past R&D investments and lack of recognition and education around the disease. To our knowledge, there are no late stage competitors entering Phase 3 clinical trials or any who have successfully completed Phase 2 studies to date. However, in recent years large pharmaceutical companies have begun to expand their focus areas to autoimmune diseases such as celiac disease, and given the unmet medical needs in these areas, we anticipate increasing competition. A few early stage programs are active, including Takeda/PvP's KumaMax (gluten degrading enzyme), Amgen/Provention Bio's AMG-714 (an IL-15 MAb) and Dr. Falk Pharma/ Zeria's ZED-1227 (a tTG-2 inhibitor). ImmunogenX's IMGX003 (two gluten degrading enzymes) failed to meet its primary endpoint in a Phase 2b trial in 2015, yet an NIH sponsored trial is evaluating a patient subset in a phase 2 trial launched in March 2019.

Product	Status	Mechanism	Company	Route	Product Type
AMG 714	Phase 2	Anti-IL-15 MAb	Amgen/ Provention Bio	Subcutaneous; 2x/month	MAb (humanized)
ZED-1227	Phase 1b	TGase-2 inhibitor	Zedira GmbH/ Dr Falk Pharma	Oral	Small molecule (peptidomimetic)
Nexvax2	Phase 2	Tolerizing vaccine	ImmusanT	Intradermal	3 gliadin epitopes (peptides)
KumaMax	Pre-clinical	Enzymatic degradation of gluten	Takeda/PvP Biologics	Oral	Recombinant enzyme
IMGX003	Phase 2	Two gluten degrading enzymes	ImmunogenX	Oral	Recombinant enzymes

Table 4: Current celiac drugs in development are still in pre-clinical to early Phase 2 proof-of-concept stage. No drugs have completed a successful Phase 2b efficacy trial other than larazotide.

Ulcerative colitis drug development has historically been primarily focused on the moderate-to-severe UC population with little investment and research and development in mild-to-moderate UC, which is the majority of the patient populations. Current treatments for mild-to-moderate UC include the mesalamine reformulations that are pictured in Figure 15 below and described above under the heading "History of Drug Development in Mild to Moderate Ulcerative Colitis," including Lialda, Pentasa, Asacol HD and Apriso, Valeant/Salix's Uceris (oral MMX-formulated budesonide; a corticosteroid) and 5-mercaptopurine (severe side effects). Eventually, half of the mild-to-moderate UC patients progress from mesalamine to the more expensive biologics, which creates a significant potential market opportunity for any drug that is more effective than mesalamine and less expensive than the biologics.

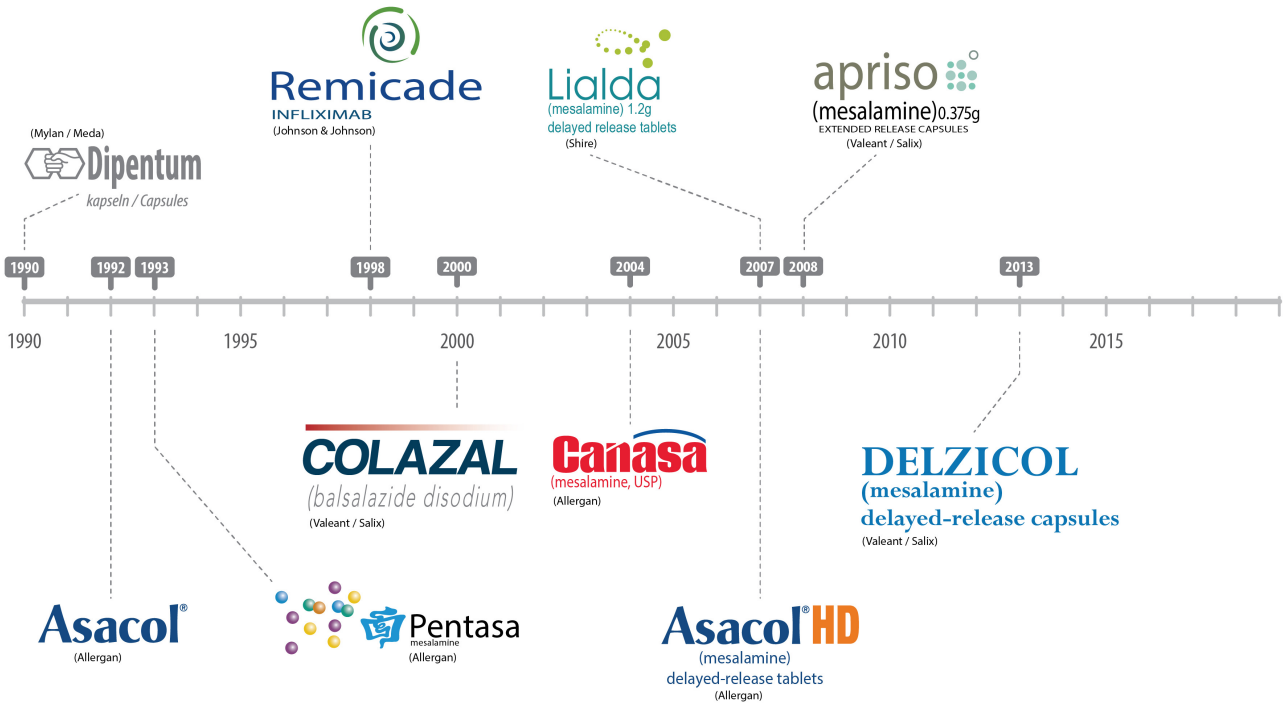

Figure 15: Other than various reformulations of mesalamine which have been used for the past several decades, no new drugs have been approved for mild-to-moderate UC

Government Regulations

The FDA and other regulatory authorities at federal, state and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, testing, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, record keeping, approval, advertising, promotion, marketing, post-

approval monitoring and post-approval reporting of drugs, such as those we are developing. Along with third-party contractors, we will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or seek approval or licensure of our product candidates. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

Government Regulation of Drugs

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

- completion of preclinical laboratory tests and animal studies performed in accordance with the FDA's current Good Laboratory Practices, or GLP, regulation;
- submission to the FDA of an Investigational New Drug application, or IND, which must become effective before clinical trials may begin and must be updated annually or when significant changes are made;
- approval by an independent Institutional Review Board, or IRB, or ethics committee for each clinical site before a clinical trial can begin;
- performance of adequate and well-controlled human clinical trials to establish the safety and efficacy of the proposed product candidate for its intended purpose;
- preparation of and submission to the FDA of a New Drug Application, or NDA, after completion of all required clinical trials;
- a determination by the FDA within 60 days of its receipt of an NDA to file the application for review;
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the proposed product is produced to assess compliance with current Good Manufacturing Practices, or cGMP, and to assure that the facilities, methods and controls are adequate to preserve the product's continued safety, purity and potency, and of selected clinical investigational sites to assess compliance with current Good Clinical Practices, or cGCPs; and
- FDA review and approval of the NDA to permit commercial marketing of the product for particular indications for use in the United States, which must be updated annually and when significant changes are made.

The testing and approval processes require substantial time, effort and financial resources and we cannot be certain that any approvals for our product candidates will be granted on a timely basis, if at all. Prior to beginning the first clinical trial with a product candidate, we must submit an IND to the FDA. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for clinical studies. The IND also includes results of animal and *in vitro* studies assessing the toxicology, pharmacokinetics, pharmacology and pharmacodynamic characteristics of the product; chemistry, manufacturing and controls information; and any available human data or literature to support the use of the investigational product. An IND must become effective before human clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises safety concerns or questions about the proposed clinical trial. In such a case, the IND may be placed on clinical hold and the IND sponsor and the FDA must resolve any outstanding concerns or questions before the clinical trial can begin. Submission of an IND therefore may or may not result in FDA authorization to begin a clinical trial.

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with cGCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A separate submission to the existing IND must be made for each successive clinical trial conducted during product development and for any subsequent protocol amendments. Furthermore, an independent Institutional Review Board, or IRB, for each site proposing to conduct the clinical trial must review and approve the plan for any clinical trial and its informed consent form before the clinical trial begins at that site and must monitor the study until completed. Regulatory authorities, the IRB or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some studies also include oversight by an independent group

of qualified experts organized by the clinical study sponsor, known as a data safety monitoring board, which provides authorization for whether or not a study may move forward at designated check points based on access to certain data from the study and may halt the clinical trial if it determines that there is an unacceptable safety risk for subjects or other grounds, such as no demonstration of efficacy. There are also requirements governing the reporting of ongoing clinical studies and clinical study results to public registries.

For purposes of NDA approval, human clinical trials are typically conducted in three sequential phases that may overlap.

- Phase 1. The drug product is initially introduced into healthy human subjects and tested for safety, pharmacokinetics and pharmacodynamics. In the case of some products for severe or life-threatening diseases, the initial human testing may be conducted in patients.
- Phase 2. The drug product is evaluated in 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, optimal dosage and dosing schedule.
- Phase 3. Clinical trials are undertaken to further evaluate dosage, clinical efficacy, potency and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk to benefit ratio of the product and provide an adequate basis for product labeling.

In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. These so-called Phase 4 studies may be required as a condition to approval of the NDA.

Phase 1, Phase 2 and Phase 3 testing may not be completed successfully within a specified period, if at all and there can be no assurance that the data collected will support FDA approval or licensure of the product. Concurrent with clinical trials, companies may complete additional animal studies (for example, long term carcinogenicity studies) and develop additional information about the drug characteristics of the product candidate and must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

NDA Submission and Review by the FDA

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, nonclinical studies and clinical trials are submitted to the FDA as part of an NDA requesting approval to market the product for one or more indications. The NDA must include all relevant data available from pertinent preclinical and clinical studies, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacturing, controls and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of a use of the product, or from a number of alternative sources, including studies initiated by investigators. The submission of an NDA requires payment of a substantial User Fee to FDA and the sponsor of an approved NDA is also subject to annual product and establishment user fees. These fees are typically increased annually. A waiver of user fees may be obtained under certain limited circumstances.

Within 60 days following submission of the application, the FDA reviews an NDA to determine if it is substantially complete before the agency accepts it for filing. The FDA may refuse to file any NDA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the NDA must be resubmitted with the additional information. Once an NDA has been filed, the FDA's goal is to review the application within ten months after it accepts the application for filing, or, if the application has been granted approval designation, six months after the FDA accepts the application for filing. The review process may be significantly extended by FDA requests for additional information or clarification. The FDA reviews an NDA to determine, among other things, whether a product is safe and effective for the indication being pursued and the facility in which it is manufactured, processed, packed, or held meets standards designed to assure the product's continued safety and effectiveness. The FDA may convene an advisory committee to provide clinical insight on application review questions. Before approving an NDA, the FDA will typically 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 an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with cGCP. If the FDA determines that the application, manufacturing process or manufacturing facilities are not acceptable, it will outline the

deficiencies in the submission and often will request additional testing or information. Notwithstanding the submission of any requested additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval and will issue a Complete Response Letter.

The testing and approval process require substantial time, effort and financial resources and each may take several years to complete. The FDA may not grant approval on a timely basis, or at all, and we may encounter difficulties or unanticipated costs in our efforts to secure necessary governmental approvals, which could delay or preclude us from marketing our products. After the FDA evaluates an NDA and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be produced, the FDA may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. The Approval Letter may contain Post-Marketing Requirements (PMRs) or Post-Marketing Commitments (PMCs) which comprise studies or clinical trials that the Sponsor is required or has committed to conducting. A Complete Response Letter indicates that the review cycle of the application is complete and the application is not ready for approval. A Complete Response Letter may request additional information or clarification. The FDA may delay or refuse approval of an NDA if applicable regulatory criteria are not satisfied, require additional testing or information and/or require post-marketing testing and surveillance to monitor safety or efficacy of a product.

If regulatory approval of a product is granted, such approval may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the NDA with a Risk Evaluation and Mitigation Strategy, or REMS, plan to mitigate risks, which could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA also may condition approval on, among other things, changes to proposed labeling or the development of adequate controls and specifications. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing regulatory standards is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase 4 post-market studies and surveillance to further assess and monitor the product's safety and effectiveness after commercialization and may limit further marketing of the product based on the results of these post-marketing studies. In addition, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory approval of our products under development.

A sponsor may seek approval of its product candidate under programs designed to accelerate FDA's review and approval of new drugs that meet certain criteria. Specifically, new drug products are eligible for fast track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. For a fast track product, the FDA may consider sections of the NDA for review on a rolling basis before the complete application is submitted if relevant criteria are met. A fast track designated product candidate may also qualify for priority review, under which the FDA sets the target date for FDA action on the NDA at six months after the FDA accepts the application for filing. Priority review is granted when there is evidence that the proposed product would be a significant improvement in the safety or effectiveness of the treatment, diagnosis, or prevention of a serious condition. If criteria are not met for priority review, the application is subject to the standard FDA review period of 10 months after FDA accepts the application for filing.

Under the accelerated approval program, the FDA may approve an NDA on the basis of either a surrogate endpoint that is reasonably likely to predict clinical benefit, or on a clinical endpoint that can be measured earlier than irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Products subject to accelerated approval must have associated marketing materials submitted for pre-approval by the FDA's Office of Prescription Drug Promotion during the pre-approval review period. Post-marketing studies or completion of ongoing studies after marketing approval are generally required to verify the product's clinical benefit in relationship to the surrogate endpoint or ultimate outcome in relationship to the clinical benefit. In addition, the Food and Drug Administration Safety and Innovation Act, or FDASIA, which was enacted and signed into law in 2012, established breakthrough therapy designation. A sponsor may seek FDA designation of its product candidate as a breakthrough therapy if the product candidate is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the therapy may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Sponsors may request the FDA to designate a breakthrough therapy at the time of or any time after the submission of an IND, but ideally before an end-of-Phase 2 meeting with FDA. If the FDA designates a breakthrough therapy, it may take actions appropriate to expedite the development and review of the application, which may include holding meetings with the sponsor and the review team throughout the development of the therapy; providing timely advice to, and interactive communication with, the sponsor regarding the development of the drug to ensure that the development program to gather the nonclinical and clinical data necessary for approval

is as efficient as practicable; involving senior managers and experienced review staff, as appropriate, in a collaborative, cross-disciplinary review; assigning a cross-disciplinary project lead for the FDA review team to facilitate an efficient review of the development program and to serve as a scientific liaison between the review team and the sponsor; and considering alternative clinical trial designs when scientifically appropriate, which may result in smaller or more efficient clinical trials that require less time to complete and may minimize the number of patients exposed to a potentially less efficacious treatment. Breakthrough designation also allows the sponsor to file sections of the NDA for review on a rolling basis. We may seek designation as a breakthrough therapy for some or all of our product candidates.

Fast Track designation, priority review and breakthrough therapy designation do not change the standards for approval but may expedite the development or approval process.

Orphan Drug Status

Under the Orphan Drug Act, the FDA may grant orphan drug designation to drug candidates intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States and for which there is no reasonable expectation that costs of research and development of the drug for the indication can be recovered by sales of the drug in the United States. Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the generic identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Although there may be some increased communication opportunities, orphan drug designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

If a drug candidate that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications, including a full NDA, to market the same drug for the same indication for seven years, except in very limited circumstances, such as if the second applicant demonstrates the clinical superiority of its product or if FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug for the same disease or condition, or the same drug for a different disease or condition. Among the other benefits of orphan drug designation are tax credits for certain research and a waiver of the NDA application user fee.

Orphan drug exclusivity could block the approval of our drug candidates for seven years if a competitor obtains approval of the same product as defined by the FDA or if our drug candidate is determined to be contained within the competitor's product for the same indication or disease.

As in the United States, designation as an orphan drug for the treatment of a specific indication in the European Union, must be made before the application for marketing authorization is made. Orphan drugs in Europe enjoy economic and marketing benefits, including up to 10 years of market exclusivity for the approved indication unless another applicant can show that its product is safer, more effective or otherwise clinically superior to the orphan designated product.

The FDA and foreign regulators expect holders of exclusivity for orphan drugs to assure the availability of sufficient quantities of their orphan drugs to meet the needs of patients. Failure to do so could result in the withdrawal of marketing exclusivity for the orphan drug.

Post-Approval Requirements

Any products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to record-keeping, reporting of adverse experiences, periodic reporting, distribution and advertising and promotion of the product. After approval, most changes to the approved product labeling, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. 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. Drug manufacturers and their subcontractors are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with GMP, which impose certain procedural and documentation requirements upon us and our third-party manufacturers. Changes to the manufacturing process are strictly regulated and, depending on the significance of the change, may require prior FDA approval before being implemented. FDA

regulations also require investigation and correction of any deviations from cGMP and impose reporting requirements upon us and any third-party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money and effort in the area of production and quality control to maintain compliance with cGMP and other aspects of regulatory compliance. We cannot be certain that we or our present or future suppliers will be able to comply with the cGMP regulations and other FDA regulatory requirements. If our present or future suppliers are not able to comply with these requirements, the FDA may, among other things, halt their clinical trials, require them to recall a product from distribution, or withdraw approval of the NDA.

Future FDA and state inspections may identify compliance issues at our facilities or at the facilities of our contract manufacturers that may disrupt production or distribution, or require substantial resources to correct. In addition, discovery of previously unknown problems with a product or the failure to comply with applicable requirements may result in restrictions on a product, manufacturer or holder of an approved NDA, including withdrawal or recall of the product from the market or other voluntary, FDA-initiated or judicial action that could delay or prohibit further marketing.

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

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

The FDA closely regulates the marketing, labeling, advertising and promotion of drugs and biologics. A company can make only those claims relating to safety and efficacy that are consistent with the FDA approved label and with FDA regulations governing marketing of prescription products. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products.

Other Healthcare Laws and Compliance Requirements

Our sales, promotion, medical education, clinical research and other activities following product approval will be subject to regulation by numerous regulatory and law enforcement authorities in the United States in addition to FDA, including potentially the Federal Trade Commission, the Department of Justice, the Centers for Medicare and Medicaid Services, or CMS, other divisions of the U.S. Department of Health and Human Services and state and local governments. Our promotional and scientific/educational programs and interactions with healthcare professionals must comply with the federal Anti-Kickback Statute, the civil False Claims Act, physician payment transparency laws, privacy laws, security laws, anti-bribery and corruption laws and additional federal and state laws similar to the foregoing.

The federal Anti-Kickback Statute prohibits, among other things, the knowing and willing, direct or indirect offer, receipt, solicitation or payment of remuneration in exchange for or to induce the referral of patients, including the purchase, order or lease of any good, facility, item or service that would be paid for in whole or part by Medicare, Medicaid or other federal health care programs. Remuneration has been broadly defined to include anything of value, including cash, improper discounts and free or reduced price items and services. The federal Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, formulary managers and beneficiaries on the other.

Although there are a number of statutory exceptions and regulatory safe harbors protecting some common activities from prosecution, the exceptions and safe harbors are drawn narrowly. Practices that involve remuneration that may be alleged to be intended to induce prescribing, purchases or recommendations may be subject to increased scrutiny and review if they do not qualify for an exception or safe harbor. Failure to meet all of the requirements of a particular applicable statutory exception or regulatory safe harbor does not make the conduct per se illegal under the federal Anti-Kickback Statute. Instead, the legality of the arrangement will be evaluated on a case-by-case basis based on a cumulative review of all its facts and circumstances. Several courts have interpreted the statute's intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the federal Anti-Kickback Statute has been violated. The government has enforced the federal Anti-Kickback Statute to reach large settlements with healthcare companies based on sham research or consulting and other financial arrangements with physicians. Further, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it to have committed a violation. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act. Many states have similar laws that apply to their state health care programs as well as private payers.

Federal false claims and false statement laws, including the federal civil False Claims Act, or FCA, impose liability on persons and/or entities that, among other things, knowingly present or cause to be presented claims that are false or fraudulent or not provided as claimed for payment or approval by a federal health care program. The FCA has been used to prosecute persons or entities that "cause" the submission of claims for payment that are inaccurate or fraudulent, by, for example, providing inaccurate billing or coding information to customers, promoting a product off-label, submitting claims for services not provided as claimed, or submitting claims for services that were provided but not medically necessary. Actions under the FCA may be brought by the Attorney General or as a qui tam action by a private individual, or whistleblower, in the name of the government. Violations of the FCA can result in significant monetary penalties and treble damages. The federal government is using the FCA and the accompanying threat of significant liability, in its investigation and prosecution of pharmaceutical and biotechnology companies throughout the country, for example, in connection with the promotion of products for unapproved uses and other illegal sales and marketing practices. The government has obtained multi-million and multi-billion dollar settlements under the FCA in addition to individual criminal convictions under applicable criminal statutes. In addition, certain companies that were found to be in violation of the FCA have been forced to implement extensive corrective action plans and have often become subject to consent decrees or corporate integrity agreements, restricting the manner in which they conduct their business.

The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, created additional federal criminal statutes that prohibit, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payers; knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services; and willfully obstructing a criminal investigation of a healthcare offense. Like the federal Anti-Kickback Statute, the Affordable Care Act amended the intent standard for certain healthcare fraud statutes under HIPAA such that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

Given the significant size of actual and potential settlements, it is expected that the federal government will continue to devote substantial resources to investigating healthcare providers' and manufacturers' compliance with applicable fraud and abuse laws. Many states have similar fraud and abuse statutes or regulations that may be broader in scope and may apply regardless of payer, in addition to items and services reimbursed under Medicaid and other state programs. To the extent that our products, once commercialized, are sold in a foreign country, we may be subject to similar foreign laws.

There has been a recent trend of increased federal and state regulation of payments made to physicians and other healthcare providers. The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively, the Affordable Care Act, among other things, imposed new reporting requirements on certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, for payments or other transfers of value made by them to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members. Covered manufacturers are required to collect and report detailed payment data and submit legal attestation to the accuracy of such data to the government each year. Failure to submit required information may result in civil monetary penalties of up to an aggregate of $150,000 per year (or up to an aggregate of $1 million per year for "knowing failures"), for all payments, transfers of value or ownership or investment interests that are not timely, accurately and completely reported in an annual submission. Additionally, entities that do not comply with mandatory reporting requirements may be subject to a corporate integrity agreement. Certain states also mandate implementation of commercial compliance programs, impose restrictions on covered manufacturers'

marketing practices and/or require the tracking and reporting of gifts, compensation and other remuneration to physicians and other healthcare professionals.

We may be subject to data privacy and security regulation by both the federal government and the states in which we conduct our business. HIPAA, as amended by the Health Information Technology and Clinical Health Act, or HITECH and their respective implementing regulations impose specified requirements on certain health care providers, plans and clearinghouses (collectively, "covered entities") and their "business associates," relating to the privacy, security and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA's security standards directly applicable to "business associates," defined as independent contractors or agents of covered entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities, business associates and possibly other persons and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce HIPAA and seek attorney's fees and costs associated with pursuing federal civil actions. In addition, certain states have their own laws that govern the privacy and security of health information in certain circumstances, many of which differ from each other and/or HIPAA in significant ways and may not have the same effect, thus complicating compliance efforts.

If our operations are found to be in violation of any of such laws or any other governmental regulations that apply to them, we may be subject to penalties, including, without limitation, civil and criminal penalties, damages, fines, disgorgement, the curtailment or restructuring of our operations, exclusion from participation in federal and state healthcare programs, imprisonment, contractual damages, reputational harm and diminished profits and future earnings, any of which could adversely affect our ability to operate our business and our financial results.

In addition to the foregoing health care laws, we are also subject to the U.S. Foreign Corrupt Practices Act, or FCPA, and similar worldwide anti-bribery laws, which generally prohibit companies and their intermediaries from making improper payments to government officials or private-sector recipients for the purpose of obtaining or retaining business. We have plans to adopt an anti-corruption policy, which will become effective upon the completion of this transaction and expect to prepare and implement procedures to ensure compliance with such policy. The anti-corruption policy mandates compliance with the FCPA and similar anti-bribery laws applicable to our business throughout the world. However, we cannot assure you that such a policy or procedures implemented to enforce such a policy will protect us from intentional, reckless or negligent acts committed by our employees, distributors, partners, collaborators or agents. Violations of these laws, or allegations of such violations, could result in fines, penalties or prosecution and have a negative impact on our business, results of operations and reputation.

Coverage and Reimbursement

Sales of pharmaceutical products depend significantly on the extent to which coverage and adequate reimbursement are provided by third-party payers. Third-party payers include state and federal government health care programs, managed care providers, private health insurers and other organizations. Although we currently believe that third-party payers will provide coverage and reimbursement for our product candidates, if approved, we cannot be certain of this. Third-party payers are increasingly challenging the price, examining the cost-effectiveness and reducing reimbursement for medical products and services. In addition, significant uncertainty exists as to the reimbursement status of newly approved healthcare products. The U.S. government, state legislatures and foreign governments have continued implementing cost containment programs, including price controls, restrictions on coverage and reimbursement and requirements for substitution of generic products. Adoption of price controls and cost containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit our net revenue and results. We may need to conduct expensive clinical studies to demonstrate the comparative cost-effectiveness of our products. The product candidates that we develop may not be considered cost-effective and thus may not be covered or sufficiently reimbursed. It is time consuming and expensive for us to seek coverage and reimbursement from third-party payers, as each payer will make its own determination as to whether to cover a product and at what level of reimbursement. Thus, one payer's decision to provide coverage and adequate reimbursement for a product does not assure that another payer will provide coverage or that the reimbursement levels will be adequate. Moreover, a payer's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Reimbursement may not be available or sufficient to allow them to sell our products on a competitive and profitable basis.

Healthcare Reform

The United States and some foreign jurisdictions are considering or have enacted a number of legislative and regulatory proposals to change the healthcare system in ways that could materially affect our ability to sell our products profitably. Among policy makers and payers in the United States and elsewhere, there is significant interest in promoting changes in healthcare

systems with the stated goals of containing healthcare costs, improving quality and/or expanding access. In the United States, the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives.

By way of example, in 2010 the Affordable Care Act was signed into law, intended to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. Among the provisions of the Affordable Care Act of importance to our potential drug candidates are:

- an annual, nondeductible fee on any entity that manufactures or imports specified branded prescription drugs and biologic agents, apportioned among these entities according to their market share in certain government healthcare programs;
- an increase in the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program to 23.1% and 13.0% of the average manufacturer price for branded and generic drugs, respectively;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for a manufacturer's outpatient drugs to be covered under Medicare Part D;
- extension of a manufacturer's Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for certain individuals with income at or below 133% of the federal poverty level, thereby potentially increasing a manufacturer's Medicaid rebate liability;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program; and
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in and conduct comparative clinical effectiveness research, along with funding for such research.

In addition, other legislative changes have been proposed and adopted since the Affordable Care Act was enacted. These changes include, among others, the Budget Control Act of 2011, which mandates aggregate reductions to Medicare payments to providers of up to 2% per fiscal year effective in 2013, and, due to subsequent legislative amendments, will remain in effect through 2024, unless additional Congressional action is taken. The American Taxpayer Relief Act of 2012, among other things, further reduced Medicare payments to several providers, including hospitals and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding, which could have a material adverse effect on customers for our product candidates, if approved, and, accordingly, our financial operations.

We expect that healthcare reform measures that may be adopted in the future, including the possible repeal and replacement of the Affordable Care Act which the Trump administration has stated is a priority, are unpredictable and the potential impact on our operations and financial position are uncertain, but may result in more rigorous coverage criteria and lower reimbursement and place additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government-funded programs may result in a similar reduction in payments from private payers. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our drugs.

Foreign Regulation

In addition to regulations in the United States, we will be subject to a variety of foreign regulations governing clinical trials and commercial sales and distribution of our products to the extent we choose to develop or sell any products outside of the United States. The approval process varies from country to country and the time may be longer or shorter than that required to obtain FDA approval. The requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement and privacy, can vary greatly from country to country.

Research and Development Expenses

We had research and development expenses of $7.6 million and $4.0 million for the years ended December 31, 2018 and 2017, respectively.

Employees

We have eight full-time employees and also engage consultants to provide services to us, including clinical development, manufacturing support, regulatory support, business development and general business operational support.

Corporate Information

Private Innovate was incorporated under the laws of North Carolina under the name "GI Therapeutics, Inc." in 2012 and changed its name to "Innovate Biopharmaceuticals Inc." when it converted to a Delaware corporation in 2014. In January 2018, Merger Sub merged with and into Private Innovate with Private Innovate surviving as a wholly owned subsidiary of the Company and the Company changed its name to Innovate Biopharmaceuticals, Inc. Our principal executive offices are located at 8480 Honeycutt Road, Suite 120, Raleigh, NC 27615 and our telephone number is (919) 275-1933. Our corporate website address is *http://www.innovatebiopharma.com*. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to reports filed pursuant to Sections 13(a) and 15(d) of the Exchange Act, will be made available free of charge on our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the U.S. Securities and Exchange Commission, or the SEC. The contents of our website are not incorporated into this Annual Report on Form 10-K and our reference to the URL for our website is intended to be an inactive textual reference only.

This Annual Report on Form 10-K contains references to our trademarks and to trademarks belonging to other entities. Solely for convenience, trademarks and trade names referred to in this Annual Report on Form 10-K, including logos, artwork and other visual displays, may appear without the ® or TM symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other companies' trade names or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other company.

We are an "emerging growth company" as defined in the JOBS Act and therefore we may take advantage of certain exemptions from various public company reporting requirements. As an "emerging growth company:"

- we will present no more than two years of audited financial statements and no more than two years of related management's discussion and analysis of financial condition and results of operations;
- we will avail ourselves of the exemption from the requirement to obtain an attestation and report from our auditors on the assessment of our internal control over financial reporting pursuant to the Sarbanes-Oxley Act;
- we will provide less extensive disclosure about our executive compensation arrangements; and
- we will not require stockholder non-binding advisory votes on executive compensation or golden parachute arrangements.

However, we have chosen to irrevocably opt out of the extended transition periods available under the JOBS Act for complying with new or revised accounting standards. We will remain an "emerging growth company" for up to five years, although we will cease to be an "emerging growth company" upon the earliest of (1) December 31, 2021, (2) the last day of the first fiscal year in which our annual gross revenues are $1.07 billion or more, (3) the date on which we have, during the previous rolling three-year period, issued more than $1 billion in non-convertible debt securities and (4) the date on which we are deemed to be a "large accelerated filer" as defined in the Exchange Act.

Item 1A. Risk Factors.

Our business, financial condition and operating results may be affected by a number of factors, including but not limited to those described below. Any one or more of such factors could directly or indirectly cause our actual results of operations and financial condition to vary materially from our past or anticipated future results of operations and financial condition. Any of these factors, in whole or in part, could materially and adversely affect our business, financial condition, results of operations and stock price. The following information should be read in conjunction with Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the accompanying financial statements and related notes in Part II, Item 8, "Financial Statements and Supplementary Data" of this Annual Report on Form 10-K.

Risks Related to Our Capital Requirements and Financial Condition

We have a limited operating history and have incurred significant losses since inception and expect that we will continue to incur losses for the foreseeable future, which makes it difficult to assess our future viability.

We have not been profitable since we commenced operations and we may never achieve or sustain profitability. As a clinical-stage biopharmaceutical company, we have a limited operating history upon which to evaluate our business and prospects. In addition, we have limited history as an organization and have not yet demonstrated an ability to successfully overcome many of the risks and uncertainties frequently encountered by companies in new and rapidly evolving fields, particularly in the biopharmaceutical industry. Drug development is a highly speculative undertaking and involves a substantial degree of risk. We have not yet obtained regulatory approvals for any of our product candidates, commercialized any of our product candidates, or generated any revenue from sales of products. We have devoted significant resources to research and development and other expenses related to our ongoing clinical trials and operations, in addition to acquiring product candidates.

Since inception, substantial resources have been dedicated to the acquisition and development of our product candidates, INN-202 (larazotide acetate), INN-108 (APAZA) and INN-329 (secretin). We will require significant additional capital to continue operations and to execute on our current business strategy to develop INN-202 through regulatory approval and further develop INN-217, INN-289, INN-108 and INN-329 for eventually seeking regulatory approval. We cannot estimate with reasonable certainty the actual amounts necessary to successfully complete the development and commercialization of our product candidates and there is no certainty that we will be able to raise the necessary capital on reasonable terms or at all.

Our auditor has expressed substantial doubt about our ability to continue as a going concern.

The audit report on our financial statements for the years ended December 31, 2018 and 2017, included an explanatory paragraph related to recurring losses from operations and our dependence on additional financing to continue as a going concern. We have incurred net losses for the years ended December 31, 2018 and 2017 and had an accumulated deficit of $43.5 million as of December 31, 2018. In view of these matters, our ability to continue as a going concern is dependent upon our ability to raise additional debt or equity financing or enter into strategic partnerships. We intend to continue to finance our operations through debt or equity financings or strategic partnerships. The failure to obtain sufficient financing or strategic partnerships could adversely affect our ability to achieve our business objectives and continue as a going concern.

We will require substantial additional financing to obtain regulatory approval for INN-202 for celiac disease and for further development of INN-217 (for NASH), INN-108 (for ulcerative colitis and acute radiation proctitis), INN-289 (for Crohn's disease) and INN-329 (for magnetic resonance cholangiopancreatography or "MRCP"), and for further development of pre-clinical drug candidates such as alcoholic steatohepatitis. Failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product development efforts and other operations.

For the years ended December 31, 2018 and 2017, we incurred losses from operations of $18.2 million and $11.2 million, respectively, and net cash used in operating activities was $15.2 million and $5.1 million, respectively. At December 31, 2018, we had an accumulated deficit of $43.5 million and cash and cash equivalents of $5.7 million. We expect to continue to incur substantial operating losses for the next several years as we advance our product candidates through clinical development, U.S. and other regional regulatory approvals and commercialization. No revenue from operations will likely be available until, and unless, one of our product candidates is approved by the Food and Drug Administration ("FDA") or another regulatory agency and successfully marketed, or we enter into an arrangement that provides for licensing revenue or other partnering-related funding, outcomes which we may not achieve on a timely basis, or at all.

Our capital requirements for the foreseeable future will depend in large part on, and could increase significantly as a result of, our expenditures on our development programs. Future expenditures on our development programs are subject to many uncertainties, and will depend on, and could increase significantly as a result of, many factors, including:

- the number, size, complexity, results and timing of our drug development programs;
- the number of nonclinical and clinical studies necessary to demonstrate acceptable evidence of the safety and efficacy of our product candidates;
- the terms of any collaborative or other strategic arrangement that we may establish;
- changes in standards of care which could change the size and complexity of clinical studies;
- the ability to locate patients to participate in a study given the limited number of patients available for orphan or ultra-orphan indications;
- the number of patients who participate, the rate of enrollment and the ratio of randomized to evaluable patients in each clinical study;
- the number and location of sites and the rate of site initiation in each study;
- the duration of patient treatment and follow-up;
- the potential for additional safety monitoring or other post-marketing studies that may be requested by regulatory agencies;
- the time and cost to manufacture clinical trial material and commercial product, including process development and scale-up activities and to conduct stability studies, which can last several years;
- the degree of difficulty and cost involved in securing alternate manufacturers or suppliers of drug product, components or delivery devices, as necessary to meet FDA requirements and/or commercial demand;
- the costs, requirements, timing of, and the ability to, secure regulatory approvals;
- the extent to which we increase our workforce and the costs involved in recruiting, training and incentivizing new employees;
- the costs related to developing, acquiring and/or contracting for sales, marketing and distribution capabilities, supply chain management capabilities and regulatory compliance capabilities, if we obtain regulatory approval for a product candidate and commercialize it without a partner;
- the costs involved in evaluating competing technologies and market developments or the loss in sales in case of such competition; and
- the costs involved in establishing, enforcing or defending patent claims and other proprietary rights.

In addition, we are obligated to dedicate a portion of our cash flow to payments on our debt, which reduces the amounts available to fund other corporate initiatives. An event of default on our debt could increase and accelerate the amounts due thereunder.

Additional capital may not be available when we need it, on terms that are acceptable to us or at all. If adequate funds are not available to us on a timely basis, we will be required to delay, limit, reduce or terminate development activities, our establishment of sales and marketing, manufacturing or distribution capabilities, or other activities that may be necessary to commercialize our product candidates, conduct preclinical or clinical studies, or other development activities.

If we raise additional capital through strategic alliances or licensing arrangements or other collaborations with third parties, we may be required to relinquish certain valuable rights to our product candidates, technologies, future revenue streams or research programs or grant licenses on terms that may not be favorable. If we raise additional capital through equity or debt offerings in which the instruments can convert to equity, the ownership interest of our stockholders will be diluted and the terms of any new equity securities may have preferential rights over our common stock. If we raise additional capital through debt financing, we may be subject to covenants limiting or restricting our ability to take specific actions, such as incurring additional debt or making capital expenditures, or subject to specified financial ratios, any of which could restrict our ability to develop and commercialize our product candidates or operate as a business.

Our ability to raise capital in the future may be limited by applicable laws and regulations.

On March 15, 2018, we filed a shelf registration statement on Form S-3 that was declared effective on July 13, 2018 registering shares of our common stock for issuance in primary offerings. Using a shelf registration statement on Form S-3 to raise additional capital generally takes less time and is less expensive than other means, such as conducting an offering under a Form S-1 registration statement. However, our ability to raise capital using a shelf registration statement may be limited by, among other things, SEC rules and regulations. Under SEC rules and regulations, if our public float (the market value of our common stock held by non-affiliates) is less than $75.0 million, at the time we update our Form S-3 as required under Section

10(a)(3) of the Securities Act, then as of the time of such update until our public float again exceeds $75.0 million, the aggregate market value of securities sold by us or on our behalf under our Form S-3 in any 12-month period will be limited to an aggregate of one-third of our public float. We expect that we will become subject to this limitation with the filing of our Annual Report on Form 10-K for the year ended December 31, 2018. If our ability to utilize a Form S-3 registration statement for a primary offering of our securities is limited to one-third of our public float or precluded altogether due to failure to satisfy other eligibility requirements of such Form, we may conduct such an offering pursuant to an exemption from registration under the Securities Act or under a Form S-1 registration statement, and we would expect either of those alternatives to increase the cost of raising additional capital relative to utilizing a Form S-3 registration statement.

In addition, under current SEC rules and regulations, our common stock must be listed and registered on a national securities exchange in order to utilize a Form S-3 registration statement (i) for a primary offering, if our public float is not at least $75.0 million as of a date within 60 days prior to the date of filing the Form S-3 or a re-evaluation date, whichever is later, and (ii) to register the resale of our securities by persons other than us (i.e., a resale offering). While currently our common stock is listed on the Nasdaq Capital Market, there can be no assurance that we will be able to maintain such listing.

Our ability to timely raise sufficient additional capital also may be limited by Nasdaq's stockholder approval requirements for transactions involving the issuance of our common stock or securities convertible into our common stock. For instance, Nasdaq requires that we obtain stockholder approval of any transaction involving the sale, issuance or potential issuance by us of our common stock (or securities convertible into our common stock) at a price less than the greater of book or market value, which (together with sales by our officers, directors and principal stockholders) equals 20% or more of our then outstanding common stock, unless the transaction is considered a "public offering" by Nasdaq. In addition, certain prior sales by us may be aggregated with any offering we may propose in the future, further limiting the amount we could raise in any future offering without stockholder approval. Nasdaq also requires that we obtain stockholder approval if the issuance or potential issuance of additional shares will be considered by Nasdaq to result in a change of control of our company.

Obtaining stockholder approval is a costly and time-consuming process. If we are required to obtain stockholder approval for a potential transaction, we would expect to spend substantial additional money and resources. In addition, seeking stockholder approval would delay our receipt of otherwise available capital or alter the terms of the transaction, which may materially and adversely affect our ability to execute our business strategy, and there is no guarantee our stockholders ultimately would approve a proposed transaction.

The Convertible Note may be converted into shares of common stock and it may also be redeemed in certain circumstances. If the holder of this note converts it into shares of common stock, our current stockholders could be significantly diluted; if certain events occur and the holder of this note redeems it, our liquidity and our ability to continue our operations may be materially impaired.

The holder of the Convertible Note can convert all or any portion of such note, including a premium in some cases, into shares of our common stock at a conversion price that may vary over time. The number of shares of common stock issued upon the conversion of such note may be significant. The issuance of new shares of common stock upon such conversion will cause the percentage ownership held by each stockholder prior to such issuance to decrease and such decrease in percentage ownership could be significant. If the holder of this note requires us to repay the note, our ability to continue developing and commercializing our product candidates or operate as a business would be severely restricted.

We have not generated any revenue from product sales and may never be profitable.

We have no products approved for commercialization and have never generated any revenue from product sales. Our ability to generate revenue and achieve profitability depends on our ability, alone or with strategic collaboration partners, to successfully complete the development of, and obtain the requisite regulatory approvals necessary to commercialize, one or more of our product candidates.

The comprehensive tax reform bill passed in 2017 could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law new legislation that significantly revises the Internal Revenue Code of 1986, as amended. The federal tax law, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating

losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time and modifying or repealing many business deductions and credits. Notwithstanding the reduction in the corporate income tax rate, the overall impact of the federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the new federal tax law. The impact of this tax reform on holders of our common stock is also uncertain and could be adverse. We urge our stockholders to consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

Risks Related to Our Business Strategy and Operations

We do not have any products that are approved for commercial sale.

We currently do not have any therapeutic products approved for commercial sale. We have not received, and may not receive within the next several years, if at all, any revenues from the commercialization of our product candidates if approved. In the event one or more of our product candidates is approved for commercial sale, we will incur significant costs in connection with commercializing any approved product candidate and we may not generate significant revenue from sales of such products, which would impact our ability to become profitable and maintain profitability.

We are substantially dependent upon the clinical, regulatory and commercial success of our five product candidates, INN-202, INN-217, INN-108, INN-289 and INN-329. Clinical drug development involves a lengthy and expensive process with an uncertain outcome; results of earlier studies and trials may not be predictive of future trial results; and our clinical trials may fail to adequately demonstrate to the satisfaction of regulatory authorities the safety and efficacy of our five product candidates.

The success of our business is dependent on our ability to advance the clinical development of INN-202 for the treatment of celiac disease, INN-217 for NASH, INN-108 for the treatment of mild to moderate ulcerative colitis, INN-289 for Crohn's disease and INN-329 for MRCP. INN-202 has successfully completed Phase 2b trials; however, Phase 3 pivotal studies and open label safety studies remain to be conducted. We will need to prepare for INN-108 to enter Phase 2 efficacy trials for mild to moderate ulcerative colitis. INN-329 requires additional studies to be performed for completion of Phase 3 trials. INN-217 and INN-289 require pre-clinical studies followed by clinical trials.

Clinical testing is expensive and can take many years to complete. The outcome of this testing is inherently uncertain. A failure of one or more of our clinical trials can occur at any time during the clinical trial process. The results of preclinical studies and early clinical trials of our product candidates may not necessarily be predictive of the results of later-stage clinical trials. There is a high failure rate for drugs proceeding through clinical trials and product candidates in later stages of clinical trials may fail to show the required safety and efficacy despite having progressed through preclinical studies and initial clinical trials. Many companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier clinical trials, and we cannot be certain that we will not face similar setbacks. Even if our clinical trials are completed, the results may not be sufficient to obtain regulatory approval for our product candidates.

Because of the developmental nature of our product candidates, we are subject to risks associated with initiating, completing and achieving positive outcomes from our current and future clinical trials, including:

- inability to enroll enough patients in the clinical trials;
- slow implementation, enrollment and completion of the clinical trials;
- low patient compliance and adherence to dosing and reporting requirements, such as incomplete reporting of patient reported outcomes in the clinical trials or missed doses;
- lack of safety and efficacy in the clinical trials;
- delays in the manufacture of supplies for drug components due to delays in formulation, process development, or manufacturing activities;
- requirements for additional nonclinical or clinical studies based on changes to formulation and/or changes to regulatory requirements; and

- requirements for additional clinical studies based on inconclusive clinical results or changes in market, standard of care, and/or regulatory requirements.

If we successfully complete the necessary clinical trials for our product candidates, our success will be subject to the risks associated with obtaining regulatory approvals, product launch and commercialization, including:

- delays during regulatory review and/or requirements for additional chemistry, manufacturing and controls, or nonclinical or clinical studies, resulting in increased costs and/or delays in marketing approval and subsequent commercialization of our product candidates in the United States and other markets;
- FDA rejection of our New Drug Application ("NDA") submissions for our product candidates;
- regulatory rejection in the European Union, Japan and other markets;
- inability to consistently manufacture commercial supplies of drug and delivery devices resulting in slowed market development and lower revenue;
- inability to enforce our intellectual property rights in and to our product candidates;
- reduction in the safety profile of our product candidates following approval; and
- poor commercial sales due to:
    - the ability of our future sales organization or our potential commercialization partners to effectively sell our product candidates;
    - lack of success in educating physicians and patients about the benefits, administration and use of our product candidates;
    - low patient demand for our product candidates;
    - the availability, perceived advantages, relative cost, relative safety and relative efficacy of other products or treatments for the targeted indications of our product candidates; and
    - poor prescription coverage and inadequate reimbursement for our product candidates.

Many of these clinical, regulatory and commercial matters are beyond our control and are subject to other risks described elsewhere in this "Risk Factors" section. Accordingly, we cannot provide any assurances that we will be able to advance our product candidates further through final clinical development or obtain regulatory approval of, commercialize or generate significant revenue from them. If we cannot do so, or are significantly delayed in doing so, our business will be materially harmed.

If we fail to attract and retain senior management and key scientific personnel, we may be unable to successfully develop and commercialize our product candidates.

We have historically operated with a limited number of employees. We currently have eight full-time employees, including two employees engaged full-time and two employees engaged part-time in research and development. Therefore, institutional knowledge is concentrated within a small number of employees. Our success depends in part on our continued ability to attract, retain and motivate highly qualified management, clinical and scientific personnel. Our future success is highly dependent upon the contributions of our senior management team. The loss of services of any of these individuals could delay or prevent the successful development of our product pipeline, completion of our planned clinical trials or the commercialization of our product candidates.

We may have intense competition from other companies and organizations for qualified personnel. Other companies and organizations with which we compete for personnel may have greater financial and other resources and different risk profiles than we do, and a history of successful development and commercialization of their product candidates. Replacing key employees may be difficult and costly; and we may not have other personnel with the capacity to assume all the responsibilities of a key employee upon his or her departure. If we cannot attract and retain skilled personnel, as needed, we may not achieve our development and other goals.

In addition, the success of our business will depend on our ability to develop and maintain relationships with respected service providers and industry-leading consultants and advisers. If we cannot develop and maintain such relationships, as needed, the rate and success at which we can develop and commercialize product candidates may be limited. In addition, our outsourcing strategy, which has included engaging consultants to manage key functional areas, may subject us to scrutiny under labor laws and regulations, which may divert management time and attention and have an adverse effect on our business and financial condition.

Our management team has limited experience managing a public company.

Most members of our management team have limited experience managing a publicly traded company, interacting with public company investors and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage our existence as a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors. These obligations and constituencies require significant attention from our senior management and could divert their attention away from the day-to-day management of our business.

We have identified a material weakness in our internal control over financial reporting and may identify additional material weaknesses in the future or otherwise fail to maintain an effective system of internal control, which may impair our ability to produce accurate financial statements or prevent fraud.

Currently, we have limited resources to address our internal controls and procedures and rely on consultants to assist us with our financial accounting and compliance obligations. In connection with the preparation of our audited financial statements for the year ended December 31, 2017, our independent auditors advised management that a material weakness existed in internal controls over financial reporting due to inadequate segregation of duties and appropriate level of review and management has been advised that this material weakness still remains at December 31, 2018. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis. Although we are committed to continuing to improve our internal control processes and intend to implement a plan to remediate this material weakness, such implementation will require us to spend limited resources, and we cannot be certain of the effectiveness of such plan or that, in the future, additional material weaknesses or significant deficiencies will not exist or otherwise be discovered. If we are unable to maintain proper and effective internal controls, we may not be able to produce timely and accurate financial statements and prevent fraud. In addition, if we are unable to successfully remediate the material weaknesses in our internal controls or if we are unable to produce accurate and timely financial statements, our stock price may be adversely affected and we may be unable to maintain compliance with applicable stock exchange listing requirements.

Our employees, independent contractors and consultants, principal investigators, clinical research organizations ("CROs"), contract manufacturing organizations ("CMOs") and other vendors, and any future commercial partners may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk that our employees, independent contractors and consultants, principal investigators, CROs, CMOs and other vendors, and any future commercial partners may engage in fraudulent conduct or other misconduct. This type of misconduct may include intentional failures to comply with FDA regulations or similar regulations of comparable foreign regulatory authorities, to provide accurate information to the FDA or comparable foreign regulatory authorities, to comply with manufacturing standards required by Current Good Manufacturing Practices ("cGMP") or our standards, to comply with federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable foreign regulatory authorities, and to report financial information or data accurately or disclose unauthorized activities to them. The misconduct of our employees and other of our service providers could involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. We have adopted a code of ethics and business conduct, but it is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity, such as the implementation of a quality system which entails vendor audits by quality experts, may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and results of operations, including the imposition of significant fines or other sanctions.

We do not have, and do not have plans to establish, manufacturing facilities. We completely rely on third parties for the manufacture and supply of our clinical trial drug supplies and, if approved, commercial product materials. The loss of any of these vendors or a vendor's failure to provide us with an adequate supply of clinical trial or commercial product material in a timely manner and on commercially acceptable terms, or at all, could harm our business.

We outsource the manufacture of our product candidates and do not plan to establish our own manufacturing facilities. To manufacture our product candidates, we have made numerous custom modifications at CMOs, making us highly dependent on these CMOs. For clinical and commercial supplies, if approved, we have or plan to have supply agreements with third party CMOs for drug substance and finished drug product. While we have existing supply agreements with third party CMOs, we would need to negotiate agreements for commercial supply with several important CMOs and we may not be able to reach agreement on acceptable terms. In addition, we rely on these third parties to conduct or assist us in key manufacturing development activities, including qualification of equipment, developing and validating methods, defining critical process parameters, releasing component materials and conducting stability testing, among other things. If these third parties are unable to perform their tasks successfully in a timely manner, whether for technical, financial or other reasons, we may be unable to secure clinical trial material, or commercial supply material if approved, which likely would delay the initiation, conduct or completion of our clinical studies or prevent us from having enough commercial supply material for sale, which would have a material and adverse effect on our business.

Currently, we do not have alternative vendors to back up our primary vendors of clinical trial material or, if approved, commercial supply material. Identification of and discussions with other vendors may be protracted and/or unsuccessful, or these new vendors may be unsuccessful in producing the same results as the current primary vendors producing the material. Therefore, if our primary vendors become unable or unwilling to perform their required activities, we could experience protracted delays or interruptions in the supply of clinical trial material and, ultimately, product for commercial sale, which would materially and adversely affect our development programs, commercial activities, operating results and financial condition. In addition, the FDA or regulatory authorities outside of the United States may require us to have an alternate manufacturer of a drug product before approving it for marketing and sale in the United States or abroad and securing such alternate manufacturer before approval of an NDA could result in considerable additional time and cost prior to approval.

Any new manufacturer or supplier of finished drug product or our component materials, including drug substance and delivery devices, would be required to qualify under applicable regulatory requirements and would need to have sufficient rights under applicable intellectual property laws to the method of manufacturing of such product or ingredients required by us. The FDA or foreign regulatory agency may require us to conduct additional clinical studies, collect stability data and provide additional information concerning any new supplier, or change in a validated manufacturing process, including scaling-up production, before we could distribute products from that manufacturer or supplier or revised process. For example, if we were to engage a third party other than our current CMOs to supply the drug substance or drug product for future clinical trial, or commercial production, the FDA or regulatory authorities outside of the United States may require us to conduct additional clinical and nonclinical studies to ensure comparability of the drug substance or drug product manufactured by our current CMOs to that manufactured by the new supplier.

The manufacture of pharmaceutical products requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers of pharmaceutical products often encounter difficulties in production, particularly in scaling-up initial production. These problems include difficulties with production costs and yields, quality control, including stability of the product candidate and quality assurance testing and shortages of qualified personnel. Our product candidates have not been manufactured at the scale we believe will be necessary to maximize their commercial value, and accordingly, we may encounter difficulties in attempting to scale-up production and may not succeed in that effort on a timely basis or at all. In addition, the FDA or other regulatory authorities may impose additional requirements as we scale-up initial production capabilities, which may delay our scale-up activities and/or add expense.

All manufacturers of our clinical trial material and, if approved, commercial product, including drug substance manufacturers, must comply with cGMP requirements enforced by the FDA through its facilities inspection program and applicable requirements of foreign regulatory authorities. These requirements include quality control, quality assurance and the maintenance of records and documentation. Manufacturers of our clinical trial material may be unable to comply with these cGMP requirements and with other FDA, state and foreign regulatory requirements. While we or our representatives generally monitor and audit our manufacturers' systems, we do not have full control over their ongoing compliance with these regulations. And while the responsibility to maintain cGMP compliance is shared between the third-party manufacturer and us, we bear ultimate responsibility for our supply chain and compliance with regulatory standards. Failure to comply with

these requirements may result in fines and civil penalties, suspension of production, suspension or delay or failure to obtain product approval, product seizure or recall, or withdrawal of product approval.

If our manufacturers encounter any of the aforementioned difficulties or otherwise fail to comply with their contractual obligations or there are delays entering commercial supply agreements due to capital constraints, we may have insufficient quantities of material to support ongoing and/or planned clinical studies or to meet commercial demand, if approved. In addition, any delay or interruption in the supply of materials necessary or useful to manufacture our product candidates could delay the completion of our clinical studies, increase the costs associated with our development programs and, depending upon the period of delay, require us to commence new clinical studies at significant additional expense or terminate the studies completely. Delays or interruptions in the supply of commercial product could result in increased cost of goods sold and lost sales. We cannot provide assurance that manufacturing or quality control problems will not arise in connection with the manufacture of our clinical trial material or commercial product, if approved, or that third-party manufacturers will be able to maintain the necessary governmental licenses and approvals to continue manufacturing such clinical trial material or commercial product, as applicable. In addition, if our products are manufactured entirely or partially outside the United States, we may experience interruptions in supply due to shipping or customs difficulties or regional instability. Furthermore, changes in currency exchange rates, shipping costs and import tariffs could adversely affect our cost of goods sold. Any of the above factors could cause us to delay or suspend anticipated or ongoing trials, regulatory submissions or commercialization of our product candidates, entail higher costs or result in us being unable to effectively commercialize our products. Our dependence upon third parties for the manufacture of our clinical trial material may adversely affect our future costs and our ability to develop and commercialize our product candidates on a timely and competitive basis.

We currently rely significantly on third parties to conduct our nonclinical testing and clinical studies and other aspects of our development programs. If those third parties do not satisfactorily perform their contractual obligations or meet anticipated deadlines, the development of our product candidates could be adversely affected.

We do not currently employ personnel or possess the facilities necessary to conduct many of the activities associated with our programs. We engage consultants, advisors, CROs and others to assist in the design and conduct of nonclinical and clinical studies of our product candidates, with interpretation of the results of those studies and with regulatory activities and expect to continue to outsource all or a significant amount of such activities. As a result, many important aspects of our development programs are and will continue to be outside our direct control and our third-party service providers may not perform their activities as required or expected including the maintenance of Good Clinical Practices ("GCP"), Good Laboratory Practices ("GLP") and Good Manufacturing Practices ("GMP") compliance, which are ultimately our responsibility to ensure. Further, such third parties may not be as committed to the success of our programs as our own employees and, therefore, may not devote the same time, thoughtfulness or creativity to completing projects or problem-solving as our own employees would. To the extent we are unable to successfully manage the performance of third-party service providers, our business may be adversely affected.

The CROs that we engage or may engage to execute our clinical studies play a significant role in the conduct of the studies, including the collection and analysis of study data, and we likely will depend on CROs and clinical investigators to conduct future clinical studies and to assist in analyzing data from completed studies and developing regulatory strategies for our product candidates. Individuals working at the CROs with which we contract, as well as investigators at the sites at which our studies are conducted, are not our employees, and we have limited control over the amount or timing of resources that they devote to their programs. If our CROs, study investigators, and/or third-party sponsors fail to devote sufficient time and resources to studies of our product candidates, if we and/or our CROs do not comply with all GLP and GCP regulatory and contractual requirements, or if their performance is substandard, it may delay commencement and/or completion of these studies, submission of applications for regulatory approval, regulatory approval and commercialization of our product candidates. Failure of CROs to meet their obligations to us could adversely affect the development of our product candidates.

In addition, the CROs we engage may have relationships with other commercial entities, some of which may compete with us. Through intentional or unintentional means, our competitors may benefit from lessons learned on the project that could ultimately harm our competitive position. Moreover, if a CRO fails to properly, or at all, perform our activities during a clinical study, we may not be able to enter into arrangements with alternative CROs on acceptable terms or in a timely manner, or at all. Switching CROs may increase costs and divert management time and attention. In addition, there likely would be a transition period before a new CRO commences work. These challenges could result in delays in the commencement or completion of our clinical studies, which could materially impact our ability to meet our desired and/or announced development timelines and have a material adverse impact on our business and financial condition.

We may not achieve our projected development goals within the time frames that we have announced.

We have set goals for accomplishing certain objectives material to the successful development of our product candidates. The actual timing of these events may vary due to many factors, including delays or failures in our nonclinical testing, clinical studies and manufacturing and regulatory activities and the uncertainties inherent in the regulatory approval process. From time to time, we create estimates for the completion of enrollment of or announcement of data from clinical studies of our product candidates. However, predicting the rate of enrollment or the time from completion of enrollment to announcement of data for any clinical study requires us to make significant assumptions that may prove to be incorrect. As discussed in other risk factors above, our estimated enrollment rates and the actual rates may differ materially and the time required to complete enrollment of any clinical study may be considerably longer than we estimate. Such delays may adversely affect our business, financial condition and results of operations.

Even if we complete a clinical study with successful results, we may not achieve our projected development goals within the periods we initially anticipate or announce. If a development plan for a product candidate becomes more extensive and costly than anticipated, we may determine that the associated time and cost are not financially justifiable and, as a result, may discontinue development in a particular indication or of the product candidate as a whole. In addition, even if a study did complete with successful results, changes may occur in regulatory requirements or policy during the period of product development and/or regulatory review of an NDA that relate to the data required to be included in NDAs which may require additional studies that may be costly and time consuming. Any of these actions may be viewed negatively, which could adversely impact our business, financial condition and results of operations.

Further, throughout development, we must provide adequate assurance to the FDA and other regulatory authorities that we can consistently develop and produce our product candidates in conformance with GLP, GCP, cGMP and other regulatory standards. As discussed above, we rely on CMOs for the manufacture of clinical and future commercial, quantities of our product candidates. If future FDA or other regulatory authority inspections identify cGMP compliance deficiencies at these third-party facilities, production of our clinical trial material or, in the future, commercial product, could be disrupted, causing potentially substantial delay in or failure of development or commercialization of our product candidates.

We currently have limited marketing capabilities and no sales organization. If we are unable to establish sales and marketing capabilities on our own or through third parties, we will be unable to successfully commercialize our products, if approved, or generate product revenue.

To commercialize our products, if approved, in the United States and other jurisdictions we seek approvals, we must build our marketing, sales, managerial and other non-technical capabilities or make arrangements with third parties to perform these services and we may not be successful in doing so. If our products receive regulatory approval, we expect to market such products in the United States through a focused, specialized sales force, which will be costly and time consuming. We have no prior experience in the marketing and sale of pharmaceutical products and there are significant risks involved in building and managing a sales organization, including our ability to hire, retain and incentivize qualified individuals, generate sufficient sales leads, provide adequate training to sales and marketing personnel and effectively manage a geographically dispersed sales and marketing team. Outside of the United States, we may consider collaboration arrangements. If we are unable to enter into such arrangements on acceptable terms or at all, we may not be able to successfully commercialize our products in certain markets. Any failure or delay in the development of our internal sales, marketing and distribution capabilities would adversely impact the commercialization of our products. If we are not successful in commercializing our products, either on our own or through collaborations with one or more third parties, our future product revenue will suffer and we would incur significant additional losses.

To establish a sales and marketing infrastructure and expand our manufacturing capabilities, we will need to increase the size of our organization and we may experience difficulties in managing this growth.

We currently have eight full-time employees, including two employees engaged full-time and two employees engaged part-time in research and development. As we advance our product candidates through the development process and to commercialization, we will need to continue to expand our development, regulatory, quality, managerial, sales and marketing, operational, finance and other resources to manage our operations and clinical trials, continue our development activities and commercialize our product candidates, if approved. As our operations expand, we expect that we will need to manage additional relationships with various manufacturers and collaborative partners, suppliers and other organizations.

Due to our limited financial resources and our limited experience in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. In addition, the physical expansion of our operations may lead to significant costs and may divert our management and resources. Any inability to manage growth could delay the execution of our development and strategic objectives, or disrupt our operations, which could materially impact our business, revenue and operating results.

Our product candidates may cause undesirable side effects or adverse events, or have other properties that could delay or prevent their clinical development, regulatory approval or commercialization.

As with many pharmaceutical products, undesirable side effects or adverse events caused by our product candidates could interrupt, delay or halt clinical studies and could result in the denial of regulatory approval by the FDA or other regulatory authorities for any or all indications, and in turn prevent us from commercializing our product candidates. If undesirable side effects occur, they could possibly prevent approval, which would have a material and adverse effect on our business.

If any of our product candidates receive marketing approval and we or others later identify undesirable side effects caused by the product:

- regulatory authorities may require the addition of labeling statements, such as a "black box" warning or a contraindication;
- we may be required to change the way the product is administered, conduct additional clinical studies or change the labeling of the product;
- regulatory authorities may withdraw approval of the product; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the affected product or could substantially increase the costs and expenses of commercializing the product, which in turn could delay or prevent us from generating significant revenue from its sale.

Our business and operations would suffer in the event of third-party computer system failures, cyber-attacks on third-party systems or deficiency in our cyber security.

We rely on information technology ("IT") systems, including third-party "cloud based" service providers, to keep financial records, maintain laboratory data, clinical data and corporate records, to communicate with staff and external parties and to operate other critical functions. This includes critical systems such as email, other communication tools, electronic document repositories and archives. If any of these third-party information technology providers are compromised due to computer viruses, unauthorized access, malware, natural disasters, fire, terrorism, war and telecommunication failures, electrical failures, cyber-attacks or cyber-intrusions over the internet, then sensitive emails or documents could be exposed or deleted. Similarly, we could incur business disruption if our access to the internet is compromised and we are unable to connect with third-party IT providers. The risk of a security breach or disruption, particularly through cyber-attacks or cyber intrusion, including by computer hackers, foreign governments and cyber terrorists, has generally increased as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased. In addition, we rely on those third parties to safeguard important confidential personal data regarding our employees and patients enrolled in our clinical trials. If a disruption event were to occur and cause interruptions in a third-party IT provider's operations, it could result in a disruption of our drug development programs. For example, the loss of clinical trial data from completed, ongoing or planned clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and development of our product candidates could be delayed, or could fail.

Risks Related to Drug Development and Commercialization

We depend on the successful completion of clinical studies of our product candidates and any positive results in prior clinical studies do not ensure that ongoing or future clinical studies will be successful.

Pharmaceutical products are subject to stringent regulatory requirements covering quality, safety and efficacy. The burden of proof is on the manufacturer, such as us, to show with substantial clinical data that the risk/benefit profile for any new drug is favorable. Only after successfully completing extensive pharmaceutical development, nonclinical testing and clinical studies may a product be considered for regulatory approval.

If we license rights to develop our product candidates to independent third parties or otherwise permit such third parties to evaluate our product candidates in clinical studies, we may have limited control over those clinical studies. Any safety or efficacy concern identified in a third-party sponsored study could adversely affect our or another licensee's development of our product candidate and prospects for our regulatory approval, even if the data from that study are subject to varying interpretations and analyses.

There is significant risk that ongoing and future clinical studies of our product candidates are or will be unsuccessful. Negative or inconclusive results could cause the FDA and other regulatory authorities to require us to repeat or conduct additional clinical studies, which could significantly increase the time and expense associated with development of that product candidate or cause us to elect to discontinue one or more clinical programs. Failure to complete a clinical study of a product candidate or an unsuccessful result of a clinical study could have a material adverse effect on our business.

Clinical drug development involves a lengthy and expensive process, with an uncertain outcome. We may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our drug candidates.

Clinical studies are expensive, difficult to design and implement, may take many years to complete and outcomes are inherently uncertain. A drug product may fail to demonstrate positive results at any stage of testing despite having progressed satisfactorily through nonclinical testing and initial clinical studies. There is significant risk in clinical development where later stage clinical studies are designed and powered based on the analysis of data from earlier studies, with these earlier studies involving a smaller number of patients and the results of the earlier studies being driven primarily by a subset of responsive patients. In addition, interim results of a clinical study do not necessarily predict final results. Further, clinical study data frequently are susceptible to varying interpretations. Medical professionals and/or regulatory authorities may analyze or weigh study data differently than the sponsor company, resulting in delay or failure to obtain marketing approval for a product candidate. Additionally, the possible lack of standardization across multiple investigative sites may induce variability in the results, which can interfere with the evaluation of treatment effects.

Delays in commencement and completion of clinical studies are common and have many causes. Delays in clinical studies of our product candidates could increase overall development costs and jeopardize our ability to obtain regulatory approval and successfully commercialize any approved products.

Clinical studies may not commence on time or be completed on schedule, if at all. The commencement and completion of clinical studies can be delayed for a variety of reasons, including:

- inability to raise sufficient funding to initiate or to continue a clinical study;
- delays in obtaining regulatory approval to commence a clinical study;
- delays in identifying and reaching agreement on acceptable terms with prospective CROs and clinical study sites and investigators, which agreements can be subject to extensive negotiation and may vary significantly among study sites;
- delays in obtaining regulatory approval in a prospective country;
- delays in obtaining ethics committee approval to conduct a clinical study at a prospective site;
- delays in reaching agreements on acceptable terms with prospective CMOs or other vendors for the production and supply of clinical trial material and, if necessary, drug administration devices, which agreements can be subject to extensive negotiation;
- delays in the production or delivery of sufficient quantities of clinical trial material from our CMOs and other vendors to initiate or continue a clinical study;

- delays due to product candidate recalls as a result of stability failure, excessive product complaints or other failures of the product candidate during its use or testing;
- invalidation of clinical data caused by premature unblinding or integrity issues;
- invalidation of clinical data caused by mixing up of the active drug and placebo through randomization or manufacturing errors;
- delays on the part of our CROs, CMOs and other third-party contractors in developing procedures and protocols or otherwise conducting activities in accordance with applicable policies and procedures and in accordance with agreed upon timelines;
- delays in identifying and hiring or engaging, as applicable, additional employees or consultants to assist in managing clinical study-related activities;
- delays in recruiting and enrolling individuals to participate in a clinical study, which historically can be challenging in orphan diseases;
- delays caused by patients dropping out of a clinical study due to side effects, concurrent disorders, difficulties in adhering to the study protocol, unknown issues related to different patient profiles than in previous studies, or otherwise;
- delays in having patients complete participation in a clinical study, including returning for post-treatment follow-up;
- delays resulting from study sites dropping out of a trial, providing inadequate staff support for the study, problems with shipment of study supplies to clinical sites, or focusing our staff's efforts on enrolling studies that compete for the same patient population;
- suspension of enrollment at a study site or the imposition of a clinical hold by the FDA or other regulatory authority following an inspection of clinical study operations at study sites or finding of a drug-related serious adverse event; and
- delays in quality control/quality assurance procedures necessary for study database lock and analysis of unblinded data.

We may experience difficulties in the enrollment of patients in our clinical trials, which may delay or prevent us from obtaining regulatory approval.

We may not be able to continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside the United States. In particular, some of our competitors have ongoing clinical trials for drug candidates that treat the same indications as our drug candidates and patients who would otherwise be eligible for our clinical trials may instead enroll in clinical trials of our competitors' drug candidates.

Patient enrollment, a critical component to successful completion of a clinical study, is affected by many factors, including:

- the size of the target patient population;
- other ongoing studies competing for the same patient population;
- the eligibility criteria for the clinical trial;
- the design of the clinical study;
- the perceived risks and benefits of the product candidate under study;
- the efforts to facilitate timely enrollment in clinical trials;
- the proximity and availability of clinical trial sites for prospective patients; and
- the ability to monitor patients adequately during and after treatment.

Clinical studies may not begin on time or be completed in the time frames we anticipate. The length of time necessary to successfully complete clinical studies varies significantly and is difficult to predict accurately. We may make statements regarding anticipated timing for completion of enrollment in and/or availability of results from our clinical studies, but such predictions are subject to a number of significant assumptions and actual timing may differ materially for a variety of reasons, including patient enrollment rates, length of time needed to prepare raw study data for analysis and then to review and analyze it and other factors described above. If we experience delays in the completion of a clinical study, if a clinical study is terminated, or if failure to conduct a study in accordance with regulatory requirements or the study's protocol leads to deficient safety and/or efficacy data, the regulatory approval and/or commercial prospects for our product candidates may be harmed and our ability to generate product revenue will be delayed. In addition, any delays in completing our clinical studies likely will increase our development costs. Further, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical studies may ultimately lead to the denial of regulatory approval of a product

candidate. Even if we ultimately commercialize our product candidates, the standard of care may have changed or other therapies for the same indications may have been introduced to the market in the interim and may establish a competitive threat to us or may diminish the need for our products.

Clinical studies are very expensive, difficult to design and implement, often take many years to complete and the outcome is inherently uncertain.

Clinical development of pharmaceutical products for humans is generally very expensive and takes many years to complete. Failures can occur at any stage of clinical testing. We estimate that clinical development of our product candidates will take several additional years to complete, but because of the variety of factors that can affect the design, timing and outcome of clinical studies, we are unable to estimate the exact funds required to complete research and development, to obtain regulatory approval and to commercialize all of our product candidates. We will need significant additional capital to continue to advance our product candidates pursuant to our current development and commercialization plans.

Failure at any stage of clinical testing is not uncommon and we may encounter problems that would require additional, unplanned studies or cause us to abandon a clinical development program.

In addition, a clinical study may be suspended or terminated by us, an institutional review board ("IRB"), a data safety monitoring board, the FDA or other regulatory authorities due to a number of factors, including:

- lack of adequate funding to continue the study;
- failure to conduct the study in accordance with regulatory requirements or the study's protocol;
- inspection of clinical study operations or sites by the FDA or other regulatory authorities resulting in the imposition of a clinical hold;
- unforeseen safety issues, including adverse side effects; or
- changes in governmental regulations or administrative actions.

Changes in governmental regulations and guidance relating to clinical studies may occur and we may need to amend study protocols to reflect these changes, or we may amend study protocols for other reasons. Amendments may require us to resubmit protocols to IRBs for reexamination and approval or renegotiate terms with CROs, study sites and investigators, all of which may adversely impact the costs or timing of or our ability to successfully complete a trial.

Use of our proprietary patient-reported outcome measure, CeD PRO, in our Phase 3 clinical trials of larazotide acetate for the treatment of celiac disease may adversely impact our ability to achieve a positive result from these clinical trials.

Patient-reported outcome assessments ("PROs"), involve patients' subjective assessments of efficacy and this subjectivity can increase the uncertainty of clinical trial outcomes. Such assessments can be influenced by a number of factors and can vary widely from day to day for a particular patient, and from patient to patient and site to site within a clinical trial, leading to high variability in PRO measurements.

The variability of PRO measures and high placebo response rates could adversely impact our Phase 3 clinical trials of larazotide acetate for celiac disease. The variability of a PRO measure can complicate clinical trial design, adversely impact the ability of a study to show a statistically significant improvement and generally adversely impact a clinical development program by introducing additional uncertainties.

There is significant uncertainty regarding the regulatory approval process for any investigational new drug, substantial further testing and validation of our product candidates and related manufacturing processes may be required, and regulatory approval may be conditioned, delayed or denied, any of which could delay or prevent us from successfully marketing our product candidates and substantially harm our business.

Pharmaceutical products generally are subject to rigorous nonclinical testing and clinical studies and other approval procedures mandated by the FDA and foreign regulatory authorities. Various federal and foreign statutes and regulations also govern or materially influence the manufacturing, safety, labeling, storage, record keeping and marketing of pharmaceutical products. The process of obtaining these approvals and the subsequent compliance with appropriate U.S. and foreign statutes and regulations is time-consuming and requires the expenditure of substantial resources.

We are preparing INN-202, larazotide acetate, for Phase 3 clinical trials, the success of which will be needed for FDA approval to market INN-202 in the United States to treat celiac disease in patients with persistent symptoms while adhering to a gluten free diet. While significant communication with the FDA on the Phase 3 study design has occurred, even if the Phase 3 clinical study meets all of its statistical goals and protocol end points, the FDA may not view the results as robust and convincing and may require additional clinical studies and/or other costly studies, which could require us to expend substantial additional resources and could significantly extend the timeline for clinical development prior to market approval. Additionally, we are required by the FDA to conduct a long-term safety study on INN-202. The results of this study will not be known until a short time prior to potential submission of an NDA for INN-202. If the safety study cannot be completed for technical or other reasons, or provides results that the FDA determines to be concerning, this may cause a delay or failure in obtaining approval for INN-202. We are conducting pre-clinical work for INN-217 in NASH and INN-289 in Crohn's disease to prepare for future clinical proof-of-concept trials.

We may make formulation changes to INN-108 that would simplify the dosing in pediatric patients. While this change is expected by us to reduce studies and/or other documentation requirements, the regulatory agencies may require additional clinical or nonclinical studies prior to approval, even if current clinical studies are deemed successful, which could require us to expend substantial additional resources and significantly extend the timeline for clinical development of INN-108.

We intend to prepare INN-329, secretin, for additional testing in its Phase 3 clinical trial, the success of which will be needed for FDA approval to market INN-329 in the United States for MRCP procedures. While significant communication with the FDA on the Phase 3 study design has occurred in the past, we will be required to initiate communication with the FDA to finalize the study design and to seek its approval for the additional Phase 3 trial design. Even if the Phase 3 clinical study meets all of its statistical goals and protocol end points, the FDA may not view the results as robust and convincing. The FDA may require additional clinical studies and/or other costly studies, which could require us to expend substantial additional resources and could significantly extend the timeline for clinical development prior to market approval. Additionally, we are required by the FDA to conduct a long-term safety study on INN-329. The results of this study will not be known until a short time prior to potential submission of an NDA for INN-329. If the safety study cannot be completed for technical or other reasons, or provides results that the FDA determines to be concerning, this may cause a delay or failure in obtaining approval for INN-329.

Significant uncertainty exists with respect to the regulatory approval process for any investigational new drug, including INN-202, INN-217, INN-108, INN-289 and INN-329. Regardless of any guidance the FDA or foreign regulatory agencies may provide a drug's sponsor during its development, the FDA or foreign regulatory agencies retain complete discretion in deciding whether to accept an NDA or the equivalent foreign regulatory approval submission for filing or, if accepted, approve an NDA. There are many components to an NDA or marketing authorization application submission in addition to clinical study data. For example, the FDA or foreign regulatory agencies will review the sponsor's internal systems and processes, as well as those of its CROs, CMOs and other vendors, related to development of its product candidates, including those pertaining to its clinical studies and manufacturing processes. Before accepting an NDA for review or before approving the NDA, the FDA or foreign regulatory agencies may request that we provide additional information that may require significant resources and time to generate and there is no guarantee that its product candidates will be approved for any indication for which we may apply. The FDA or foreign regulatory agencies may choose not to approve an NDA for any of a variety of reasons, including a decision related to the safety or efficacy data, manufacturing controls or systems, or for any other issues that the agency may identify related to the development of its product candidates. Even if one or more Phase 3 clinical studies are successful in providing statistically significant evidence of the efficacy and safety of the investigational drug, the FDA or foreign regulatory agencies may not consider efficacy and safety data from the submitted studies adequate scientific support for a conclusion of effectiveness and/or safety and may require one or more additional Phase 3 or other studies prior to granting marketing approval. If this were to occur, the overall development cost for the product candidate would be substantially greater and our competitors may bring products to market before we do, which could impair our ability to generate revenues from the product candidates, or even seek approval, if blocked by a competitor's Orphan Drug exclusivity, which would have a material adverse effect on our business, financial condition and results of operations.

Further, development of our product candidates and/or regulatory approval may be delayed for reasons beyond our control. For example, a U.S. federal government shut-down or budget sequestration, such as ones that occurred during 2013, 2018 and 2019, may result in significant reductions to the FDA's budget, employees and operations, which may lead to slower response times and longer review periods, potentially affecting our ability to progress development of our product candidates or obtain regulatory approval for our product candidates.

Even if the FDA or foreign regulatory agencies grant approvals for our product candidates, the conditions or scope of the approval(s) may limit successful commercialization of the product candidates and impair our ability to generate substantial sales revenue. The FDA or foreign regulatory agencies may also only grant marketing approval contingent on the performance of costly post-approval nonclinical or clinical studies, or subject to warnings or contraindications that limit commercialization. Additionally, even after granting approval, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for our products will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration and continued compliance with cGMP, good clinical practices, regulations of the International Council for Harmonization of Technical Requirements for Pharmaceuticals for Human Use and good laboratory practices, which are regulations and guidelines that are enforced by the FDA or foreign regulatory agencies for all of our clinical development and for any clinical studies that we conduct post-approval. The FDA or foreign regulatory agencies may decide to withdraw approval, add warnings or narrow the approved indications in the product label, or establish risk management programs that could restrict distribution of our products. These actions could result from, among other things, safety concerns, including unexpected side effects or drug-drug interaction problems, or concerns over misuse of a product. If any of these actions were to occur following approval, we may have to discontinue commercialization of the product, limit our sales and marketing efforts, implement risk minimization procedures and/or conduct post-approval studies, which in turn could result in significant expense and delay or limit our ability to generate sales revenues.

Regulations may be changed prior to submission of an NDA that require higher hurdles than currently anticipated. These may occur as a result of drug scandals, recalls, or a political environment unrelated to our products.

Even if we receive regulatory approval for a product candidate, we may face regulatory difficulties that could materially and adversely affect our business, financial condition and results of operations.

Even if initial regulatory approval is obtained, as a condition to the initial approval the FDA or a foreign regulatory agency may impose significant restrictions on a product's indicated uses or marketing or impose ongoing requirements for potentially costly post-approval studies or marketing surveillance programs, any of which would limit the commercial potential of the product. Our product candidates also will be subject to ongoing FDA requirements related to the manufacturing processes, labeling, packaging, storage, distribution, advertising, promotion, record-keeping and submission of safety and other post-market information regarding the product. For instance, the FDA may require changes to approved drug labels, require post-approval clinical studies and impose distribution and use restrictions on certain drug products. In addition, approved products, manufacturers and manufacturers' facilities are subject to continuing regulatory review and periodic inspections. If previously unknown problems with a product are discovered, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, the FDA may impose restrictions on that product or us, including requiring withdrawal of the product from the market. If one of our CMOs or we fail to comply with applicable regulatory requirements, a regulatory agency may:

- issue warning letters or untitled letters;
- impose civil or criminal penalties;
- suspend or terminate any ongoing clinical studies;
- close the facilities of a CMO;
- refuse to approve pending applications or supplements to approved applications;
- suspend or withdraw regulatory approval;
- exclude our product from reimbursement under government healthcare programs, including Medicaid or Medicare;
- impose restrictions or affirmative obligations on our or our CMOs' operations, including costly new manufacturing requirements; or
- seize or detain products or require a product recall.

If any of our product candidates for which we receive regulatory approval fails to achieve significant market acceptance among the medical community, patients or third-party payers, the revenue we generate from our sales will be limited and our business may not be profitable.

Our success will depend in substantial part on the extent to which our product candidates, if approved, are accepted by the medical community and patients and reimbursed by third-party payers, including government payers. We cannot predict with reasonable accuracy whether physicians, patients, healthcare insurers or health maintenance organizations, or the medical community in general, will accept or utilize any of our products, if approved. If our product candidates are approved but do not achieve an adequate level of acceptance by these parties, we may not generate sufficient revenue to become or to

remain profitable. In addition, our efforts to educate the medical community and third-party payers regarding the benefits of our products may require significant resources and may never be successful.

The degree of market acceptance with respect to each of our approved products, if any, will depend upon a number of factors, including:

- the safety and efficacy of our product as demonstrated in clinical studies;
- acceptance in the medical and patient communities of our product as a safe and effective treatment;
- the perceived advantages of our product over alternative treatments, including with respect to the incidence and severity of any adverse side effects and the cost of treatment;
- the indications for which our product is approved;
- claims or other information (including limitations or warnings) in our product's approved labeling;
- reimbursement and coverage policies of government and other third-party payers;
- smaller than expected market size due to lack of disease awareness of a rare disease, or the patient population with a specific rare disease being smaller than anticipated;
- availability of alternative treatments;
- pricing and cost-effectiveness of our product relative to alternative treatments;
- inappropriate diagnostic efforts due to limited knowledge and/or resources among clinicians;
- the prevalence of off-label substitution of chemically equivalent products or alternative treatments; and
- the resources we devote to marketing our product and restrictions on promotional claims we can make with respect to the product.

If we determine that a product candidate may not achieve adequate market acceptance or that the potential market size does not justify additional expenditure on the program, we may reduce our expenditures on the development and/or the process of seeking regulatory approval of the product candidate while we evaluate whether and on what timeline to move the program forward.

Even if we receive regulatory approval to market one or more of our product candidates in the United States, we may never receive approval or commercialize our products outside of the United States, which would limit our ability to realize the full commercial potential of our product candidates.

In order to market products outside of the United States, we must establish and comply with the numerous and varying regulatory requirements of other countries regarding safety and efficacy. Approval procedures vary among countries and can involve additional product testing and validation and additional administrative review periods. The time required to obtain approval in other countries generally differs from that required to obtain FDA approval. The regulatory approval process in other countries may include all of the risks detailed above regarding FDA approval in the United States, as well as other risks. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may have a negative effect on the regulatory process in others. Failure to obtain regulatory approval in other countries or any delay or setback in obtaining such approval could have the same adverse effects detailed above regarding FDA approval in the United States. As described above, such effects include the risks that our product candidates may not be approved for all indications requested, which could limit the uses of our product candidates and have an adverse effect on product sales, and that such approval may be subject to limitations on the indicated uses for which the product may be marketed or require costly, post-marketing follow-up studies.

Conversely, even if our product candidates receive approval outside the United States in the future, we may still be unable to meet the FDA requirements necessary for approval in the United States.

We must comply with the U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws.

The U.S. Foreign Corrupt Practices Act, to which we are subject, prohibits corporations and individuals from engaging in certain activities to obtain or retain business or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. Other countries, such as the United Kingdom, have similar laws with which we must comply. We face the risk that an employee or agent could be accused of violating one or more of these laws, particularly in geographies where significant overlap exists between local government and healthcare industries. Such an accusation, even if unwarranted, could prove disruptive to our developmental and commercialization efforts.

We may expend our limited resources to pursue a particular product candidate or indication in lieu of other opportunities and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we intend to focus on developing product candidates for specific indications that we identify as most likely to succeed, in terms of their potential both to gain regulatory approval and to achieve commercialization. As a result, we may forego or delay pursuit of opportunities with other product candidates or in other indications with greater commercial potential. We currently intend to focus our limited financial and managerial resources on developing our lead program, INN-202, for the treatment of celiac disease and INN-217 for the treatment of NASH. As a result, we may allocate fewer resources to the other product candidates in our pipeline, including INN-108, and we will be required to seek additional sources of financing to pursue further development of such other product candidates.

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

Risks Related to Our Intellectual Property

Our success will depend in part on obtaining and maintaining effective patent and other intellectual property protection for our product candidates and proprietary technology.

We rely on patents and other intellectual property to maintain exclusivity for our product candidates. INN-202 and INN-108 are covered by several issued patents in the U.S., issued patents outside the U.S. and with patent applications pending in several jurisdictions. INN-329 is not protected by patents. Intellectual property relating to the INN-202 program is exclusively licensed from Alba Therapeutics Corp. Intellectual property relating to INN-108 program is exclusively licensed from Seachaid Pharmaceuticals Inc. There are two pending patent applications relating to INN-217 based on Innovate's internal developments.

Our success will depend in part on our ability to:

- obtain and maintain patents and other exclusivity with respect to our products;
- prevent third parties from infringing upon our proprietary rights;
- maintain proprietary know-how and trade secrets;
- operate without infringing upon the patents and proprietary rights of others; and
- obtain and maintain appropriate licenses to patents or proprietary rights held by third parties if infringement would otherwise occur or if necessary to secure exclusive rights to them, both in the United States and in foreign countries.

The patent and intellectual property positions of biopharmaceutical companies generally are highly uncertain, involve complex legal and factual questions and have been and continue to be the subject of much litigation. There is no guarantee that we have or will develop or obtain the rights to products or processes that are patentable, that patents will issue from any pending applications or that claims issued will be sufficient to protect the technology we develop or have developed or that is used by us, our CMOs or our other service providers. In addition, any patents that are issued and/or licensed to us may be limited in scope or challenged, invalidated, infringed or circumvented, including by our competitors and any rights we have under issued and/or licensed patents may not provide competitive advantages to us. If competitors can develop and commercialize technology and products similar to ours, our ability to successfully commercialize our technology and products may be impaired.

Patent applications in the United States are confidential for a period of time until they are published, and publication of discoveries in scientific or patent literature typically lags actual discoveries by several months. As a result, we cannot be certain that the inventors listed in any patent or patent application owned or licensed by us were the first to conceive of the inventions covered by such patents and patent applications (for U.S. patent applications filed before March 16, 2013), or that

such inventors were the first to file patent applications for such inventions outside the United States and, after March 15, 2013, in the United States. In addition, changes in or different interpretations of patent laws in the United States and foreign countries may affect our patent rights and limit the patents we can obtain, which could permit others to use our discoveries or to develop and to commercialize our technology and products without any compensation to us.

We also rely on unpatented know-how and trade secrets and continuing technological innovation to develop and maintain our competitive position, which we seek to protect, in part, through confidentiality agreements with employees, consultants, collaborators and others. We also have invention or patent assignment agreements with our employees and certain consultants. The steps we have taken to protect our proprietary rights, however, may not be adequate to preclude misappropriation of or otherwise protect our proprietary information or prevent infringement of our intellectual property rights, and we may not have adequate remedies for any such misappropriation or infringement. In addition, it is possible that inventions relevant to our business could be developed by a person not bound by an invention assignment agreement with us or independently discovered by a competitor.

We also intend to rely on regulatory exclusivity for protection of our product candidates, if approved for commercial sale. Implementation and enforcement of regulatory exclusivity, which may consist of regulatory data protection and market protection, varies widely from country to country. Failure to qualify for regulatory exclusivity, or failure to obtain or to maintain the extent or duration of such protections that we expect for our product candidates, if approved, could affect our decision on whether to market the products in a particular country or countries or could otherwise have an adverse impact on our revenue or results of operations.

We may rely on trademarks, trade names and brand names to distinguish our products, if approved for commercial sale, from the products of our competitors. However, our trademark applications may not be approved. Third parties may also oppose our trademark applications or otherwise challenge our use of the trademarks, in which case we may expend substantial resources to defend our proposed or approved trademarks and may enter into agreements with third parties that may limit our use of our trademarks. In the event that our trademarks are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition and could require us to devote significant resources to advertising and marketing these new brands. Further, our competitors may infringe our trademarks or we may not have adequate resources to enforce our trademarks.

If we fail to comply with our obligations under any license, collaboration or other agreements, we could lose intellectual property rights that are necessary for developing and commercializing our product candidates.

Our intellectual property relating to the INN-202 program is licensed from Alba Therapeutics Corp. Our intellectual property relating to the INN-108 program is licensed from Seachaid Pharmaceuticals Inc. Our license agreements with Alba and Seachaid impose, and any future licenses or collaboration agreements we enter into are likely to impose, various development, commercialization, funding, milestone, royalty, diligence, sublicensing, patent prosecution and enforcement and other obligations on us. These type of agreements and related obligations are complex and subject to contractual disputes. If we breach any of these imposed obligations, or use the intellectual property licensed to us in an unauthorized manner, we may be required to pay damages or the licensor may have the right to terminate the license, which could result in our loss of the intellectual property rights and us being unable to develop, manufacture and sell drugs that are covered by the licensed technology.

Our success depends on our ability to prevent competitors from duplicating or developing and commercializing equivalent versions of our product candidates, and intellectual property protection may not be sufficient or effective to exclude this competition.

We have patent protection in the United States and other countries to cover the composition of matter, formulation and method of use for INN-202 and INN-108. However, these patents may not provide us with significant competitive advantages, because the validity, scope, term, or enforceability of the patents may be challenged and, if instituted, one or more of the challenges may be successful. Patents may be challenged in the United States under post-grant review proceedings, *inter partes* reexamination, *ex parte* reexamination, or challenged in district court. Any patents issued in foreign jurisdictions may be subjected to comparable proceedings lodged in various foreign patent offices or courts. These proceedings could result in either loss of the patent or loss or reduction in the scope of one or more of the claims of the patent. Even if a patent issues, and is held valid and enforceable, competitors may be able to design around our patent rights, such as by using pre-existing or newly developed technology, in which case competitors may not infringe our issued claims and may be able to market and sell products that compete directly with ours before and after our patents expire.

Further, the INN-202 primary end point is a proprietary patient reported outcome measure (CeD PRO) that is protected by copyright until 2106. However, copyright protection may not be sufficient to exclude others from developing products that compete with INN-202.

The patent prosecution process is expensive and time-consuming. We, and any future licensors and licensees, may not apply for or prosecute patents on certain aspects of our product candidates at a reasonable cost, in a timely fashion, or at all. We may not have the right to control the preparation, filing and prosecution of some patent applications related to our product candidates or technologies. As a result, these patents and patent applications may not be prosecuted and enforced in a manner consistent with our best interests. It is also possible that we or any future or present licensors or licensees will fail to identify patentable aspects of inventions made in the course of development and commercialization activities before it is too late to obtain patent protection on them. Further, it is possible that defects of form in the preparation or filing of our patent applications may exist, or may arise in the future, such as with respect to proper priority claims, inventorship, assignment, term or claim scope. If there are material defects in the form or preparation of our patents or patent applications, such patents or applications may be invalid or unenforceable. In addition, one or more parties may independently develop similar technologies or methods, duplicate our technologies or methods, or design around the patented aspects of our products, technologies or methods. Any of these circumstances could impair our ability to protect our products, if approved, in ways which may have an adverse impact on our business, financial condition and operating results.

Furthermore, the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability and our owned and licensed patents may be challenged in the courts or patent offices in and outside of the United States. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to use our patents to stop others from using or commercializing similar or identical products or technology, or to limit the duration of the patent protection of our technology and drugs. Given the amount of time required for the development, testing and regulatory review of new drug candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing drugs similar to or identical to ours.

Enforcement of intellectual property rights in certain countries outside the United States, including China in particular, has been limited or non-existent. Future enforcement of patents and proprietary rights in many other countries will likely be problematic or unpredictable. Moreover, the issuance of a patent in one country does not assure the issuance of a similar patent in another country. Claim interpretation and infringement laws vary by nation, so the extent of any patent protection is uncertain and may vary in different jurisdictions.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and applications are required to be paid to the United States Patent and Trademark Office ("USPTO") and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and applications. The USPTO and various non-U.S. governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process and after a patent has issued. There are situations in which non-compliance can result in decreased patent term or in abandonment or lapse of the patent or patent application, leading to partial or complete loss of patent rights in the relevant jurisdiction.

Third parties may claim that our products, if approved, infringe on their proprietary rights and may challenge the approved use or uses of a product or our patent rights through litigation or administrative proceedings, and defending such actions may be costly and time consuming, divert management attention away from our business and result in an unfavorable outcome that could have an adverse effect on our business.

Our commercial success depends on our ability and the ability of our CMOs and component suppliers to develop, manufacture, market and sell our products and product candidates and use our proprietary technologies without infringing the proprietary rights of third parties. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are or may be developing products. Because patent applications can take many years to publish and issue, there currently may be pending applications, unknown to us, that may later result in

issued patents that our products, product candidates or technologies infringe, or that the process of manufacturing our products or any of our respective component materials, or the component materials themselves, infringe, or that the use of our products, product candidates or technologies infringe.

We, our CMOs and/or our component material suppliers may be exposed to, or threatened with, litigation by third parties alleging that our products, product candidates and/or technologies infringe their patents and/or other intellectual property rights, or that one or more of the processes for manufacturing our products or any of our respective component materials, or the component materials themselves, or the use of our products, product candidates or technologies, infringe their patents and/or other intellectual property rights. If a third-party patent or other intellectual property right is found to cover our products, product candidates, technologies or uses, or any of the underlying manufacturing processes or components, we could be required to pay damages and could be unable to commercialize our products or to use our technologies or methods unless we are able to obtain a license to the patent or intellectual property right. A license may not be available to us in a timely manner or on acceptable terms, or at all. In addition, during litigation, the third party alleging infringement could obtain a preliminary injunction or other equitable remedy that could prohibit us from making, using, selling or importing our products, technologies or methods.

There generally is a substantial amount of litigation involving patent and other intellectual property rights in the industries in which we operate and the cost of such litigation may be considerable. We can provide no assurance that our product candidates or technologies will not infringe patents or rights owned by others, licenses to which may not be available to us in a timely manner or on acceptable terms, or at all. If a third party claims that we or our CMOs or component material suppliers infringe its intellectual property rights, we may face a number of issues, including, but not limited to:

- infringement and other intellectual property claims which, with or without merit, may be expensive and time consuming to litigate and may divert management's time and attention from our core business;
- substantial damages for infringement, including the potential for treble damages and attorneys' fees, which we may have to pay if it is determined that the product and/or its use at issue infringes or violates the third party's rights;
- a court prohibiting us from selling or licensing the product unless the third-party licenses its intellectual property rights to us, which it may not be required to do;
- if a license is available from the third party, we may have to pay substantial royalties, fees and/or grant cross-licenses to the third party; and
- redesigning our products or processes so they do not infringe, which may not be possible or may require substantial expense and time.

No assurance can be given that patents do not exist, have not been filed, or could not be filed or issued, which contain claims covering our products, product candidates or technology or those of our CMOs or component material suppliers or the use of our products, product candidates or technologies. Because of the large number of patents issued and patent applications filed in the industries in which we operate, there is a risk that third parties may allege they have patent rights encompassing our products, product candidates or technologies, or those of our CMOs or component material suppliers, or uses of our products, product candidates or technologies.

In the future, it may be necessary for us to enforce our proprietary rights, or to determine the scope, validity and unenforceability of other parties' proprietary rights, through litigation or other dispute proceedings, which may be costly and, to the extent we are unsuccessful, adversely affect our rights. In these proceedings, a court or administrative body could determine that our claims, including those related to enforcing patent rights, are not valid or that an alleged infringer has not infringed our rights. The uncertainty resulting from the mere institution and continuation of any patent- or other proprietary rights-related litigation or interference proceeding could have a material and adverse effect on our business prospects, operating results and financial condition.

Risks Related to Our Industry

We are subject to uncertainty relating to healthcare reform measures and reimbursement policies that, if not favorable to our products, could hinder or prevent our products' commercial success, if any of our product candidates are approved.

The unavailability or inadequacy of third-party payer coverage and reimbursement could negatively affect the market acceptance of our product candidates and the future revenues we may expect to receive from our products. The commercial success of our product candidates, if approved, will depend in part on the extent to which the costs of such products will be

covered by third-party payers, such as government health programs, commercial insurance and other organizations. Third-party payers are increasingly challenging the prices and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third-party payers do not consider our products to be cost-effective compared to other therapies, we may not obtain coverage for our products after approval as a benefit under the third-party payers' plans or, even if we do, the level of coverage or payment may not be sufficient to allow us to sell our products on a profitable basis.

Significant uncertainty exists as to the reimbursement status for newly approved drug products, including coding, coverage and payment. There is no uniform policy requirement for coverage and reimbursement for drug products among third-party payers in the United States; therefore coverage and reimbursement for drug products can differ significantly from payer to payer. The coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payer separately, with no assurance that coverage and adequate payment will be applied consistently or obtained. The process for determining whether a payer will cover and how much it will reimburse a product may be separate from the process of seeking approval of the product or for setting the price of the product. Even if reimbursement is provided, market acceptance of our products may be adversely affected if the amount of payment for our products proves to be unprofitable for healthcare providers or less profitable than alternative treatments or if administrative burdens make our products less desirable to use. Third-party payer reimbursement to providers of our products, if approved, may be subject to a bundled payment that also includes the procedure of administering our products or third-party payers may require providers to perform additional patient testing to justify the use of our products. To the extent there is no separate payment for our product(s), there may be further uncertainty as to the adequacy of reimbursement amounts.

The continuing efforts of governments, private insurance companies and other organizations to contain or to reduce costs of healthcare may adversely affect:

- our ability to set an appropriate price for our products;
- the rate and scope of adoption of our products by healthcare providers;
- our ability to generate revenue or achieve or maintain profitability;
- the future revenue and profitability of our potential customers, suppliers and collaborators; and
- our access to additional capital.

Our ability to successfully commercialize our products will depend in part on the extent to which governmental authorities, private health insurers and other organizations establish what we believe are appropriate coverage and reimbursement for our products. The containment of healthcare costs has become a priority of federal, state and foreign governments and the prices of drug products have been a focus in this effort. For example, there have been several recent U.S. Congressional inquiries and proposed bills designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs and reform government program reimbursement methodologies for drugs and the Trump administration has stated that reducing drug pricing is a priority. We expect that federal, state and local governments in the United States, as well as governments in other countries, will continue to consider legislation directed at lowering the total cost of healthcare. In addition, in certain foreign markets, the pricing of drug products is subject to government control and reimbursement may in some cases be unavailable or insufficient. It is uncertain whether and how future legislation, whether domestic or abroad, could affect prospects for our product candidates or what actions governmental or private payers for healthcare treatment and services may take in response to any such healthcare reform proposals or legislation. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, may prevent or limit our ability to generate revenue, attain profitability or commercialize our product candidates, especially in light of our plans to price our product candidates at a high level.

Furthermore, the U.S. Congress may again attempt to pass reform measures, including the possible repeal and replacement of the Patient Protection and Affordable Care Act, which the Trump administration has stated is a priority. These potential courses of action are unpredictable and the potential impact of new legislation on our operations and financial position is uncertain, but may result in more rigorous coverage criteria, lower reimbursement and additional downward pressure on the price we may receive for an approved product. Any reduction in reimbursement from Medicare or other government-funded programs may result in a similar reduction in payments from private payers. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our products, if approved.

We expect competition in the marketplace for our product candidates, should any of them receive regulatory approval.

Larazotide acetate has issued patents for composition of matter, method of use and formulation in the United States, our primary targeted market. INN-202 has either been issued patents or is prosecuting patent applications in numerous countries outside the United States. The barrier to entry for any company developing larazotide acetate for celiac disease is very high. We believe that INN-202 is the first drug entering into Phase 3 clinical trials for celiac disease. Additionally, if larazotide acetate is the first drug granted FDA approval for celiac disease, competitors may need to license or to seek approval from us for the usage of our CeD PRO as an endpoint in subsequent celiac disease trials.

We have received Orphan Drug Designation from the FDA for INN-108 for pediatric ulcerative colitis. Orphan Drug Designation may provide market exclusivity in the U.S. for seven years if (1) INN-108 receives market approval before a competitor using the same active compound for the same indication, (2) we are able to produce sufficient supply to meet demand in the marketplace, and (3) another product with the same active ingredient(s) is not deemed clinically superior.

INN-329, secretin, has received Orphan Drug Designation from the FDA. Orphan Drug Designation may provide market exclusivity in the U.S. for seven years if (1) INN-329 receives market approval before a competitor using a similar peptide for the same indication, (2) we are able to produce sufficient supply to meet demand in the marketplace, and (3) another product with the same active ingredient is not deemed clinically superior.

The industries in which we operate are highly competitive and subject to rapid and significant changes. Developments by others may render potential application of any of our product candidates in a particular indication obsolete or noncompetitive, even prior to completion of our development and approval for that indication.

If successfully developed and approved, we expect our product candidates will face competition. We may not be able to compete successfully against organizations with competitive products, particularly large pharmaceutical companies. Many of our potential competitors have significantly greater financial, technical and human resources than we do, and may be better equipped to develop, manufacture, market and distribute products. Many of these companies operate large, well-funded research, development and commercialization programs, have extensive experience in nonclinical and clinical studies, obtaining FDA and other regulatory approvals and manufacturing and marketing products and have multiple products that have been approved or are in late-stage development. These advantages may enable them to receive approval from the FDA or any foreign regulatory agency before us and prevent us from competing due to their orphan drug protections. Smaller companies may also prove to be significant competitors, particularly through collaborative arrangements with large pharmaceutical and biotechnology companies. Furthermore, heightened awareness on the part of academic institutions, government agencies and other public and private research organizations of the potential commercial value of their inventions have led them to actively seek to commercialize the technologies they develop, which increases competition for investment in our programs. Competitive products may be more effective, easier to dose, or more effectively marketed and sold, which would have a material adverse effect on our ability to generate revenue.

We face potential product liability exposures, and if successful claims are brought against us, we may incur substantial liability for a product or product candidate and may have to limit its commercialization. In the future, we anticipate that we will need to obtain additional or increased product liability insurance coverage and we are uncertain whether such increased or additional insurance coverage can be obtained on commercially reasonable terms, if at all.

Our business (in particular, the use of our product candidates in clinical studies and the sale of any products for which we obtain marketing approval) will expose us to product liability risks. Product liability claims may be brought against us by patients, healthcare providers, pharmaceutical companies or others selling or involved in the use of our products. If we cannot successfully defend ourselves against any such claims, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- significant costs of related litigation;
- decreased demand for our products and loss of revenue;
- impairment of our business reputation;
- a “clinical hold,” suspension or termination of a clinical study or amendments to a study design;
- delays in enrolling patients to participate in our clinical studies;
- withdrawal of clinical study participants;
- substantial monetary awards to patients or other claimants; and
- the inability to commercialize our products and product candidates.

We maintain limited product liability insurance for our clinical studies and our insurance coverage may not reimburse us or may not be sufficient to reimburse us for all expenses or losses we may suffer. Moreover, insurance coverage is becoming increasingly expensive, and in the future, we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses.

We expect that we will expand our insurance coverage to include the sale of commercial products if we obtain marketing approval for any of our product candidates, but we may be unable to obtain product liability insurance on commercially acceptable terms or may not be able to maintain such insurance at a reasonable cost or in sufficient amounts to protect us against potential losses. Large judgments have been awarded in class action lawsuits based on drug products that had unanticipated side effects. A successful product liability claim or series of claims brought against us, if judgments exceed our insurance coverage, could materially decrease our cash and adversely affect our business.

Our relationships with investigators, healthcare professionals, institutional providers, consultants, third-party payors and customers are subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to penalties, including without limitation, civil, criminal and administrative penalties, damages, monetary fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings and the curtailment or restructuring of our operations.

Healthcare providers, physicians and others play a primary role in the recommendation and prescribing of any product candidates for which we may obtain marketing approval. In the United States, our current business operations and future arrangements with investigators, healthcare professionals, institutional providers, consultants, third-party payors and customers, may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations. These laws may constrain the business or financial arrangements and relationships through which we research, market, sell and distribute our products that obtain marketing approval. Restrictions under applicable federal, state and foreign healthcare laws and regulations, include, but are not limited to, the following:

- the federal healthcare program anti-kickback statute prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for purchasing, leasing, ordering, or arranging for or recommending the purchase, lease, or order of any good, facility, service or item for which payment is made, in whole or in part, under a federal healthcare program;
- the federal civil and criminal false claims laws and civil monetary penalties laws, including civil whistleblower or qui tam actions, prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, to the federal government, claims for payment or approval that are false or fraudulent or from knowingly making a false statement to improperly avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA"), as amended by the Health Information Technology for Economic and Clinical Health Act ("HITECH"), and its implementing regulations, and as amended again by the final HIPAA omnibus rule, Modifications to the HIPAA Privacy, Security, Enforcement and Breach Notification Rules Under HITECH and the Genetic Information Nondiscrimination Act; Other Modifications to HIPAA, published in January 2013, imposes certain obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by entities subject to the omnibus rule, such as health plans, clearinghouses and healthcare providers and their associates;
- HIPAA, imposes criminal liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or to obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program regardless of the payor (e.g., public or private) and knowingly or willfully falsifying, concealing, or covering up by any trick, scheme or device a material fact or making any materially false statement in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters;
- the federal transparency law, enacted as part of the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the "ACA"), and its implementing regulations, require manufacturers of drugs, devices, biologicals and medical supplies to report to the U.S. Department of Health and

Human Services information related to payments and other transfers of value made to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;
- analogous state laws and regulations, including but not limited to: state anti-kickback and false claims laws, which may apply to our business practices, including but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by state governmental and non-governmental third-party payors, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; and state laws and regulations that require manufacturers to file reports relating to pricing and marketing information, which requires tracking gifts and other remuneration and items of value provided to healthcare professionals and entities; and
- European Union ("EU"), data protection regulations, which may require member states of the EU to impose minimum restrictions on the collection and use of personal data that, in many respects, are more stringent and impose more significant burdens on subject businesses, than current privacy standards in the United States.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these or any other health regulatory laws or any other governmental regulations that may apply to us, we may be subject to penalties, including without limitation, civil, criminal and administrative penalties, damages, monetary fines, disgorgement, enhanced government reporting and oversight under a corporate integrity agreement or other similar arrangement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings and the curtailment or restructuring of our operations. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses or divert our management's attention from the operation of our business. If any of the physicians or other providers or entities with whom we expect to do business are found to be not in compliance with applicable healthcare laws, they also may be subject to similar penalties.

Risks Related to Our Common Stock

The market price of our common stock has been and will likely in the future be volatile.

The stock market in general and the market for pharmaceutical companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. For example, since our stock began trading under the symbol "INNT" on February 1, 2018, through March 13, 2019, the price thereof has ranged from a low of $1.70 per share to a high of $50.50 per share. Companies like us with a lower number of shares comprising their public floats and limited trading activity may experience greater volatility in their stock prices. The market price of our common stock may be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including:

- regulatory or legal developments in the United States and foreign countries;
- results from or delays in clinical trials of our product candidates;
- announcements of regulatory approval or disapproval of, or delays in clinical trials for, INN-202 (for celiac disease), INN-217 (for NASH), INN-289 (for Crohn's disease), INN-108 (for ulcerative colitis) and INN-329 (for magnetic resonance cholangiopancreatography or MRCP) or any future product candidates, including ASH;
- commercialization of our product candidates;
- FDA or other U.S. or foreign regulatory actions affecting us or our industry;
- introductions and announcements of new products by us, any commercialization partners or our competitors and the timing of these introductions and announcements;
- variations in our financial results or those of companies that are perceived to be similar to us;
- changes in the structure of healthcare payment systems;
- announcements by us or our competitors of significant acquisitions, licenses, strategic partnerships, joint ventures or capital commitments;
- market conditions in the pharmaceutical and biopharmaceutical sectors and issuance of securities analysts' reports or recommendations;
- actual or anticipated quarterly variations in our results of operations or those of our competitors;

- changes in financial estimates or guidance, including our ability to meet our future revenue and operating profit or loss estimates or guidance;
- our liquidity position and ability to raise additional capital;
- sales of substantial amounts of our stock by insiders and other stockholders, or the expectation that such sales might occur;
- general economic, industry and market conditions;
- additions or departures of key personnel;
- intellectual property, product liability or other litigation against us;
- expiration or termination of our potential relationships with strategic partners; and
- the other factors described in this section entitled "Risk Factors" section.

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

Equity research analysts do not currently provide research coverage of our common stock. In particular, as a smaller company, it may be difficult for us to attract the interest of equity research analysts. A lack of research coverage may adversely affect the liquidity of and market price of our common stock. To the extent we obtain equity research analyst coverage, we will not have any control of the analysts or the content and opinions included in their reports. The market price of our stock could decline if one or more equity research analysts begin coverage of our common stock and downgrade our common stock or issue other unfavorable commentary or research on us. If one or more equity research analysts ceases coverage of us in the future, or fails to publish reports on us regularly, demand for our common stock could decrease, which in turn could cause the market price of our common stock or trading volume to decline.

Sales of substantial amounts of our common stock in the public markets, or the perception that such sales might occur, could cause the market price of our common stock to drop significantly, even if our business is doing well.

If we or our existing stockholders sell, or indicate an intent to sell, substantial amounts of our common stock in the public markets, the trading price of our common stock could decline significantly. On March 15, 2018, we filed a shelf registration statement, or the Shelf Registration Statement, which was declared effective on July 13, 2018. Under the Shelf Registration Statement, we may, from time to time, subject to certain eligibility requirements, sell our common stock in one or more offerings up to an aggregate dollar amount of $175.0 million (of which up to an aggregate of $40 million may be sold in an "at-the-market" offering as defined in Rule 415 of the Securities Act). In addition, the selling stockholders included in the Shelf Registration Statement may from time to time sell up to an aggregate amount of approximately 13.99 million shares of our common stock (including up to approximately 2.1 million shares issuable upon exercise of warrants) in one or more offerings. On October 26, 2018, we filed a prospectus supplement in connection with an "at-the-market" offering under the Shelf Registration Statement in which we may sell shares up to an aggregate of $40 million. As of December 31, 2018, we had 26.1 shares of common stock outstanding and exercisable options and warrants to purchase approximately 5.3 million shares of common stock, excluding out-of-the-money options and warrants. In addition, the Convertible Note may be converted into shares of our common stock at any time at various conversion prices, and in March 2019, we entered into an agreement for the issuance of up to 6.9 million warrants to purchase shares of our common stock, with registration rights for the underlying shares, of which warrants to purchase up to 4.3 million would be exercisable immediately. Therefore, sales of common stock by us or our stockholders under the Shelf Registration Statement or otherwise (including sales pursuant to Rule 144) may represent a significant percentage of our common stock currently outstanding. If we or our stockholders sell, or the market perceives that we or our stockholders intend to sell, substantial amounts of our common stock under the Shelf Registration Statement or otherwise, the market price of our common stock could decline significantly. For example, our closing stock price on July 13, 2018, prior to the Shelf Registration Statement being declared effective, was $23.70 per share, and our closing stock price on July 16, 2018, after the Registration Statement was declared effective, was $8.08 per share.

The issuance of additional shares of common stock may cause substantial dilution to our existing stockholders and reduce the trading price of our common stock.

We presently have outstanding and exercisable options and warrants that if exercised would result in the issuance of 5.3 million shares of our common stock as of December 31, 2018, excluding out-of-the-money stock options and warrants. In addition, the Convertible Note may be converted into shares of our common stock at any time at various conversion prices and in March 2019, we entered into an agreement for the issuance of up to 4.3 million shares of our common stock and up to 6.9 million warrants to purchase shares of our common stock, of which warrants to purchase up to 4.3 million would be

exercisable immediately. The issuance of shares upon exercise of warrants and options or conversion of the Convertible Note may result in dilution to the interests of other stockholders and may reduce the trading price of our common stock.

We may from time to time issue additional shares of our common stock at a discount from the then-current trading price. As a result, our stockholders would experience immediate dilution upon the purchase of any shares of such common stock sold at such discount. In addition, as opportunities present themselves, we may enter into financing or similar arrangements in the future, including the issuance of debt securities, preferred stock or common stock. If we issue common stock or securities convertible into common stock, our common stockholders would experience additional dilution and, as a result, the market price of our common stock may decline.

Claims for indemnification by our directors and officers may reduce our available funds to satisfy successful third-party claims against us and may reduce the amount of money available to us.

Our certificate of incorporation and restated bylaws provide that we will indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

To the extent that a third party brings a claim against us and/or any of our officers or directors, whether successful or not, a claim for indemnification brought by any of our directors or officers would reduce the amount of funds available for use in our business.

Concentration of ownership of our common stock among our existing principal stockholders may effectively limit the voting power of other stockholders.

Our executive officers, directors and current beneficial owners of 5% or more of our common stock, in aggregate, beneficially own approximately 47.7% of our outstanding common stock as of December 31, 2018. Accordingly, these stockholders, acting together, will continue to be able to significantly influence all matters requiring stockholder approval, including the election and removal of directors and any merger or other significant corporate transactions. These stockholders may therefore delay or prevent a change of control, even if such a change of control would benefit the other stockholders. The significant concentration of stock ownership may adversely affect the market price of our common stock due to investors' perception that conflicts of interest may exist or arise.

Anti-takeover provisions in our corporate charter documents and under Delaware law could make an acquisition of us more difficult, which could discourage takeover attempts and lead to management entrenchment, and the market price of our common stock may be lower as a result.

Certain provisions in our certificate of incorporation and bylaws may make it difficult for a third party to acquire, or attempt to acquire, control of our company, even if a change in control was considered favorable by the stockholders. For example, our board of directors ("the Board") has the authority to issue up to 10,000,000 shares of preferred stock. The Board can fix the price, rights, preferences, privileges and restrictions of the preferred stock without any further vote or action by our stockholders. The issuance of shares of preferred stock may delay or prevent a change in control transaction. As a result, the market price of our common stock and the voting and other rights of our stockholders may be adversely affected. An issuance of shares of preferred stock may result in the loss of voting control to other stockholders.

Our organizational documents also contain other provisions that could have an anti-takeover effect, including provisions that:

- provide for a classified Board
- provide that vacancies on the Board may be filled only by a majority of directors then in office, even though less than a quorum;
- eliminate cumulative voting in the election of directors;
- authorize the Board to issue shares of preferred stock and determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval;
- prohibit director removal without cause and to allow removal with cause, and to allow amendment of certain provisions of our amended and restated certificate of incorporation and our bylaws, only by the vote of the holders of at least two-thirds of all then-outstanding shares of common stock of the Company;
- grant the Board the exclusive authority to increase or decrease the size of the Board;
- permit stockholders to only take actions at a duly called annual or special meeting and not by written consent;

- prohibit stockholders from calling a special meeting of stockholders;
- require that stockholders give advance notice to nominate directors or submit proposals for consideration at stockholder meetings; and
- authorize the Board, by a majority vote, to amend the bylaws.

In addition, we are subject to the anti-takeover provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us. These provisions could discourage potential acquisition proposals and could delay or prevent a change in control transaction. They could also have the effect of discouraging others from making tender offers for our common stock, including transactions that may be in your best interests. These provisions may also prevent changes in our management or limit the price that certain investors are willing to pay for our stock.

We may be subject to litigation related to our status as a public company, which is expensive and could divert management attention.

The market price of our common stock may be volatile, and in the past companies that have experienced volatility in the market price of their stock have been subject to securities related litigation, including class action litigation. We may be the target of this type of litigation, or other litigation related to our status as a public company, in the future. For example, a claim has been filed against us in the Superior Court of the State of Delaware by one of our former consultants who received compensatory stock options, demanding damages of up to approximately $3.6 million plus punitive damages in connection with a delay in his ability and timing to exercise his options and sell the underlying shares of our common stock related to past consulting services. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

We have not paid cash dividends in the past and do not expect to pay dividends in the future. Any return on investment may be limited to the value of our common stock.

We have never paid cash dividends on our common stock and do not anticipate paying cash dividends in the near future. The payment of dividends on our common stock will depend on earnings, financial condition and other business and economic factors affecting us at such time as our board of directors may consider relevant. If we do not pay dividends, our common stock may be less valuable because a return on investment will only occur if our stock price appreciates.

We will continue to seek additional funds through equity offerings, debt financings, or other capital sources, which may impose restrictions on our business.

In order to raise additional funds to support our operations, we will continue to seek additional funds through equity offerings, debt financings or other capital sources, which may impose restrictive covenants that adversely impact our business. The incurrence of indebtedness would result in increased fixed payment obligations and could also result in restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we are unable to expand our operations or otherwise capitalize on our business opportunities due to such restrictions, our business, financial condition and results of operations could be materially adversely affected.

Our ability to use our net operating loss carryforwards and certain other tax attributes to offset future taxable income may be subject to certain limitations.

We have U.S. federal net operating loss carryforwards, or NOLs, which expire in various years if not utilized. In addition, we have federal research and development credit carryforwards. The federal research and development credit carryforwards expire in various years if not utilized. Under Sections 382 and 383 of Internal Revenue Code of 1986, as amended, or the Code, if a corporation undergoes an "ownership change," the corporation's ability to use its pre-change NOLs and other pre-change tax attributes, such as research tax credits, to offset its future post-change income and taxes may be limited. In general, an "ownership change" occurs if there is a cumulative change in our ownership by "5% shareholders" that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. We have not performed a formal study to determine whether any of our NOLs are subject to these limitations. We have recorded deferred tax assets for our NOLs and research and development credits and have recorded a full valuation allowance against these deferred tax assets. In the event that it is determined that we have in the past experienced additional ownership changes, or if we experience one or more ownership changes as a result of future transactions in our stock, then we may be further limited

in our ability to use our NOLs and other tax assets to reduce taxes owed on the net taxable income that we earn in the event that we attain profitability. Any such limitations on the ability to use our NOLs and other tax assets could adversely impact our business, financial condition and operating results in the event that we attain profitability.

We must comply with laws, regulations and standards applicable to public companies, including evaluating our internal controls under Section 404 of the Sarbanes-Oxley Act of 2002, which requires significant cost and management attention, and any failure to comply with or adverse results from our compliance with such laws, regulations and standards could impact investor confidence and materially harm our business.

As a public company in the United States, and increasingly after we are no longer an "emerging growth company," we are subject to laws, regulations and standards relating to corporate governance and public disclosure, including the Sarbanes-Oxley Act and regulations implemented by the SEC and Nasdaq, that are subject to varying interpretations and may evolve over time as new guidance is provided by regulatory and governing bodies. We have invested and intend to continue to invest resources to comply with such laws, regulations and standards, which may divert management's time and attention from revenue-generating activities to compliance activities. If notwithstanding our efforts to comply with applicable laws, regulations and standards, we fail to comply, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

As a public company in the United States, we are required, pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting. We are required to disclose any material weaknesses identified by our management in our internal control over financial reporting, and, when we are no longer an "emerging growth company," we may need to provide a statement that our independent registered public accounting firm has issued an opinion on our internal control over financial reporting.

The controls and other procedures are designed to ensure that information required to be disclosed by us in the reports that we file with the SEC is disclosed accurately and is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms. We have developed internal control procedures designed to comply with the requirements of Section 404, but our controls may not be adequate because of changes in conditions or the degree of compliance with our policies or procedures may deteriorate, or material weaknesses in our internal control over financial reporting may be discovered. We may err in the design or operation of our controls, and all internal control systems, no matter how well designed and operated, can provide only reasonable assurance that the objectives of the control system are met. If we are unable, or are perceived as unable, to produce reliable financial reports due to internal control deficiencies, investors could lose confidence in our reported financial information and operating results, which could result in a negative market reaction. Furthermore, remediation of any identified material weaknesses, such as a requirement to issue a financial statement restatement, may cause delays in our filing of quarterly or annual financial results, which could limit our ability to raise capital, and may create a significant strain on our internal resources, increase our costs, cause management distraction and significantly affect our stock price in an adverse manner.

To fully comply with Section 404, we will need to retain additional employees to supplement our current finance staff, and we may not be able to do so in a timely manner, or at all. In addition, in the process of evaluating our internal control over financial reporting, we expect that certain of our internal control practices will need to be updated to comply with the requirements of Section 404 and the regulations promulgated thereunder, and we may not be able to do so on a timely basis, or at all. In the event that we are not able to demonstrate compliance with Section 404 in a timely manner, or are unable to produce timely or accurate financial statements, we may be subject to sanctions or investigations by regulatory authorities, such as the SEC or the stock exchange on which our stock is listed, and investors may lose confidence in our operating results and the price of our common stock could decline. Furthermore, if we are unable to certify that our internal control over financial reporting is effective and in compliance with Section 404, we may be subject to sanctions or investigations by regulatory authorities, such as the SEC or stock exchanges, and we could lose investor confidence in the accuracy and completeness of our financial reports, which could hurt our business, the price of our common stock and our ability to access the capital markets.

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

We are an "emerging growth company," as defined in the Jumpstart Our Business Startups, or JOBS, Act enacted in April 2012, and may remain an "emerging growth company" for up to five years following the completion of our initial public offering, although, if we have more than $1.07 billion in annual revenue, we are deemed to be a large accelerated filer

under the rules of the SEC, or we issue more than $1.0 billion of non-convertible debt over a three-year period before the end of that five-year period, we would cease to be an "emerging growth company" as of the following December 31. For as long as we remain an "emerging growth company," we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not "emerging growth companies." These exemptions include:

- being permitted to provide only two years of audited financial statements, in addition to any required unaudited interim financial statements, with correspondingly reduced "management's discussion and analysis of financial condition and results of operations" disclosure;
- not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor's report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation; and
- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and shareholder approval of any golden parachute payments not previously approved.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards, delaying the adoption of these accounting standards until they would apply to private companies. We have irrevocably elected not to avail ourselves of this exemption. We cannot predict whether investors will find our common stock less attractive as a result of our reliance on these exemptions. 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 the market price of our common stock may be reduced or more volatile.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

Our main office is located in Raleigh, North Carolina, where we lease approximately 2,480 square feet of office space under a lease that expires on September 30, 2020. The lease contains a two-year renewal option.

We believe that our existing facilities are adequate to support our near-term needs. We believe that suitable alternative space would be available if required in the future on commercially reasonable terms.

Item 3. Legal Proceedings.

In November 2018, we received a letter and draft complaint regarding a former consultant of ours who was compensated in cash and stock options for his services, demanding damages of up to approximately $3.6 million plus punitive damages in connection with a delay in such consultant's ability and timing to exercise options and sell shares of the Company's common stock related to past consulting services. On January 8, 2019, M. Scott Harris and Middleburg Consultants, Inc. (collectively, "Harris") filed the claim in the Superior Court of the State of Delaware (the "Delaware Action"). As previously disclosed, we strongly deny any wrongdoing alleged in the threatened litigation and firmly believe the allegations in the complaint are entirely without merit and intend to defend against them vigorously. On February 25, 2019, we filed a motion to dismiss the Delaware Action. If the motion is not granted, we intend to dispute the factual basis of Harris' claims and also intend to assert affirmative defenses and counterclaims against Harris.

Other than as described above, we are not currently a party to any legal or governmental regulatory proceedings, nor is our management aware of any pending or threatened legal or government regulatory proceedings proposed to be initiated against us that would have a material adverse effect on our business, financial condition or operating results.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information

Monster's common stock originally began trading on the Nasdaq Capital Market on July 7, 2016, under the trading symbol "MSDI." Prior to July 7, 2016, there was no public market for Monster's common stock. On January 29, 2018, Monster and Private Innovate completed the Merger, further described in Note 1—Summary of Significant Accounting Policies. In connection with the Merger, Private Innovate became a wholly owned subsidiary of Monster and we changed Monster's name to Innovate Biopharmaceuticals, Inc. and changed the trading symbol for the common stock to "INNT."

Holders

As of March 13, 2019, there were approximately 310 holders of record of our common stock. Holders of record are defined as those stockholders whose shares are registered in their names in our stock records and do not include beneficial owners of common stock whose shares are held in the names of brokers, dealers or clearing agencies.

Dividend Policy

We historically have not, and do not anticipate in the future, paying dividends on our common stock. We currently intend to retain any future earnings to finance our operations and for the development and growth of our business. The declaration of any future cash dividend, if any, would be at the discretion of our Board of Directors and would depend upon our earnings, if any, our capital requirements and financial position, general economic conditions and other factors that our Board of Directors consider to be relevant.

Recent Sales of Unregistered Securities

On January 29, 2018, we entered into a Note Purchase Agreement and Senior Note (the "Note") with a lender. The principal amount of the Note was $4.8 million. On October 4, 2018, we entered into an Amendment and Exchange Agreement ("Exchange Agreement") with the noteholder exchanging the Note for a new Senior Convertible Note (the "New Note"), in reliance upon the exemption from registration provided by Section 3(a)(9) of the Securities Act. The principal amount of the New Note is approximately $5.2 million and bears interest at a rate of eight percent (8%) per annum payable quarterly in cash, maturing on October 4, 2020. The New Note contains certain redemption features, conversion options, restrictions on specific transactions, non-financial covenants and penalties to us in the case of an event of default, as defined in the New Note.

All amounts due under the New Note are convertible at any time, in whole or in part, at the option of the noteholder into shares of our common stock at a fixed conversion price equal to $8.02 (the "Conversion Price"), with such Conversion Price adjusted downward to the price of any future issuances of our common stock or other securities convertible or exercisable into our common stock, or units of common stock and other security (excluding certain equity compensation issuances). This Conversion Price is also subject to adjustment for stock splits, combinations or similar events. In addition, all amounts due under the New Note are alternatively convertible at any time, in whole or in part, at the option of the noteholder, into shares of our common stock at an alternate conversion price equal to the greater of (a) $3.08, (the "Floor Price") or (b) the lower of (I) the Conversion Price or (II) 93% of the average volume weighted average price (the "VWAP") of our common stock for the 10 trading days preceding the conversion, provided, that if we default then the noteholder is entitled to convert the New Note subject to an event of default redemption, in whole or in part, at the noteholder's option, at the value of such portion of the New Note subject to a potential event of default redemption (i.e., one hundred twenty-five percent (125%)) of the amount then outstanding under the New Note.

During January 2019, the noteholder of New Note issued a redemption notice and we repaid the noteholder $1.1 million of principal and accrued interest. The principal balance of the New Note after this redemption was $4.1 million. In addition, we entered into an Option Agreement with the noteholder during January 2019, further described in Note 6—Debt and Note 12—Subsequent Events. During March 2019, we exercised our repurchase rights from the Option Agreement and paid the noteholder of the New Note approximately $5.3 million, which was the full purchase amount, including interest, of the New Note pursuant to the terms of the Option Agreement. There are no further amounts outstanding under the New Note and the New Note has been canceled.

On March 8, 2019, we entered into a Securities Purchase Agreement (the "Purchase Agreement") with a Convertible Noteholder. Pursuant to the Purchase Agreement, we issued the Convertible Noteholder an unsecured Convertible Promissory Note (the "Convertible Note") in the principal amount of $5,500,000. The Convertible Noteholder may elect to convert all or a portion of the Convertible Note at any time and from time to time into our common stock at a conversion price of $3.25 per share, subject to adjustment for stock splits, dividends, combinations and similar events. We may prepay all or a portion of the Convertible Note at any time for an amount equal to 115% of any then outstanding obligations or the portion of the obligations we are prepaying. The purchase price of the Convertible Note was $5,000,000, and the Convertible Note carries an original issuance discount of $500,000, which is included in the principal amount of the Convertible Note. In addition, we agreed to pay $20,000 of transaction expenses, which were netted out of the purchase price of the Convertible Note.

The Convertible Note bears interest at the rate of 10% (which will increase to 18% upon and during the continuance of an event of default) per annum, compounding on a daily basis. All principal and accrued interest on the Convertible Note is due on the second-year anniversary of the Convertible Note's issuance.

At any time after the six month anniversary of the issuance of the Convertible Note, (i) if the average volume weighted average price over twenty trading dates exceeds $10.00 per share, we may generally require that the Convertible Note convert into shares of its common stock at the $3.25 (as adjusted) conversion price, and (ii) the Convertible Noteholder may elect to require all or a portion of the Convertible Note be redeemed by us. If the Convertible Noteholder requires a redemption, we, at our discretion, may pay the redeemed portion of the Convertible Note in cash or in our common stock at a conversion rate equal to the lesser of (i) the $3.25 (as adjusted) conversion rate or (ii) 80% of the average of the five lowest volume weighted average price of our Common Stock over the preceding twenty trading days. The Convertible Noteholder may not redeem more than $500,000 per calendar month during the period between the six months anniversary of the date of issuance until the first year anniversary of the date of issuance and $750,000 per calendar month thereafter. The obligation or right of us to deliver our shares upon the conversion or redemption of the Convertible Note is subject to a 19.99% cap and subject to a floor price trading price of $3.25 (unless waived by us). Any amounts redeemed or converted once the cap is reached or if the market price is less than the $3.25 floor price must be paid in cash.

If there is an Event of Default under the Convertible Note, the Convertible Noteholder may accelerate our obligations or elect to increase the outstanding obligations under the Convertible Note. The amount of the increase ranges from 5% to 15% depending on the type of default (as defined in the Convertible Note). In addition, the Convertible Note obligations will be increased if there are delays in our delivery requirements for the shares or cash issuable upon the conversion or redemption of the Convertible Note in certain circumstances.

If we issue convertible debt in the future with any terms, including conversion terms, that are more favorable to the terms of the Convertible Note, the Convertible Noteholder may elect to incorporate the more favorable terms into the Convertible Note.

Item 6. Selected Financial Data.

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Except as otherwise noted or where the context otherwise requires, as used in this report, the words "we," "us," "our," the "Company" and "Innovate" refer to Innovate Biopharmaceuticals, Inc. as of and following the closing of the Merger on January 29, 2018, and, where applicable, the business of Private Innovate prior to the Merger. All references to "Monster" refer to Monster Digital, Inc. prior to the closing of the Merger.

The following analysis reflects the historical financial results of Private Innovate prior to the Merger and that of Innovate following the Merger and does not include the historical financial results of Monster. All share and per share disclosures have been retroactively adjusted to reflect the exchange of shares in the Merger.

The following discussion of our financial condition and results of operations should be read in conjunction with our audited financial statements and the related notes thereto included elsewhere in this Annual Report on Form 10-K. In addition to historical information, the following discussion contains forward-looking statements that involve risks, uncertainties and assumptions. Our actual results could differ materially from those anticipated by the forward-looking statements due to important factors and risks including, but not limited to, those set forth in the "Risk Factors" in Part I, Item 1A of this report.

Company Overview

We are a clinical-stage biopharmaceutical company developing novel medicines for autoimmune and inflammatory diseases with unmet medical needs, including drug candidates for celiac disease, nonalcoholic steatohepatitis (NASH), alcoholic steatohepatitis (ASH), Crohn's disease and ulcerative colitis (UC). Our lead drug candidate, larazotide acetate or larazotide (INN-202) for the treatment of celiac disease (CeD) is entering Phase 3 clinical trials, targeted for the first half of 2019, subject to the receipt of financing, and has the potential to be the first-to-market therapeutic for celiac disease, an unmet medical need, which affects an estimated 1% of the North American population or approximately 3 million individuals. Celiac patients have no treatment alternative other than a strict lifelong adherence to a gluten-free diet, which is difficult to maintain and can be deficient in key nutrients. In celiac disease, larazotide is the only drug which has successfully met its primary endpoint with statistical significance in a Phase 2b efficacy trial, which was comprised of 342 patients. Innovate completed the End of Phase 2 meeting with the FDA for the treatment of celiac disease with larazotide and received Fast Track designation. Larazotide has been shown to be safe and effective after being tested in several clinical trials involving more than 600 patients, most recently in the Phase 2b trial for celiac disease.

We are also developing larazotide for the treatment of NASH (INN-217), a smaller subset of liver disease stemming from the most common liver disease in the world, fatty liver disease. NASH is an unmet medical need affecting approximately 5% to 6% of the U.S. adult population. We are developing a proprietary formulation of larazotide for NASH for efficient delivery to the intestine. INN-217 has the potential to reduce the transport of bacterial toxins and immunogenic antigens, including lipopolysaccharide (LPS). There are currently a number of drugs in development for NASH; however, to our knowledge, no others have larazotide's mechanism of action.

INN-108 is a novel oral small molecule therapeutic for UC, which plagues up to 1.4 million individuals in the U.S. alone. With the combination of an immunomodulator, INN-108 could lead to a more efficacious drug than the current 5-ASA/mesalamine formations being used to treat UC today. We successfully completed a Phase 1 trial in the U.S. with 24 subjects. We expect to enter Phase 2 trials for mild to moderate UC and an adult orphan indication, subject to the receipt of financing.

Building on previous research that showed a type of permeability known as "leaky gut" that may cause microbial translocation of toxic products into circulation of the bloodstream, we are expanding our work in liver disease. Initial *in-vitro* data suggests the potential use of larazotide in alcoholic liver diseases. We recently entered into a research collaboration with Massachusetts General Hospital to explore larazotide in animal models for the treatment of ASH.

Merger

On January 29, 2018, Monster Digital, Inc. ("Monster") and privately held Innovate Biopharmaceuticals Inc. ("Private Innovate") completed a reverse recapitalization in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated July 3, 2017, as amended (the "Merger Agreement"), by and among Monster, Monster Merger Sub, Inc. ("Merger Sub") and Private Innovate. In connection with the transaction, Private Innovate changed its name to IB Pharmaceuticals Inc. ("IB Pharmaceuticals"). Pursuant to the Merger Agreement, Merger Sub merged with and into IB Pharmaceuticals with IB Pharmaceuticals surviving as the wholly owned subsidiary of Monster (the "Merger"). Immediately following the Merger,

Monster changed its name to Innovate Biopharmaceuticals, Inc. ("Innovate"). On March 29, 2018, IB Pharmaceuticals was merged into Innovate and ceased to exist.

The Merger is further described in "Note 1—Summary of Significant Accounting Policies" and "Note 3—Merger and Financing" to the accompanying financial statements included in this Annual Report on Form 10-K.

Financial Overview

Since our inception, we have focused our efforts and resources on identifying and developing our research and development programs. We have not had any products approved for commercial sale and have incurred operating losses in each year since inception. Substantially all of our operating losses resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations. As of December 31, 2018, we had an accumulated deficit of $43.5 million. We incurred net losses of $24.2 million and $11.6 million for the years ended December 31, 2018 and 2017, respectively. We expect to continue to incur significant expenses and increase our operating losses for the foreseeable future, which may fluctuate significantly between periods. We anticipate that our expenses will increase substantially as we:

- continue research and development, including preclinical and clinical development of our existing and future product candidates;
- potentially seek regulatory approval for our product candidates;
- commercialize any product candidates for which we obtain regulatory approval;
- maintain and protect our intellectual property rights;
- add operational, financial and management information systems and personnel; and
- continue to incur additional legal, accounting, regulatory, tax-related and other expenses required to operate as a public company.

As such, we will need substantial additional funding to support our operating activities. Adequate funding may not be available to us on acceptable terms, or at all. We currently anticipate that we will seek to fund our operations through public or private equity or debt financings, strategic alliances or licensing arrangements, or other sources of financing. Our failure to obtain sufficient funds on acceptable terms could have a material adverse effect on our business, results of operations and financial condition.

Recent Developments

Corporate Updates

In February 2019, we strengthened our clinical development team by appointing Patrick Griffin, M.D., F.A.C.P. to Chief Medical Officer. Dr. Griffin has several decades of clinical development experience in gastroenterology, autoimmune and metabolic diseases and has overseen multiple phase 3 clinical trials.

In February 2019, Christopher P. Prior, Ph.D., our Chief Executive Officer and a member of the Board of Directors at that time, resigned as Chief Executive Officer and as a director of the Company. In connection with Dr. Prior's resignation, on February 19, 2019, we entered into a Separation and Release Agreement (the "Separation Agreement") with Dr. Prior pursuant to which Dr. Prior will (subject to his not revoking the Separation Agreement and continued compliance with existing confidentiality and non-compete obligations) be entitled to the severance payments set forth in his amended and restated employment agreement, dated March 11, 2018, including an amount equal to 12 months of his current base salary and certain health care reimbursement benefits, and, additionally, continued vesting of his outstanding time-based equity awards for the 12-month period following the separation.

On February 18, 2019, the Board appointed our current Executive Chairman, Sandeep Laumas, M.D., to the additional position of Chief Executive Officer of the Company, effective upon the resignation of Dr. Prior. Dr. Laumas will not be entitled to any additional compensation as a result of his appointment as Chief Executive Officer.

In November 2018, the employment of June S. Almenoff, M.D., Ph.D., F.A.C.P., then the Chief Operating Officer and Chief Medical Officer, was terminated, and as previously disclosed, she is entitled under severance agreement to the severance payments

set forth in her employment agreement, dated March 9, 2018, including an amount equal to 12 months of her current base salary and certain health care reimbursement benefits. Additionally, she was granted an extension to the exercise period for her vested options to a period of six months from the separation date.

In June 2018, we appointed Saira Ramasastry to the board of directors to further strengthen the public company background of our board.

Shelf Registration

On March 15, 2018, we filed a shelf registration statement that was declared effective on July 13, 2018. Under the shelf registration statement, we may, from time to time, sell our common stock in one or more offerings up to an aggregate dollar amount of $175 million (of which up to an aggregate of $40 million may be sold in an "at-the-market" offering as defined in Rule 415 of the Securities Act). As of March 13, 2019, we had sold 723,290 shares under the "at-the-market" offering for net proceeds of approximately $1.7 million. In addition, the selling stockholders included in the shelf registration statement may from time to time sell up to an aggregate amount of 13,990,403 shares of our common stock (including up to 2,051,771 shares issuable upon exercise of warrants) in one or more offerings.

Securities Purchase Agreement

On March 17, 2019, we entered into a Securities Purchase Agreement (the "SPA") to offer up to 4,291,845 shares of our common stock at a price of $2.33 per share. In a concurrent private placement, we offered warrants to purchase up to an aggregate of 6,866,952 shares of our common stock. Under the terms of the SPA, each purchaser is eligible to receive a long-term warrant and a short-term warrant to purchase up to a number of shares of our common stock equal to 60% of the number of common shares purchased and equal to 100% of the number of common shares purchased by such purchaser, respectively.

The long-term warrants issued will be exercisable commencing on the six-month anniversary of March 18, 2019 ("Closing Date") and have an expiration date of March 18, 2024. Any long-term warrant that has not been exercised by the expiration date are automatically exercised via cashless exercise. The exercise price of the long-term warrants is equal to the greater of (i) 125% of the volume weighted average price of our common stock during the twenty-day trading period immediately prior to the Closing Date and (ii) the closing price of our common stock on the trading day immediately prior to the Closing Date, subject to adjustment as specified in the SPA. The short-term warrants are exercisable as of the Closing Date, have an expiration date of March 18, 2020 and have an exercise price of $4.00, provided that the exercise price may be higher under certain circumstances to conform to Nasdaq Capital Market rules. If at any time after March 18, 2019, the weighted-average price of our common stock exceeds $5.25 for ten consecutive trading days, we may call the outstanding short-term warrants and require that they be exercised in cash, except to the extent that such exercise would surpass the beneficial ownership limitations, as specified in the SPA.

If we sell all of the shares offered in the prospectus supplement filed with the SEC on March 18, 2019 (the "March 2019 Offering"), the gross proceeds received prior to deduction of offering expenses would be $10.0 million. However, there can be no assurance that we will sell all or any of the securities being offered.

Amendment to the 2012 Omnibus Incentive Plan

On December 4, 2018, our stockholders approved an amendment to the 2012 Omnibus Incentive Plan (the "Amended Omnibus Plan") to provide for an additional 3,000,000 shares of common stock to be issued pursuant to the Amended Omnibus Plan and an evergreen provision to automatically increase the number of shares issuable pursuant to the plan on an annual basis for the period commencing January 1, 2019 and ending on January 1, 2022. The plan will automatically terminate on April 30, 2022.

Senior Convertible Note

On October 4, 2018, we entered into an Amendment and Exchange Agreement and Senior Convertible Note ("New Note"). The New Note is convertible into shares of our common stock at certain conversion prices depending on certain factors, which include the volume weighted average price ("VWAP") of our common stock for a period of time prior to conversion. In addition, the New Note is redeemable by the noteholder or by us under certain qualifying conditions. The principal balance of the New Note is $5.2 million with a stated interest rate of 8.0% per annum and a maturity date of October 4, 2020. In January 2019, the noteholder issued a redemption notice and the Company repaid the noteholder $1.1 million of principal and accrued interest. The principal balance of the New Note after this redemption was $4.1 million. During January 2019, we entered into an Option to Purchase Senior Convertible Note ("Option Agreement") with the noteholder. The Option Agreement provides us with the ability to repay the New Note prior to March 31, 2019 and prevents the noteholder from exercising certain redemption options from the New Note until after March 31, 2019. During March 2019, the Company exercised its repurchase rights from the Option Agreement and paid the noteholder of the New Note approximately $5,260,000, which was the full purchase amount, including interest, of the New Note pursuant to the terms of the Option Agreement. There are no further amounts outstanding under the New Note and the New Note has been canceled. See "Note 6—Debt" and "Note 12—Subsequent Events" to the accompanying financial statements included in this Annual Report on Form 10-K.

Unsecured Convertible Promissory Note

On March 8, 2019, we entered into a Securities Purchase Agreement and an unsecured Convertible Promissory Note, or the Convertible Note, in the principal amount of $5.5 million. The holder of the Convertible Note, or the Convertible Noteholder, may elect to convert all or a portion of the Convertible Note at any time and from time to time into our common stock at a conversion price of $3.25 per share, subject to adjustment for stock splits, dividends, combinations and similar events. We may prepay all or a portion of the Convertible Note at any time for an amount equal to 115% of then outstanding obligations or the portion of the obligations we are prepaying. The purchase price of the Convertible Note was $5.0 million and the Convertible Note carries an original issuance discount of $0.5 million, which is included in the principal amount of the Convertible Note. See "Liquidity and Capital Resources" below and "Note 12—Subsequent Events" to the accompanying financial statements included in this Annual Report on Form 10-K for further details regarding the terms of the Convertible Note.

Research and Development

In preparation for the Phase 3 clinical trials for INN-202, we are performing key study start-up activities, including study site identification and study of adult patients with celiac disease who have persistent abdominal symptoms while on a gluten free diet. We anticipate that our first Phase 3 trial will have approximately 900 subjects, with three treatment groups (two different doses of larazotide and a placebo group).

Recent research and development milestones include:

- completion of an initial feasibility review of over 200 potential investigative sites and pre-selected 122 potential investigational sites to participate in the upcoming Phase 3 clinical trials for celiac disease;
- execution of agreement with clinical research organization to facilitate completion of start-up activities for our Phase 3 clinical trials for celiac disease;
- execution of agreement with Amarex Clinical Research to provide data management and biostatistics in our Phase 3 clinical trials for celiac disease;
- continuation of pre-clinical work in NASH by studying larazotide in both ex-vivo and animal models;
- continued research collaboration with Dr. Anthony Blikslager of North Carolina State University to explore life-cycle extension of our lead molecule larazotide acetate;
- initiation of research collaboration with Dr. O. Colin Stine of University of Maryland at Baltimore to study larazotide's corrective effect on the dysfunctional intestinal barrier and the dysfunctional microbiome in various diseases;
- initiation of research collaboration with Dr. James Nataro of the University of Virginia, Charlottesville to study larazotide's effect on Environmental Enteric Dysfunction; and
- initiation of a research collaboration with Jay Luther, MD and Raymond Chung, MD at the Gastroenterology Unit at Massachusetts General Hospital in order to research the effects of larazotide on certain forms of alcoholic liver disease, such as ASH.

Results of Operations

Comparison of the Years Ended December 31, 2018 and 2017

The following table sets forth the key components of our results of operations for the years ended December 31, 2018 and 2017:

	Year Ended December 31,			
	2018	**2017**	**$ Change**	**% Change**
Operating expenses:				
Research and development	$ 7,559,077	$ 4,007,911	$ 3,551,166	89 %
General and administrative	10,664,991	7,161,612	3,503,379	49 %
Total operating expenses	18,224,068	11,169,523	7,054,545	63 %
Loss from operations	(18,224,068)	(11,169,523)	(7,054,545)	(63)%
Total other expense, net	(5,938,211)	(436,294)	(5,501,917)	(1,261)%
Net loss	$(24,162,279)	$(11,605,817)	$(12,556,462)	(108)%

Research and Development Expense

Research and development expense for the year ended December 31, 2018 increased approximately $3.6 million, or 89%, as compared to the year ended December 31, 2017. The increase was driven primarily by: (i) an increase of approximately $2.3 million associated with preparation for our Phase 3 clinical trials in INN-202; (ii) an increase of approximately $0.8 million in compensation costs related to an increase in research and development personnel, (iii) an increase of approximately $0.4 million in non-cash share-based compensation expense primarily due to an increase in stock option awards granted to our research and development personnel during the year ended December 31, 2018; and (iv) an increase of approximately $0.1 million related to manufacturing, consulting and further development of our product candidate pipeline.

General and Administrative Expense

General and administrative expense for the year ended December 31, 2018 increased approximately $3.5 million, or 49%, as compared to the year ended December 31, 2017. The increase was driven primarily by: (i) an increase of approximately $1.3 million in accounting and legal fees associated with the Merger, SEC filings and outsourced accounting personnel; (ii) an increase of approximately $1.0 million in transaction advisory fees associated with the Merger; (iii) an increase of approximately $1.1 million for increased costs associated with operating as a public company, including directors' and officers' liability insurance premiums, investor relations costs and regulatory fees and services associated with maintaining compliance with Nasdaq exchange listing and SEC regulations; (iv) an increase of $1.5 million in compensation costs for our general and administrative personnel, (v) an increase of approximately $0.2 million in board compensation; and (vi) an increase of approximately $1.0 million for market research and business development, patent protection of our intellectual property and other general corporate costs. These increases were offset by a decrease of approximately $2.6 million in non-cash stock compensation expense. The decrease in stock compensation expense is primarily due to the fact that the majority of the stock options granted in 2017 were fully vested as of December 31, 2017, and there was a decrease in the number of stock options granted in 2018.

Other income (expense), net

Other expense, net, for the year ended December 31, 2018, increased by approximately $5.5 million, or (1,261)%, as compared to the year ended December 31, 2017. The increase was primarily due to: (i) a non-cash charge of $3.1 million for the beneficial conversion feature that was triggered when our convertible debt and accrued interest were converted to common stock at a 25% discount on January 29, 2018; (ii) non-cash interest expense of approximately $2.5 million for the amortization of debt discount; and (iii) $0.2 million in cash interest expense associated with our Senior Note Payable issued on January 29, 2018. The interest expense increases were offset by an increase of $0.1 million associated with the change in fair value of the derivative liability and an increase of $0.2 million in interest income on our money market account due to an increase in our cash balance as a result of the equity financing in January 2018.

Liquidity and Capital Resources

Sources of Liquidity

As of December 31, 2018, we had cash and cash equivalents of approximately $5.7 million, compared to approximately $0.4 million as of December 31, 2017. The increase in cash was primarily due to the net proceeds from the Equity Issuance and the issuance of convertible debt, net of expenditures for business operations, research and development and clinical trial preparations, further described below. We expect to incur substantial expenditures in the foreseeable future for the continued development and clinical trials of our product candidates. We will continue to require additional financing to develop our product candidates and fund operations for the foreseeable future. We plan to seek funds through debt or equity financings, strategic alliances and licensing arrangements, and other collaborations or sources of financing. However, there can be no assurance that we will be able to raise the additional capital needed to complete our pipeline of research and development programs on terms acceptable to us, on a timely basis or at all. If we are unable to raise additional funds when needed, our ability to develop our product candidates will be impaired. We may also be required to delay, reduce, or terminate some or all of our development programs and clinical trials.

March 2019 Offering

On March 17, 2019, we entered into a Securities Purchase Agreement (the "SPA") to offer up to 4,291,845 shares of our common stock at a price of $2.33 per share. In a concurrent private placement, we offered warrants to purchase up to an aggregate of 6,866,952 shares of our common stock. Under the terms of the SPA, each purchaser is eligible to receive a long-term warrant and a short-term warrant to purchase up to a number of shares of our common stock equal to 60% of the number of common shares purchased and equal to 100% of the number of common shares purchased by such purchaser, respectively. For additional terms of the agreement, see "Recent Development—Corporate Updates" above.

If the Company sells all of the shares offered in the March 2019 Offering, the gross proceeds received prior to deduction of offering expenses would be $10.0 million. However, there can be no assurance that the Company will sell all or any of the securities being offered. We estimate the total expenses incurred in the March 2019 Offering will be $0.1 million.

January 2018 Equity Issuance

Immediately prior to the closing of the Merger, accredited investors purchased shares of Private Innovate common stock in a private placement for gross proceeds of approximately $18.1 million, or $16.5 million, net of approximately $1.5 million in placement agent fees and $80,000 in non-accountable expense costs (the "Equity Issuance"). Additionally, Private Innovate issued five-year warrants to each cash purchaser of common stock, or an aggregate of approximately 1.4 million warrants, with an exercise price of $3.18 per share after giving effect to the Exchange Ratio. Private Innovate also issued 349,555 five-year warrants with an exercise price of $2.54 per share and 279,862 five-year warrants with an exercise price of $3.18 per share (after giving effect of the Exchange Ratio) to the respective placement agents and their affiliates.

Concurrently with the Equity Issuance, convertible promissory notes issued by Private Innovate in the aggregate principal amount of approximately $8.6 million plus accrued interest of $0.6 million were converted into shares of Private Innovate common stock at an exercise price per share of $0.72, prior to the Exchange Ratio (the "Conversion"), which reflected a 25% discount relative to the shares issued pursuant to the Equity Issuance (the "Conversion Discount"). The Conversion Discount represented a beneficial conversion feature of approximately $3.1 million which was recorded as a charge to interest expense and a credit to additional paid-in capital.

H.C. Wainwright & Co., LLC ("HCW") and GP Nurmenkari Inc. ("GPN") were retained as the placement agents for the Equity Issuance. HCW was paid a flat fee of $0.3 million, a cash fee of $0.3 million (equal to 10% of the gross proceeds of the Equity Issuance up to a certain cap) and non-accountable expense allowance of approximately $30,000. GPN was paid a cash fee of $0.9 million (equal to 10% of the gross proceeds of certain investors in the Equity Issuance) and non-accountable expense allowance of $50,000. IB Pharmaceuticals issued to affiliates of HCW five-year warrants to purchase 209,951 shares of common stock with an exercise price per share equal to $3.18 (after giving effect to the Exchange Ratio). IB Pharmaceuticals issued to GPN five-year warrants to purchase 349,555 shares of common stock with an exercise price per share equal to $2.54 and five-year warrants to purchase 69,911 shares of common stock with an exercise price of $3.18 (after giving effect to Exchange Ratio). Upon the closing of the Merger, the outstanding shares of IB Pharmaceuticals' common stock were exchanged for shares of common stock of Monster at an exchange ratio of one share of IB Pharmaceuticals common stock to 0.37686604 shares of Monster common stock (the "Exchange Ratio"). Immediately following the closing of the Merger, after giving effect to the Equity Issuance and applying the Exchange Ratio, Monster's securityholders owned approximately 5.8% of our outstanding common stock on a fully-diluted basis and IB Pharmaceuticals' securityholders owned approximately 94.2% of our outstanding common stock.

Senior Convertible Note and Exchange Agreement

On January 29, 2018, we entered into a Note Purchase Agreement and Senior Note Payable ("Note") with a lender. The principal amount of the Note was $4.8 million. The Note was issued at a discount of $1.8 million and net of financing costs, for total proceeds of $3.0 million. Interest on the Note accrued from January 29, 2018, at a rate of 12.5% per annum and quarterly payments of interest only were due beginning on March 30, 2018 and compounded quarterly. The Note was scheduled to mature on September 30, 2018 ("Maturity Date"). We entered into a Waiver Agreement with the noteholder that extended the Maturity Date until October 4, 2018. On October 4, 2018, we entered into an Amendment and Exchange Agreement ("Exchange Agreement") with the noteholder exchanging the Note for a new Senior Convertible Note (the "New Note").

The principal amount of the New Note is $5.2 million and bears interest at a rate of eight percent (8%) per annum payable quarterly in cash, maturing on October 4, 2020. The New Note contains certain redemption features, conversion options, restrictions on specific transactions, non-financial covenants and penalties to us in the case of an event of default, as defined in the New Note. If an event of default occurs, the noteholder may require us to redeem all or any portion of the New Note (including all accrued and unpaid interest thereon), in cash, at a price equal to the greater of (i) up to 125% of the amount being redeemed, depending on the nature of the default, or (ii) the intrinsic value of the shares of Common Stock then issuable upon conversion of the New Note. The interest rate shall automatically increase if there is an event of default to 18% per annum during the default period.

All amounts due under the New Note are convertible at any time, in whole or in part, at the option of the noteholder into shares of our common stock at a fixed conversion price equal to $8.02 (the "Conversion Price"), with such Conversion Price adjusted downward to the price of any future issuances of our common stock. This Conversion Price is also subject to adjustment for stock splits, combinations or similar events. In addition, all amounts due under the New Note are alternatively convertible at any time, in whole or in part, at the option of the noteholder, into shares of our common stock at an alternate conversion price equal to the greater of (a) $3.08, (the "Floor Price") or (b) the lower of (I) the Conversion Price or (II) 93% of the volume weighted average price (the "VWAP") of our common stock for the 10 days preceding the conversion, provided, that if we default then the noteholder is entitled to convert the New Note subject to an event of default redemption, in whole or in part, at the noteholder's option, at the value of such portion of the New Note subject to a potential event of default redemption (i.e., one hundred twenty percent (120%) of the amount then outstanding under the New Note.

The various conversion and redemption features contained in the New Note are embedded derivative instruments, which are recorded as a debt discount and derivative liability at their estimated fair value of $0.4 million. During 2018, the VWAP of our common stock was lower than the Floor price for more than ten consecutive days. As such the noteholder had the right to require us to redeem the New Note prior to December 31, 2018, at its option. Therefore, we have amortized the entire debt discount to interest expense through the triggering of the redemption option, which occurred in 2018. Amortization of the debt discount recorded as interest expense for the Note and the New Note totaled approximately $2.5 million for the year ended December 31, 2018. Based on the conversion features, redemption features and subjective acceleration clauses contained in the New Note, we recorded the New Note as a short-term obligation on the accompanying balance sheet as of December 31, 2018. For further details describing our debt obligation, see "Note 6—Debt" and "Note 12—Subsequent Events" to the accompanying financial statements included in this Annual Report on Form 10-K.

On January 7, 2019, we entered into an Option to Purchase Senior Convertible Note ("Option Agreement") with the noteholder. Immediately prior to entering into the Option Agreement, the noteholder issued a redemption notice requiring us to repay the noteholder $1.1 million of principal and accrued interest. The principal balance of the New Note was reduced to $4.1 million as a result of this repayment. We paid the noteholder $0.3 million in consideration for the noteholder entering into the Option Agreement with us. The Option Agreement provides us with the ability to repay (purchase) the outstanding principal and accrued interest of the New Note any time from January 7, 2019 until March 31, 2019 ("Option Period"). The purchase amount of the New Note under the terms of the Option agreement is $5.2 million (as reduced proportionally for any principal converted under the New Note during the Option Period), plus any accrued interest on such amount of 8% per annum to the date of exercise. On March 11, 2019, we exercised our repurchase rights from the Option Agreement and paid the noteholder of the New Note approximately $5.3 million, which was the full purchase amount, including accrued interest, of the New Note pursuant to the terms of the Option Agreement. There are no further amounts outstanding under the New Note and the New Note has been canceled.

Unsecured Convertible Promissory Note

On March 8, 2019, we entered into a Securities Purchase Agreement (the "Purchase Agreement") with a new noteholder (the "Convertible Noteholder"). Pursuant to the Purchase Agreement, we issued the Convertible Noteholder an unsecured Convertible Promissory Note (the "Convertible Note") in the principal amount of $5,500,000. The Convertible Noteholder may elect to convert all or a portion of the Convertible Note at any time and from time to time into our common stock at a conversion price of $3.25 per share, subject to adjustment for stock splits, dividends, combinations and similar events. We may prepay all or a portion of the Convertible Note at any time for an amount equal to 115% of any then outstanding obligations or the portion of the obligations we are prepaying. The purchase price of the Convertible Note was $5,000,000, and the Convertible Note carries an original issuance discount of $500,000, which is included in the principal amount of the Convertible Note. In addition, we agreed to pay $20,000 of transaction expenses, which were netted out of the purchase price of the Convertible Note.

The Convertible Note bears interest at the rate of 10% (which will increase to 18% upon and during the continuance of an event of default) per annum, compounding on a daily basis. All principal and accrued interest on the Convertible Note is due on the second-year anniversary of the Convertible Note's issuance.

At any time after the six-month anniversary of the issuance of the Convertible Note, (i) if the average volume weighted average price over twenty trading dates exceeds $10.00 per share, we may generally require that the Convertible Note convert into shares of its common stock at the $3.25 (as adjusted) conversion price, and (ii) the Convertible Noteholder may elect to require all or a portion of the Convertible Note be redeemed by us. If the Convertible Noteholder requires a redemption, we, at our discretion, may pay the redeemed portion of the Convertible Note in cash or in our common stock at a conversion rate equal to the lesser of (i) the $3.25 (as adjusted) conversion rate or (ii) 80% of the average of the five lowest volume weighted average price of our Common Stock over the preceding twenty trading days. The Convertible Noteholder may not redeem more than $500,000 per calendar month during the period between the six-month anniversary of the date of issuance until the first year anniversary of the date of issuance and $750,000 per calendar month thereafter. The obligation or right of us to deliver our shares upon the conversion or redemption of the Convertible Note is subject to a 19.99% cap and subject to a floor price trading price of $3.25 (unless waived by us). Any amounts redeemed or converted once the cap is reached or if the market price is less than the $3.25 floor price must be paid in cash.

If there is an Event of Default under the Convertible Note, the Convertible Noteholder may accelerate our obligations or elect to increase the outstanding obligations under the Convertible Note. The amount of the increase ranges from 5% to 15% depending on the type of default (as defined in the Convertible Note). In addition, the Convertible Note obligations will be increased if there are delays in our delivery requirements for the shares or cash issuable upon the conversion or redemption of the Convertible Note in certain circumstances.

If we issue convertible debt in the future with any terms, including conversion terms, that are more favorable to the terms of the Convertible Note, the Convertible Noteholder may elect to incorporate the more favorable terms into the Convertible Note.

At-the-market Offering

On October 26, 2018, we entered into a stock sales agreement with H.C. Wainwright & Co., LLC and Ladenburg Thalmann & Co. Inc. and filed a prospectus with the Securities and Exchange Commission ("SEC") related to such offering. We previously filed a Form S-3 that became effective on July 13, 2018 that included the registration of $40 million of our shares of common

stock in connection with a potential "at-the-market" offering. Pursuant to the sales agreement, we may issue and sell shares having an aggregate gross sales price of up to $40 million. As of March 13, 2019, we had sold 723,290 shares under the "at the market" offering for net proceeds of approximately $1.7 million.

Cash Flows

The following table sets forth the primary sources and uses of cash for the years ended December 31, 2018 and 2017:

	Year Ended December 31,	
	2018	**2017**
Net cash (used in) provided by:		
Operating activities	$ (15,169,330)	$ (5,096,546)
Investing activities	(13,943)	(38,727)
Financing activities	20,556,610	5,130,025
Net increase (decrease) in cash and cash equivalents	$ 5,373,337	$ (5,248)

Operating Activities

For the year ended December 31, 2018, net cash used in operating activities of approximately $15.2 million primarily consisted of a net loss of $24.2 million, offset by adjustments for non-cash share-based compensation of approximately $3.8 million, beneficial conversion feature of $3.1 million, non-cash interest expense of approximately $2.8 million offset by the change in fair value of derivative liability of $0.1 million and a net change totaling approximately $0.7 million due to increases in prepaid expense and other current assets and accounts payable and decreases in accrued expenses.

For the year ended December 31, 2017, net cash used in operating activities of approximately $5.1 million primarily consisted of a net loss of $11.6 million, offset by adjustments for non-cash share-based compensation of approximately $6.0 million, non-cash interest expense of approximately $0.4 million and a net increase in prepaid expense, accounts payable and accrued expenses of less than $0.1 million.

Investing Activities

For the year ended December 31, 2018, net cash used in investing activities of approximately $14,000 represented the purchase of office furniture and computer equipment of approximately $14,000. In addition, we received loan payments from a related party of $75,000 which was offset by an investment in a certificate of deposit of $75,000. Net cash used in investing activities for the year ended December 31, 2017 represented the purchase of office furniture, computer equipment and leasehold improvements.

Financing Activities

For the year ended December 31, 2018, net cash provided by financing activities of approximately $20.6 million primarily consisted of: (i) the proceeds of $18.1 million received from the sale of our common stock and warrants in the Equity Issuance; (ii) $3.0 million from the issuance of a note payable; (iii) $0.9 million from the exercise of warrants and (iv) $0.2 million in proceeds from the exercise of stock options. These increases were offset by approximately $1.5 million in stock issuance costs and $0.2 million in payment of deferred offering costs.

For the year ended December 31, 2017, net cash provided by financing activities of approximately $5.1 million primarily consisted of borrowings from convertible debt.

Capital Requirements

We have not generated any revenue from product sales or any other activities. We do not expect to generate significant revenue unless and until we obtain regulatory approval of and commercialize, or out license, one or more of our product candidates and do not know when, or if, these will occur. In addition, we expect our expenses to increase in connection with our ongoing development activities, particularly as we continue the research, development and clinical trials of, and seek regulatory approval for, our product candidates. In addition, subject to obtaining regulatory approval of our product candidates, we expect to incur

significant commercialization expenses for product sales, marketing, manufacturing and distribution. We anticipate that we will need substantial additional funding in connection with our continuing operations, including increased costs associated with being a public company.

The accompanying financial statements have been prepared on a basis which assumes that we will continue as a going concern, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. Based on our limited operating history and recurring operating losses, there is substantial doubt that we will continue as a going concern for at least one year following the date of this Annual Report on Form 10-K, without additional financing. Management's plans with regard to these matters include entering into strategic partnerships or seeking additional debt or equity financing arrangements or a combination of these activities. The failure to obtain sufficient financing or strategic partnerships could adversely affect our ability to achieve our business objectives and continue as a going concern. The accompanying financial statements do not include any adjustments that might be necessary should we be unable to continue as a going concern.

Contractual Obligations and Commitments

In October 2017, we entered into a three-year lease agreement for office space that expires on September 30, 2020 and includes a two-year renewal option. Base annual rent is less than $0.1 million. The first twelve months of rent were paid in advance during 2017. Beginning in October 2018, we began paying monthly rent of $5,000 due in advance of the first day of each month for the remaining term. A security deposit of approximately $5,000 was paid in October 2017 and is included in other assets on the accompanying balance sheets included elsewhere in this Annual Report on Form 10-K.

We are obligated to make future payments to third parties under in-license agreements, including sublicense fees, royalties and payments that become due and payable on the achievement of certain development and commercialization milestones. As the amount and timing of sub-license fees and the achievement and timing of these milestones are not probable and estimable, such commitments have not been included on the accompanying balance sheets.

We also enter into agreements in the normal course of business with contract research organizations and other third parties with respect to services for clinical trials, clinical supply manufacturing and other operating purposes that are generally terminable by us with thirty to ninety days advance notice.

For further details, see "Note 11—Commitments and Contingencies" in the accompanying financial statements included in this Annual Report on Form 10-K.

Off-Balance Sheet Arrangements

As of December 31, 2018, we had no off-balance sheet arrangements as defined in Item 303(a)(4) of Regulation S-K as promulgated by the SEC.

Critical Accounting Policies and Use of Estimates

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

While our significant accounting policies are more fully described in the notes to our financial statements included elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are critical to the process of making significant judgments and estimates in the preparation of our financial statements and understanding and evaluating our reported financial results.

Areas of the financial statements where estimates may have the most significant effect include fair value measurements, accrued expenses and share-based compensation. Changes in the facts or circumstances underlying these estimates could result in material changes and actual results could differ from these estimates.

Fair Value Measurements

We account for derivative instruments in accordance with Accounting Standards Codification ("ASC") 815, *Derivative and Hedging,* which establishes accounting and reporting standards for derivative instruments, including certain derivative instruments embedded in other financial instruments or contracts and requires recognition of all derivatives on the balance sheet at fair value. Our derivative financial instrument consists of an embedded option in our convertible debt. The embedded derivative includes provisions that provide the noteholders with certain conversion and put rights at various conversion or redemption values as well as certain call options for us.

The fair value of the embedded derivative issued in connection with the convertible debt financing was determined by using a Monte Carlo simulation technique ("MCS") to value the embedded derivative. As part of the MCS valuation a discounted cash flow ("DCF") model is used to value the debt on a stand-alone basis and determine the discount rate to utilize in both the DCF and MCS models. The significant estimates used in the DCF model include the time to maturity of the convertible debt and calculated discount rate, which includes an estimate of our specific risk premium. The discount rate utilized was 13.1% and 13.6% as of October 4, 2018 and December 31, 2018, respectively. The MCS methodology calculates the theoretical value of an option based on certain parameters, including: (i) the threshold of exercising the option, (ii) the price of the underlying security, (iii) the time to expiration, (iv) the expected volatility of the underlying security, (v) the risk-free rate and (vi) the number of paths. The volatility, risk-free interest rate and time to expiration utilized as of October 4, 2018 were 98.2%, 2.9% and 24 months, respectively. The volatility, risk-free interest rate and time to expiration utilized as of December 31, 2018 were 105.6%, 2.5% and 21 months, respectively. We recognized a gain of 0.1 million for the change in derivative liability during the year ended December 31, 2018.

This valuation technique involves management's estimates and judgment based on unobservable inputs and is classified in Level 3. Changes to estimates and assumptions used in estimating the fair value of an instrument may produce materially different values and could have a material impact to our reported net losses in future periods. See "Note 1—Summary of Significant Accounting Policies" and "Note 6—Debt" to the accompanying financial statements included in this Annual Report on Form 10-K for additional details regarding the accounting policy and fair value assumptions used in accounting for our fair value instruments.

Accrued Expenses

We incur periodic expenses such as cost associated with clinical trials and non-clinical activities, manufacturing of pharmaceutical active ingredients and drug products, regulatory fees and activities, fees paid to external service providers and consultants, salaries and related employee benefits and professional fees. We are required to estimate our accrued expenses which involves reviewing quotations and contracts, identifying services that have been performed on our behalf and estimating the level of service performed and the associated cost incurred for the service when we have not been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice monthly in arrears for services performed or when contractual milestones are met. We estimate accrued expenses as of each balance sheet date based on facts and circumstances known at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary.

Costs incurred in research and development of products are charged to research and development expense as incurred. Costs for preclinical studies and clinical trial activities are recognized based on an evaluation of the vendors' progress towards completion of specific tasks, using data such as patient enrollment, clinical site activations or information provided by vendors regarding the actual costs incurred. Payments for these activities are based on the terms of individual contracts and payment timing may differ significantly from the period in which services are performed. We determine accrual estimates through reports from and discussions with applicable personnel and outside service providers as to the progress or state of clinical trials, or the services completed. Nonrefundable advance payments for goods or services that will be used in future research and development activities are expensed when the activity is performed or when the goods have been received, rather than when payment is made. The estimates of accrued expenses as of each balance sheet date are based on the facts and circumstances known at the time. Although we do not expect our estimates to be materially different from those actually incurred, our estimates and assumptions could differ significantly from actual costs, which could result in increases or decreases in research and development expenses in future periods when actual results are known.

Share-based Compensation

We account for share-based compensation using the fair value method of accounting which requires all such compensation to employees, including the grant of employee stock options, to be recognized in the statements of operations based on its fair value at the grant date. The expense associated with share-based compensation is recognized on a straight-line basis over the requisite service period of each award; however, the amount of compensation expense recognized at any date must be at least equal to the portion of the grant-date value of the award that is vested at that date. For share-based compensation granted to non-employees, the measurement date is generally considered to be the date when all services have been rendered or the date that options are fully vested. Share-based compensation expense for stock options granted to non-employees is adjusted each reporting period for changes in the fair value of our common stock until the measurement date.

We estimate the fair value of our stock-based awards to employees and non-employees using the Black-Scholes option pricing model, which requires the input of valuation assumptions, some of which are highly subjective. Key valuation assumptions include:

- *Expected dividend yield:* the expected dividend is assumed to be zero as we have never paid dividends and have no current plans to pay any dividends on our common stock.

- *Expected stock price volatility:* due to our limited historical trading data as a public company, the expected volatility is derived from the average historical volatilities of publicly traded companies within the same industry that we consider to be comparable to our business over a period approximating the expected term. In evaluating comparable companies, we consider factors such as industry, stage of life cycle, financial leverage, size and risk profile.

- *Risk-free interest rate:* the risk-free interest rate is based on the U.S. Treasury yield in effect at the time of grant for zero coupon U.S. Treasury notes with maturities approximately equal to the expected term.

- *Expected term:* the expected term represents the period that the stock-based awards are expected to be outstanding. Our historical stock option exercise data does not provide a reasonable basis upon which to estimate an expected term for employees due to a lack of sufficient data. Therefore, we estimate the expected term by using the simplified method provided by the SEC. The simplified method calculates the expected term as the average of the time-to-vesting and the contractual life of options. The expected term for non-employees is the remaining contractual life of the option.

In preparing our financial statements for the year ended December 31, 2018, we determined that an immaterial error was made in the amount of share-based compensation expense recorded in our financial statements for the three months ended March 31, 2018. The error resulted in an overstatement of share-based compensation expense of approximately $1.2 million for the first quarter of 2018. In addition, share-based compensation expense was overstated for this same amount for the six months and nine months ended June 30, 2018 and September 30, 2018, respectively. The error did not impact our financial statements for the three months ended June 30, 2018 or the three months ended September 30, 2018. We assessed the materiality of this misstatement in the 2018 interim period financial statements in accordance with the Securities and Exchange Commission ("SEC") Staff Accounting Bulletin ("SAB") No. 99, Materiality, codified in Accounting Standards Codification No. 250, Presentation of Financial Statements, and concluded that the misstatement was not material to any interim period. We have corrected the financial statements for the year ended December 31, 2018. There was no impact to stockholders' equity or cash flows. For further details, see Note 1—Summary of Significant Accounting Policies.

Income Taxes

No provision for federal and state income tax expense has been recorded for the years ended December 31, 2018 and 2017 due to the valuation allowance recorded against the net deferred tax asset and recurring losses. Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes.

On December 22, 2017, the Tax Cuts and Jobs Act was enacted into law, which reduced the federal corporation income tax rate to 21% for tax years beginning after December 31, 2017. As a result of the new enacted tax rate, we adjusted our deferred tax assets as of December 31, 2017 by applying the new 21% rate, which resulted in a decrease to the deferred tax assets and corresponding decrease to the valuation allowance of approximately $2.2 million.

As of December 31, 2018, we have net operating loss carryforwards for federal and state income tax purposes of approximately $18,918,000 and $18,322,400, respectively. Federal loss carryforwards of $3,551,900 begin to expire in 2034 and $15,366,100 of the federal losses carryforward indefinitely. The state loss carryforwards begin to expire in 2029. As of December 31, 2018, we have contribution carryforwards of approximately $10,700, which begin to expire in 2020. In addition, we have federal research and development credits of $224,900, which begin to expire in 2038.

The Internal Revenue Code of 1986, as amended, contains provisions which limit the ability to utilize the net operating loss and tax credit carryforwards in the case of certain events, including significant changes in ownership interests. If our net operating loss and tax credit carryforwards are limited, and we have taxable income which exceeds the permissible yearly net operating loss and tax credit carryforwards, we would incur a federal income tax liability even though net operating loss and tax credit carryforwards would be available in future years.

Recent Accounting Pronouncements

For details of recent accounting pronouncements that we have adopted and our evaluation of their adoption on our financial statements, see "Note 1—Summary of Significant Accounting Policies—Recently Issued Accounting Standards" to the accompanying financial statements included in this Annual Report on Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Not applicable.

Item 8. Financial Statements and Supplementary Data.

The information required by this item appears beginning on page F-1 of this Annual Report on Form 10-K.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2018. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, or persons performing similar functions, as appropriate, to allow timely decisions regarding required disclosure. Based on such evaluation, our principal executive officer and principal financial officer concluded that, as of December 31, 2018, our disclosure controls and procedures were not effective as a result of the material weakness in our internal control over financial reporting described below.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Internal control over financial reporting is a process to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external

purposes in accordance with GAAP. Internal control over financial reporting includes maintaining records that in reasonable detail accurately and fairly reflect our transactions; providing reasonable assurance that transactions are recorded as necessary for preparation of our financial statements; providing reasonable assurance that receipts and expenditures of our assets are made in accordance with management's authorization; and providing reasonable assurance that unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements would be prevented or detected on a timely basis. Because of its inherent limitations, internal control over financial reporting is not intended to provide absolute assurance that a misstatement of our financial statements would be prevented or detected.

In making the assessment of internal control over financial reporting, our management used the criteria issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in *Internal Control-Integrated Framework (2013)*. Based on that assessment and those criteria, management determined that our internal control over financial reporting was not effective as of December 31, 2018 due to our limited resources available to address our internal controls and procedures and our reliance on part-time consultants to assist us with our financial accounting and compliance obligations. In connection with the preparation of our audited financial statements for the year ended December 31, 2017, our independent auditors advised management that a material weakness existed in internal control over financial reporting due to its inability to adequately segregate duties as a result of its limited number of accounting personnel and management has been advised that this material weakness remains at December 31, 2018.

Although we are committed to continuing to improve our internal control processes and intend to implement a plan to remediate our material weakness, we cannot be certain of the effectiveness of such plan or that, in the future, additional material weaknesses or significant deficiencies will not exist or otherwise be discovered. If we are unable to maintain proper and effective internal controls, we may not be able to produce timely and accurate financial statements and prevent fraud. In addition, if we are unable to successfully remediate the material weakness in our internal controls or if we are unable to produce accurate and timely financial statements, our stock price may be adversely affected and we may be unable to maintain compliance with applicable stock exchange listing requirements.

Our independent registered public accounting firm has not assessed the effectiveness of our internal control over financial reporting and, under the JOBS Act, will not be required to provide an attestation report on the effectiveness of our internal control over financial reporting so long as we qualify as an "emerging growth company."

Changes in Internal Control Over Financial Reporting

As of December 31, 2018, there were no other material changes in our internal control over financial reporting that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by Items 401, 405 and 407(c)(3), (d)(4) and (d)(5) of Regulation S-K is incorporated herein by reference to our definitive proxy statement, which will be filed with the SEC within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A under the Exchange Act under the headings "Executive Officers and Directors," "Section 16a Beneficial Ownership Reporting Compliance."

We have adopted a code of ethics and business conduct that applies to our officers, directors and employees. The full text of our code of ethics and business conduct can be found on our website (http://www.innovatebiopharma.com) under the "Corporate Governance" heading on the "Investors" page. We intend to disclose on our website, or file an 8-K as may be required, any amendment to, or waivers from, our code of ethics and business conduct that are required to be disclosed pursuant to the rules of the SEC and Nasdaq.

Item 11. Executive Compensation

The information required by Item 402 and paragraph (e)(4) and (e)(5) of Item 407 of Regulation S-K is incorporated herein by reference to our definitive proxy statement, which will be filed with the SEC within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A under the Exchange Act under the heading "Executive Compensation."

Item 12. Security Ownership of Certain Beneficial Owners and Management

The information required by Item 201(d) and Item 403 of Regulation S-K is incorporated herein by reference to our definitive proxy statement, which will be filed with the SEC within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A under the Exchange Act under the heading "Security Ownership of Certain Beneficial Owners and Management."

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by Items 404 and 407(a) of Regulation S-K is incorporated herein by reference to our definitive proxy statement, which will be filed with the SEC within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A under the Exchange Act under the heading "Certain Relationships and Related Party Transactions."

Item 14. Principal Accountant Fees and Services.

The information required by Item 9(e) of Schedule 14A is incorporated herein by reference to our definitive proxy statement, which will be filed with the SEC within 120 days after the end of our 2018 fiscal year pursuant to Regulation 14A under the Exchange Act under the heading "Principal Accounting Fees and Services."

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a)(1) Financial Statements

The financial statements required by this item are submitted in a separate section beginning on page F-1 of this annual report.

(a)(2) Financial Statement Schedules

Financial statement schedules have been omitted because they are either not required, not applicable, or the information is otherwise included.

(a)(3) Exhibits

EXHIBIT INDEX

EXHIBIT NO.		DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
				FORM	FILE NO.	EXHIBIT	FILING DATE
2.1	+	Agreement and Plan of Merger and Reorganization by and among Monster Digital, Inc., Merger Sub and Innovate Biopharmaceuticals Inc., dated July 3, 2017		8-K	001-37797	2.1	July 6, 2017
2.2		Amendment, dated January 3, 2018, to Agreement and Plan of Merger and Reorganization by and among Monster Digital, Inc., Merger Sub and Innovate Biopharmaceuticals Inc., dated July 3, 2017		8-K	001-37797	2.1	January 5, 2018
2.3		Form of Support Agreement, by and between Monster Digital, Inc. and certain directors, officers and stockholders of Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.)		8-K	001-37797	2.2	July 6, 2017
2.4		Form of Support Agreement, by and between Innovate Biopharmaceuticals Inc. and the directors and executive officers and certain stockholders of Monster Digital, Inc. (now IB Pharmaceuticals)		8-K	001-37797	2.3	July 6, 2017
3.1		Certificate of Incorporation of the Company, as amended	X				
3.2		Amended and Restated Bylaws of the Company		8-K	001-37797	3.1	December 10, 2018
4.1		Form of Share Certificate		10-K	001-37797	4.1	March 14, 2018
4.2		Form of Warrant		8-K	001-37797	4.1	February 2, 2018
4.3		Senior Note dated January 29, 2018		8-K	001-37797	4.2	February 2, 2018
4.4		Subscription Agreement dated January 29, 2018		8-K	001-37797	10.1	February 2, 2018
4.5		Form of Warrant Certificate		S-1/A	333-207938	4.2	June 24, 2016

EXHIBIT NO.		DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
				FORM	FILE NO.	EXHIBIT	FILING DATE
4.6		Form of Warrant Agreement by and between Monster Digital, Inc. and Corporate Stock Transfer, Inc.		S-1/A	333-207938	4.3	June 24, 2016
10.1	†	Sublicense Agreement, dated February 19, 2016, between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Alba Therapeutics Corporation		10-K/A	001-33797	10.1	June 29, 2018
10.2	†	License Agreement, dated February 26, 2016, between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Alba Therapeutics Corporation		10-K/A	001-33797	10.2	June 29, 2018
10.3	†	Asset Purchase Agreement, dated December 23, 2014, between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Repligen Corporation		10-K	001-37797	10.3	March 14, 2018
10.4	†	Apaza License Agreement, dated April 19, 2013, between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Seachaid Pharmaceuticals, Inc., as amended		10-K	001-37797	10.4	March 14, 2018
10.5	†	Master Services Agreement by and between the Company and Amarex Clinical Research, LLC, dated as of August 20, 2018		10-Q	001-37797	10.1	November 13, 2018
10.6		Note Purchase Agreement dated January 29, 2018		8-K	001-37797	10.2	February 2, 2018
10.7		Amendment and Exchange Agreement by and between the Company and Gustavia Capital Partners, LLC, dated as of October 4, 2018		8-K	001-37797	10.1	October 5, 2018
10.8		Senior Convertible Note by and between the Company and Gustavia Capital Partners, LLC		8-K	001-37797	10.2	October 5, 2018
10.9	#	Form of Director Indemnification Agreement		8-K	001-37797	10.3	February 2, 2018
10.10	#	2012 Innovate Omnibus Incentive Plan, as amended		8-K	001-37797	10.1	December 10, 2018
10.11	#	Form of Option Agreement and Option Grant Notice under the 2012 Omnibus Incentive Plan		S-1	333-207938	10.2	November 10, 2015
10.12	#	Form of Restricted Stock Award Agreement and Notice of Grant of Restricted Stock Award under the 2012 Omnibus Incentive Plan		S-1	333-207938	10.3	November 10, 2015
10.13	#	Form of Restricted Stock Unit Award Agreement and Notice of Grant of Restricted Stock Unit Award under 2012 Omnibus Incentive Plan		S-1	333-207938	10.4	November 10, 2015
10.14	#	Innovate Biopharmaceuticals Inc. 2015 Stock Incentive Plan, as amended		10-K	001-37797	10.11	March 14, 2018
10.15	#	Form of Incentive Stock Option Agreement under the 2015 Stock Incentive Plan		10-K	001-37797	10.12	March 14, 2018
10.16	#	Form of Nonstatutory Stock Option Agreement under the 2015 Stock Incentive Plan		10-K	001-37797	10.13	March 14, 2018

EXHIBIT NO.		DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
				FORM	FILE NO.	EXHIBIT	FILING DATE
10.17	#	Form of Restricted Stock Purchase Agreement under the 2015 Stock Incentive Plan		10-K	001-37797	10.14	March 14, 2018
10.18	#	Consulting Agreement, dated May 7, 2015, by and between the Company and David Clarke		S-1	333-207938	10.11	November 10, 2015
10.19	#	Separation Agreement and Release of Claims, dated January 26, 2018, by and between the Company and David Olert		10-K	001-37797	10.17	March 14, 2018
10.20		Consulting Agreement, dated February 17, 2018, by and between the Company and David Olert		10-K	001-37797	10.18	March 14, 2018
10.21	#	Executive Employment Agreement, dated November 2, 2015, by and between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Christopher Prior, as amended		10-K	001-37797	10.20	March 14, 2018
10.22	#	Executive Employment Agreement, dated October 28, 2015, by and between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Sandeep Laumas, as amended		10-K	001-37797	10.21	March 14, 2018
10.23	#	Executive Employment Agreement, dated October 28, 2015, by and between Innovate Biopharmaceuticals Inc. (now IB Pharmaceuticals Inc.) and Jay Madan, as amended		10-K	001-37797	10.22	March 14, 2018
10.24	#	Executive Employment Agreement, dated March 9, 2018, by and between the Company and June Almenoff		10-K	001-37797	10.23	March 14, 2018
10.25	#	Non-Employee Director Compensation Policy dated as of September 21, 2018		10-Q	001-37797	10.2	November 13, 2018
10.26	#	Amended and Restated Executive Employment Agreement, dated March 11, 2018, by and between the Company and Sandeep Laumas		10-K	001-37797	10.25	March 14, 2018
10.27	#	First Amendment, dated February 19, 2019, to Amended and Restated Executive Employment Agreement, dated March 11, 2018, by and between the Company and Sandeep Laumas	X				
10.28	#	Amended and Restated Executive Employment Agreement, dated March 11, 2018, by and between the Company and Christopher Prior		10-K	001-37797	10.26	March 14, 2018
10.29	#	Separation Agreement, dated February 19, 2019, by and between the Company and Christopher Prior	X				
10.30	#	Consulting Agreement, dated February 19, 2019, by and between the Company and Christopher Prior	X				
10.31	#	Amended and Restated Executive Employment Agreement, dated March 11, 2018, by and between the Company and Jay Madan		10-K	001-37797	10.27	March 14, 2018
10.32		Common Stock Sales Agreement by and among the Company and H.C. Wainwright & Co., LLC and Ladenburg Thalmann & Co. Inc. dated as of October 26, 2018		8-K	001-37797	10.1	October 29, 2018

EXHIBIT NO.		DESCRIPTION	FILED HEREWITH	INCORPORATED BY REFERENCE			
				FORM	FILE NO.	EXHIBIT	FILING DATE
10.33	#	Separation Agreement, dated November 16, 2018, by and between the Company and June Almenoff	X				
10.34		Convertible Promissory Note by and between the Company and Atlas Sciences, LLC		8-K	001-37797	4.1	March 13, 2019
10.35		Securities Purchase Agreement by and between the Company and Atlas Sciences, LLC		8-K	001-37797	10.1	March 13, 2019
23.1		Consent of Mayer Hoffman McCann P.C.	X				
31.1		Certification of Principal Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X				
31.2		Certification of Principal Financial Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X				
32.1		Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X				
32.2		Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X				
101.INS		XBRL Instance Document	X				
101.SCH		XBRL Taxonomy Extension Schema Document	X				
101.CAL		XBRL Taxonomy Extension Calculation Linkbase Document	X				
101.DEF		XBRL Taxonomy Extension Definition Document	X				
101.LAB		XBRL Taxonomy Extension Label Linkbase Document	X				
101.PRE		XBRL Taxonomy Extension Presentation Linkbase Document	X				

+ Pursuant to Regulation S-K Item 601(b)(2), certain schedules (or similar attachments) to this exhibit have not been filed herewith. A list of omitted schedules (or similar attachments) is included in the agreement. The Company agrees to furnish supplementally a copy of any such schedule (or similar attachment) to the Securities and Exchange Commission upon request; provided, however, that the Company may request confidential treatment of omitted items.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment pursuant to Rule 24b-2 under the Securities Exchange Act of 1934.

# Indicates management contract or compensatory plan or arrangement.

Item 16. Form 10-K Summary.

None

SIGNATURES

Pursuant to the requirements of the Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Date: March 18, 2019

Innovate Biopharmaceuticals, Inc.

By: /s/ Sandeep Laumas
Name: Sandeep Laumas, M.D.
Title: Chief Executive Officer

Signature	Title	Date
/s/ Sandeep Laumas Sandeep Laumas, M.D.	Executive Chairman, Chief Executive Officer and Director (Principal Executive Officer)	March 18, 2019
/s/ Jay P. Madan Jay P. Madan, M.S.	President, Chief Business Officer, Interim Principal Financial Officer, Interim Principal Accounting Officer and Director (Principal Financial Officer and Principal Accounting Officer)	March 18, 2019
/s/ Lorin K. Johnson Lorin K. Johnson, Ph.D.	Director	March 18, 2019
/s/ Anthony E. Maida III Anthony E. Maida III, Ph.D., M.A., M.B.A.	Director	March 18, 2019
/s/ Roy Proujansky Roy Proujansky, M.D.	Director	March 18, 2019
/s/ Saira Ramasastry Saira Ramasastry, M.S., M.Phil.	Director	March 18, 2019

INNOVATE BIOPHARMACEUTICALS, INC.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Innovate Biopharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Innovate Biopharmaceuticals, Inc. (the "Company") as of December 31, 2018 and 2017, and the related statements of operations and comprehensive loss, stockholders' deficit, and cash flows for each of the two years in the period ended December 31, 2018, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 2 to the financial statements, the Company has incurred recurring operating losses and is dependent on additional financing to fund operations. These conditions raise substantial doubt about the Company's ability to continue as a going concern. Management's plans in regard to these matters are described in Note 2 to the financial statements. The financial statements do not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classification of liabilities that may result from the outcome of this uncertainty.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Mayer Hoffman McCann P.C.
Orange County, California
March 18, 2019

We have served as the Company's auditor since 2014.

INNOVATE BIOPHARMACEUTICALS, INC.
BALANCE SHEETS

	December 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 5,728,900	$ 355,563
Restricted deposit	75,000	—
Prepaid expenses and other current assets	504,907	161,844
Deferred offering costs	104,706	159,795
Due from related party	—	75,000
Total current assets	6,413,513	752,202
Property and equipment, net	35,095	40,707
Other assets	5,580	5,580
Total assets	$ 6,454,188	$ 798,489
Liabilities and Stockholders' Deficit		
Current liabilities:		
Accounts payable	$ 3,618,634	$ 2,658,637
Accrued expenses	826,327	1,180,225
Convertible note payable	5,196,667	—
Derivative liability	370,000	—
Convertible promissory notes, net	—	8,329,045
Convertible promissory notes, related party, net	—	244,816
Accrued interest	101,624	560,380
Total liabilities	10,113,252	12,973,103
Commitments and contingencies (Note 11)		
Stockholders' deficit:		
Preferred stock $0.0001 par value as of December 31, 2018, 10,000,000 shares authorized as of December 31, 2018; 0 shares issued and outstanding as of December 31, 2018 and 2017	—	—
Common stock $0.0001 and $0.001 par value as of December 31, 2018 and 2017, respectively, 350,000,000 and 250,000,000 shares authorized as of December 31, 2018 and 2017, respectively; 26,088,820 and 11,888,240 shares issued and outstanding as of December 31, 2018 and 2017, respectively	2,609	11,888
Additional paid-in capital	39,854,297	7,167,189
Accumulated deficit	(43,515,970)	(19,353,691)
Total stockholders' deficit	(3,659,064)	(12,174,614)
Total liabilities and stockholders' deficit	$ 6,454,188	$ 798,489

See accompanying notes to these financial statements.

INNOVATE BIOPHARMACEUTICALS, INC.
STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

	Year Ended December 31,	
	2018	**2017**
Operating expenses:		
Research and development	$ 7,559,077	$ 4,007,911
General and administrative	10,664,991	7,161,612
Total operating expenses	18,224,068	11,169,523
Loss from operations	(18,224,068)	(11,169,523)
Other income (expense):		
Interest income	163,832	—
Interest expense	(6,152,043)	(436,294)
Change in fair value of derivative liability	50,000	—
Total other expense, net	(5,938,211)	(436,294)
Loss before income taxes	(24,162,279)	(11,605,817)
Benefit from (provision for) income taxes	—	—
Net loss	$ (24,162,279)	$ (11,605,817)
Net loss per common share, basic and diluted*	$ (0.98)	$ (0.98)
Weighted-average common shares, basic and diluted*	24,762,151	11,888,240

* Common shares adjusted for the exchange ratio from the reverse recapitalization

See accompanying notes to these financial statements.

INNOVATE BIOPHARMACEUTICALS, INC.
STATEMENTS OF STOCKHOLERS' EQUITY (DEFICIT)

	Common Stock*					
	Shares	Amount	Additional Paid-in Capital	Accumulated Deficit	Stock Subscription Receivable	Total
Balance as of December 31, 2016	11,888,240	$ 11,888	$ 1,148,457	$ (7,747,874)	$ (25)	$ (6,587,554)
Payment of stock subscription receivable	—	—	—	—	25	25
Share-based compensation	—	—	6,018,732	—	—	6,018,732
Net loss	—	—	—	(11,605,817)	—	(11,605,817)
Balance as of December 31, 2017	11,888,240	11,888	7,167,189	(19,353,691)	—	(12,174,614)
Change in par value from $0.001 to $0.0001	—	(10,699)	10,699	—	—	—
Issuance of shares as a result of reverse recapitalization	1,864,808	186	(978,860)	—	—	(978,674)
Issuance of common stock	7,129,207	713	16,181,289	—	—	16,182,002
Warrants issued with common stock	—	—	1,995,000	—	—	1,995,000
Warrants issued to placement agents	—	—	913,000	—	—	913,000
Stock issuance costs	—	—	(2,569,659)	—	—	(2,569,659)
Conversion of convertible debt and accrued interest	4,827,001	483	9,229,336	—	—	9,229,819
Beneficial conversion feature	—	—	3,077,887	—	—	3,077,887
Share-based compensation	—	—	3,805,000	—	—	3,805,000
Exercise of stock options	87,706	9	182,419	—	—	182,428
Exercise of warrants, net of issuance costs	291,858	29	840,997	—		841,026
Net loss	—	—	—	(24,162,279)	—	(24,162,279)
Balance as of December 31, 2018	26,088,820	$ 2,609	$39,854,297	$ (43,515,970)	$ —	$ (3,659,064)

* Common shares adjusted for the exchange ratio from the reverse recapitalization

See accompanying notes to these financial statements.

INNOVATE BIOPHARMACEUTICALS, INC.
STATEMENTS OF CASH FLOWS

	Year Ended December 31,	
	2018	**2017**
Cash flows from operating activities		
Net loss	$ (24,162,279)	$ (11,605,817)
Adjustments to reconcile net loss to net cash used in operating activities:		
Share-based compensation	3,805,000	6,018,732
Accrued interest on convertible promissory notes	280,394	396,769
Amortization of debt discount	2,513,475	39,525
Depreciation	19,555	5,787
Beneficial conversion feature	3,077,887	—
Change in fair value of derivative liability	(50,000)	—
Changes in operating assets and liabilities:		
Prepaid expenses and other assets	(298,724)	(155,339)
Accounts payable	86,412	746,797
Accrued expenses	(441,050)	(543,000)
Net cash used in operating activities	(15,169,330)	(5,096,546)
Cash flows from investing activities		
Purchase of property and equipment	(13,943)	(38,727)
Purchase of restricted deposit	(75,000)	—
Loan payments from related party	75,000	—
Net cash used in investing activities	(13,943)	(38,727)
Cash flows from financing activities		
Borrowings from note payable	3,000,000	—
Payments of note payable issuance costs	(50,000)	—
Borrowings from convertible promissory notes	345,000	5,130,000
Principal payments of convertible promissory notes	(275,000)	—
Proceeds from issuance of common stock and warrants	18,132,661	—
Payment of stock issuance costs	(1,496,862)	—
Payment of deferred offering costs	(209,795)	—
Proceeds from exercise of stock options	182,428	—
Proceeds from exercise of warrants	928,178	—
Payment of stock subscription receivable	—	25
Net cash provided by financing activities	20,556,610	5,130,025
Net increase (decrease) in cash and cash equivalents	5,373,337	(5,248)
Cash and cash equivalents as of beginning of period	355,563	360,811
Cash and cash equivalents as of end of period	$ 5,728,900	$ 355,563
Supplemental disclosure of cash flow information		
Cash paid during the period for interest	$ 280,287	$ —
Supplemental disclosure of noncash financing activities		
Conversion of convertible notes and accrued interest to common stock	$ 9,229,819	$ —
Assumption of liabilities from reverse recapitalization transaction	$ 978,674	$ —
Warrants issued to placement agents	$ 913,000	$ —
Commissions owed and accrued for exercise of warrants	$ 87,152	$ —
Accrued interest converted to convertible note payable	$ 156,667	$ —
Non-cash addition of derivative liability	$ 420,000	$ —
Non-cash addition of deferred offering costs	$ 54,706	$ 159,795
Deferred offering costs reclassified to additional paid-in capital	$ 159,795	$ —

See accompanying notes to these financial statements.

NOTE 1: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Business Description

Innovate Biopharmaceuticals, Inc. (the "Company" or "Innovate") is a clinical-stage biopharmaceutical company developing novel medicines for autoimmune and inflammatory diseases with unmet medical needs. The Company's pipeline includes drug candidates for celiac disease, nonalcoholic steatohepatitis (NASH), alcoholic steatohepatitis (ASH), Crohn's disease and ulcerative colitis.

On January 29, 2018, Monster Digital, Inc. ("Monster") and privately held Innovate Biopharmaceuticals Inc. ("Private Innovate") completed a reverse recapitalization in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated July 3, 2017, as amended (the "Merger Agreement"), by and among Monster, Monster Merger Sub, Inc. ("Merger Sub") and Private Innovate. In connection with the transaction, Private Innovate changed its name to IB Pharmaceuticals Inc. ("IB Pharmaceuticals"). Pursuant to the Merger Agreement, Merger Sub merged with and into IB Pharmaceuticals with IB Pharmaceuticals surviving as the wholly owned subsidiary of Monster (the "Merger"). Immediately following the Merger, Monster changed its name to Innovate Biopharmaceuticals, Inc. ("Innovate"). On March 29, 2018, IB Pharmaceuticals was merged into Innovate and ceased to exist.

Monster, a Delaware corporation (formed in November 2010), and its subsidiary SDJ Technologies, Inc. ("SDJ"), was an importer of high-end memory storage products, flash memory and action sports cameras marketed and sold under the Monster Digital brand name acquired under a long-term licensing agreement with Monster, Inc. In September 2017, Monster incorporated MD Holding Co, Inc. ("MDH"), a Delaware corporation, and transferred all of the businesses and assets of Monster, including all shares of SDJ and those liabilities of Monster not assumed by Innovate pursuant to the Merger to MDH. In January 2018, the name of MDH was changed to NLM Holding Co., Inc.

On January 29, 2018, prior to the Merger, Private Innovate completed an equity financing (the "Equity Issuance"). See Note 3—Merger and Financing.

Basis of Presentation

The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). The Company's financial position, results of operations and cash flows are presented in U.S. Dollars.

Upon the closing of the Merger, the outstanding shares of Private Innovate were exchanged for shares of common stock of Monster at an exchange ratio of one share of Private Innovate common stock to 0.37686604 shares of Monster common stock (the "Exchange Ratio"). All common share amounts and per share amounts have been adjusted to reflect this Exchange Ratio, which was effected upon the Merger.

The Merger has been accounted for as a reverse recapitalization. Prior to the Merger, Monster spun-out all of its pre-merger business assets and liabilities before it acquired Private Innovate. The owners and management of Private Innovate have actual or effective voting and operating control of the combined company. In the Merger transaction, Monster is the accounting acquiree and Private Innovate is the accounting acquirer. A reverse recapitalization is equivalent to the issuance of stock by the private operating company for the net monetary assets of the accounting acquiree accompanied by a recapitalization with accounting similar to that resulting from a reverse acquisition, except that no goodwill or intangible assets are recorded.

Immediately prior to the effective time of the Merger, Monster effected a reverse stock split at a ratio of one new share for every ten shares of its common stock outstanding. In connection with the Merger, 1,864,808 shares of the Company's common stock were transferred to the existing Monster stockholders and the Company assumed approximately $1.0 million in liabilities from Monster for certain transaction costs and tail insurance coverage for its directors and officers, which were recorded as a reduction of additional paid-in capital. In addition, warrants to purchase up to 154,403 shares of the Company's common stock remained outstanding after completion of the Merger. These warrants have a weighted-average exercise price of $55.31 per share and expire in 2021 and 2022.

The accompanying financial statements and related notes reflect the historical results of Private Innovate prior to the Merger and of the combined company following the Merger, and do not include the historical results of Monster prior to the completion of the Merger. These financial statements and related notes should be read in conjunction with Monster's audited consolidated financial statements and related notes thereto for the year ended December 31, 2017, included in the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed with the SEC on March 14, 2018, as amended.

Shelf Registration Filing

On March 15, 2018, the Company filed a shelf registration statement that was declared effective on July 13, 2018. Under the shelf registration statement, the Company may, from time to time, sell its common stock in one or more offerings up to an aggregate dollar amount of $175 million (of which up to an aggregate of $40 million may be sold in an "at-the-market" offering as defined in Rule 415 of the Securities Act). In addition, the selling stockholders included in the shelf registration statement may from time to time sell up to an aggregate amount of 13,990,403 shares of the Company's common stock (including up to 2,051,771 shares issuable upon exercise of warrants) in one or more offerings.

Business Risks

The Company faces risks associated with biopharmaceutical companies whose products are in the early stages of development. These risks include, among others, the Company's need for additional financing to achieve key development milestones, the need to defend intellectual property rights and the dependence on key members of management.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and disclosures made in the accompanying notes to the financial statements. Areas of the financial statements where estimates may have the most significant effect include accrued expenses, share-based compensation, valuation of the derivative liability, valuation allowance for income tax assets and management's assessment of the Company's ability to continue as a going concern. Changes in the facts or circumstances underlying these estimates could result in material changes and actual results could differ from these estimates.

Concentration of Credit Risk

Financial instruments which potentially subject the Company to concentration of credit risk consists of cash and cash equivalents. While cash held by financial institutions may at times exceed federally insured limits, management believes that no material credit or market risk exposure exists due to the high quality of the financial institutions. The Company has not experienced any losses on such accounts.

Cash and Cash Equivalents

The Company considers all highly liquid investments with a maturity of three months or less at the date of purchase to be cash and cash equivalents. Cash equivalents are stated at cost and consist primarily of money market accounts.

Restricted Deposit

The Company maintains a certificate of deposit ("CD") with a bank, which matures on October 17, 2019 and pays interest at a rate of 2.39% per annum. The CD serves as collateral for the Company's credit cards.

Property and Equipment

The Company records property and equipment at cost. Improvements and betterments that add new functionality or extend the useful life of the asset are capitalized, while general repairs and maintenance are expensed as incurred. The Company depreciates its property and equipment over the estimated useful lives of the assets, typically three years, using the straight-line method. Leasehold improvements are amortized over the lesser of their estimated useful lives or the lives of the underlying leases, whichever is shorter. Depreciation and amortization expense for property and equipment and leasehold improvements has been included in general and administrative expenses in the accompanying statements of operations and comprehensive loss.

Accrued Expenses

The Company incurs periodic expenses such as research and development, licensing fees, salaries and benefits and professional fees. The Company is required to estimate its expenses resulting from obligations under contracts with clinical research organizations, vendors and consulting agreements that have been incurred by the Company prior to them being invoiced. This process involves reviewing quotations and contracts, identifying services that have been performed on the Company's behalf and estimating the level of service performed and the associated cost incurred for the service when the Company has not yet been invoiced or otherwise notified of the actual cost. The majority of the Company's service providers invoice monthly in arrears for services performed or when contractual milestones are met. The Company estimates accrued expenses as of each balance sheet date based on facts and circumstances known at that time.

Accrued expenses consisted of the following:

	December 31,	
	2018	**2017**
Accrued compensation and benefits	$ 697,334	$ 1,065,225
Other accrued expenses	128,993	115,000
Total	$ 826,327	$ 1,180,225

Derivative Liability

The Company accounts for derivative instruments in accordance with Accounting Standards Codification ("ASC") 815, *Derivative and Hedging,* which establishes accounting and reporting standards for derivative instruments, including certain derivative instruments embedded in other financial instruments or contracts and requires recognition of all derivatives on the balance sheet at fair value. The Company's derivative financial instrument consists of an embedded option in the Company's convertible debt. The embedded derivative includes provisions that provide the noteholder with certain conversion and put rights at various conversion or redemption values as well as certain call options for the Company. See Note 6—Debt for further details.

Research and Development

Research and development expenses consist of costs incurred to further the Company's research and development activities and include salaries and related employee benefits, manufacturing of pharmaceutical active ingredients and drug products, costs associated with clinical trials, nonclinical activities, regulatory activities, research-related overhead expenses and fees paid to expert consultants, external service providers and contract research organizations which conduct certain research and development activities on behalf of the Company. Costs incurred in the research and development of products are charged to research and development expense as incurred.

Costs for preclinical studies and clinical trial activities are recognized based on an evaluation of the vendors' progress towards completion of specific tasks, using data such as patient enrollment, clinical site activations or information provided by vendors regarding their actual costs incurred. Payments for these activities are based on the terms of individual contracts and payment timing may differ significantly from the period in which the services were performed. The Company determines accrual estimates through reports from and discussions with applicable personnel and outside service providers as to the progress or state of completion of trials, or the services completed. The estimates of accrued expenses as of each balance sheet date are based on the facts and circumstances known at the time. Although the Company does not expect its estimates to be materially different from amounts incurred, the Company's estimates and assumptions for clinical trial costs could differ significantly from actual costs incurred, which could result in increases or decreases in research and development expenses in future periods when actual results are known.

Nonrefundable advance payments for goods and services that will be used in future research and development activities are expensed when the goods have been received or when the activity is performed, rather than when payment is made.

Share-Based Compensation

The Company recognizes share-based compensation expense for grants of stock options to employees and non-employee members of the Company's board of directors based on the grant-date fair value of those awards using the Black-Scholes option-

pricing model. Share-based compensation expense is generally recognized on a straight-line basis over the requisite service period for awards expected to vest.

Share-based compensation expense related to stock options granted to non-employees, other than non-employee directors, is adjusted each reporting period for changes in the fair value of the Company's stock until the measurement date. The measurement date is generally considered to be the date when all services have been rendered or the date that options are fully vested. Share-based compensation expense for both employees and non-employees includes an estimate, which is made at the time of grant, of the number of awards that are expected to be forfeited. This estimate is revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Under the Black-Scholes option-pricing model, fair value is calculated based on assumptions with respect to:

- *Expected dividend yield.* The expected dividend yield is assumed to be zero as the Company has never paid dividends and has no current plans to pay any dividends on the Company's common stock.
- *Expected stock price volatility.* Due to limited trading history as a public company, the expected volatility is derived from the average historical volatilities of publicly traded companies within the Company's industry that the Company considers to be comparable to the Company's business over a period approximately equal to the expected term. In evaluating comparable companies, the Company considers factors such as industry, stage of life cycle, financial leverage, size and risk profile.
- *Risk-free interest rate.* The risk-free interest rate is based on the U.S. Treasury yield in effect at the time of grant for zero coupon U.S. Treasury notes with maturities approximately equal to the expected term.
- *Expected term.* The expected term represents the period that the stock-based awards are expected to be outstanding. Due to limited history of stock option exercises, the Company estimates the expected term of employee stock options based on the simplified method, which calculates the expected term as the average of the time-to-vesting and the contractual life of the options. The expected term for non-employees is the remaining contractual life of the option.

Share-based Compensation Adjustment to Prior Period Results

In preparing the Company's financial statements for the year ended December 31, 2018, the Company determined that an immaterial error was made in the amount of share-based compensation expense recorded in the Company's financial statements for the three months ended March 31, 2018. The error resulted in an overstatement of share-based compensation expense of approximately $1.2 million for the first quarter of 2018. In addition, share-based compensation expense was overstated for this same amount for the six months and nine months ended June 30, 2018 and September 30, 2018, respectively. The error did not impact the Company's financial statements for the three months ended June 30, 2018 or the three months ended September 30, 2018. The Company assessed the materiality of this misstatement in the 2018 interim period financial statements in accordance with the Securities and Exchange Commission ("SEC") Staff Accounting Bulletin ("SAB") No. 99, Materiality, codified in Accounting Standards Codification No. 250, Presentation of Financial Statements, and concluded that the misstatement was not material to any interim period. The Company has corrected the financial statements for the year ended December 31, 2018. There was no impact to stockholders' deficit or cash flows.

Additionally, the Company will adjust its previously filed financial statements for the impact on the first, second and third quarter 2018 information when it is presented in future Exchange Act reports.

Reconciliation Between Amounts Previously Reported and Corrected Amounts

The impact of the share-based compensation correction on the financial statements line items is presented below (unaudited):

	Three Months Ended March 31, 2018			Six Months Ended June 30, 2018			Nine Months Ended September 30, 2018		
	As Originally Reported	Adjustment	As Corrected	As Originally Reported	Adjustment	As Corrected	As Originally Reported	Adjustment	As Corrected
General and administrative expense	$ 6,358,004	$ (1,196,000)	$ 5,162,004	$ 7,601,225	$ (1,196,000)	$ 6,405,225	$ 5,815,580	$ (1,196,000)	$ 4,619,580
Loss from operations	$(12,524,617)	$ 1,196,000	$(11,328,617)	$(15,900,688)	$ 1,196,000	$(14,704,688)	$(15,681,035)	$ 1,196,000	$(14,485,035)
Net loss and comprehensive loss	$(16,155,744)	$ 1,196,000	$(14,959,744)	$(20,371,296)	$ 1,196,000	$(19,175,296)	$(21,147,226)	$ 1,196,000	$(19,951,226)
Net earnings (loss) per share, basic and diluted	$ (0.76)	$ 0.06	$ (0.70)	$ (0.87)	$ 0.05	$ (0.82)	$ (0.87)	$ 0.05	$ (0.82)

	As of March 31, 2018			As of June 30, 2018			As of September 30, 2018		
	As Originally Reported	Adjustment	As Corrected	As Originally Reported	Adjustment	As Corrected	As Originally Reported	Adjustment	As Corrected
Additional paid-in capital	$ 43,353,122	$ (1,196,000)	$ 42,157,122	$ 43,181,593	$ (1,196,000)	$ 41,985,593	$ 40,879,119	$ (1,196,000)	$ 39,683,119
Accumulated deficit	$(35,509,435)	$ 1,196,000	$(34,313,435)	$(39,724,987)	$ 1,196,000	$(38,528,987)	$(40,500,917)	$ 1,196,000	$(39,304,917)

Income Taxes

The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial statements and the tax basis of assets and liabilities using the enacted tax rates in effect for the year in which the differences are expected to reverse.

Net deferred tax assets are recognized to the extent the Company's management believes these assets will more likely than not be realized. In making such determination, management considers all positive and negative evidence, including reversals of existing temporary differences, projected future taxable income, tax planning strategies and recent financial operations. A valuation allowance is recorded to reduce the deferred tax assets reported if, based on the weight of the evidence, it is more likely than not that some portion or all of the deferred tax assets will not be realized. Management periodically reviews its deferred tax assets for recoverability and its estimates and judgments in assessing the need for a valuation allowance.

The Company recognizes a tax benefit from uncertain positions when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits of the position. Income tax positions must meet a more-likely-than-not recognition threshold to be recognized.

Fair Value of Financial Instruments

Fair value is defined as the price that would be received for sale of an asset or paid for transfer of a liability, in an orderly transaction between market participants at the measurement date. U.S. GAAP establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). Financial instruments recorded in the accompanying consolidated balance sheets are categorized based on the inputs to valuation techniques as follows:

- Level 1 — defined as observable inputs based on unadjusted quoted prices for identical instruments in active markets;
- Level 2 — defined as inputs other than Level 1 that are either directly or indirectly observable in the marketplace for identical or similar instruments in markets that are not active; and
- Level 3 — defined as unobservable inputs in which little or no market data exists where valuations are derived from techniques in which one or more significant inputs are unobservable.

The fair value of the embedded derivative issued in connection with the convertible debt financing was determined by using a Monte Carlo simulation technique ("MCS") to value the embedded derivative. As part of the MCS valuation a discounted cash flow ("DCF") model is used to value the debt on a stand-alone basis and determine the discount rate to utilize in both the DCF and MCS models. The significant estimates used in the DCF model include the time to maturity of the convertible debt and calculated discount rate, which includes an estimate of the Company's specific risk premium. The discount rate utilized was 13.1% and 13.6% as of October 4, 2018 and December 31, 2018, respectively. The MCS methodology calculates the theoretical value of an option based on certain parameters, including: (i) the threshold of exercising the option, (ii) the price of the underlying security, (iii) the time to expiration, (iv) the expected volatility of the underlying security, (v) the risk-free rate and (vi) the number of paths. The volatility, risk-free interest rate and time to expiration utilized as of October 4, 2018 were 98.2%, 2.9% and 24 months, respectively. The volatility, risk-free interest rate and time to expiration utilized as of December 31, 2018 were 105.6%, 2.5% and 21 months, respectively.

This valuation technique involves management's estimates and judgment based on unobservable inputs and is classified in Level 3. The following table summarizes the changes in fair value of the derivative liability classified in Level 3. Gains and losses reported in this table include changes in fair value that are attributable to unobservable inputs.

	Year Ended December 31, 2018
Beginning balance as of December 31, 2017	$ —
Addition to derivative liability for embedded derivative issued in connection with convertible debt	420,000
Change in fair value of derivative liability	(50,000)
Ending balance as of December 31, 2018	$ 370,000
The amount of total gain (losses) for the period included in earnings attributable to the change in unrealized gains (losses) relating to the derivative liability still held at the reporting date	$ 50,000

The change in derivative liability of $50,000 for the year ended December 31, 2018 is included in other expense in the statements of operations and comprehensive loss.

ASC 820, *Fair Value Measurement and Disclosures* requires all entities to disclose the fair value of financial instruments, both assets and liabilities, for which it is practicable to estimate fair value. As of December 31, 2018 and 2017, the recorded values of cash and cash equivalents, restricted deposit, accounts payable, accrued expenses and convertible promissory notes approximate their fair values due to the short-term nature of the instruments.

Deferred Offering Costs

Deferred offering costs consist principally of legal, accounting and underwriters' fees related to offerings or the Company's shelf registration. Offering costs incurred prior to an offering are initially capitalized and then subsequently reclassified to additional paid-in capital upon completion of the offering. Deferred offering costs associated with the shelf registration will be charged to additional paid-in capital on a pro-rata basis in the event the Company completes an offering under the Shelf Registration. Offering costs incurred in relation to the Equity Issuance were charged to additional paid-in capital upon completion of the offering on January 29, 2018.

Patent Costs

Costs associated with the submission of patent applications are expensed as incurred given the uncertainty of the future economic benefits of the patents. Patent and patent related legal and administrative costs included in general and administrative expenses were approximately $513,000 and $409,000 for the years ended December 31, 2018 and 2017, respectively.

Net Loss Per Share

The Company calculates net loss per share as a measurement of the Company's performance while giving effect to all potentially dilutive shares that were outstanding during the reporting period. Because the Company had a net loss for all periods presented, the inclusion of common stock options or other similar instruments would be anti-dilutive. Therefore, the weighted average shares outstanding used to calculate both basic and diluted net loss per share are the same. For the years ended December 31, 2018 and 2017, 9.0 million and 6.8 million potentially dilutive securities related to warrants and stock options issued and outstanding have been excluded from the computation of diluted weighted average shares outstanding because the effect would be anti-dilutive. The potentially dilutive securities consisted of the following:

	Year Ended December 31,	
	2018	**2017**
Options outstanding under the Private Innovate Plan	6,340,871	6,843,296
Options and warrants outstanding under the Amended Omnibus Plan	776,131	1,683
Warrants issued at a weighted-average exercise price of $55.31	154,403	—
Warrants issued at an exercise price of $2.54	349,555	—
Warrants issued at an exercise price of $3.18	1,410,358	—
Total	9,031,318	6,844,979

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and circumstances from non-owner sources. The Company is required to record all components of comprehensive loss in the financial statements in the period in which they are recognized. Net loss and other comprehensive loss, including unrealized gains and losses on investments are reported, net of their related tax effect, to arrive at a comprehensive loss. For the years ended December 31, 2018 and 2017, comprehensive loss was equal to net loss.

Segments

Operating segments are defined as components of an enterprise engaging in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and in assessing performance. The Company operates and manages its business as one operating segment and all of the Company's operations are in North America.

Recently Issued Accounting Standards

Accounting Pronouncements Adopted

In August 2016, the Financial Accounting Standards Board ("FASB") issued ASU 2016-15, *Statement of Cash Flows (Topic 230) - Classification of Certain Cash Receipts and Cash Payments.* The provisions of ASU 2016-15 address eight specific cash flow issues and how those certain cash receipts and cash payments are presented and classified in the statement of cash flows. The Company adopted this standard effective January 1, 2018, and the adoption of this standard did not have a material impact on the Company's financial statements.

In May 2017, the FASB issued ASU 2017-09, *Compensation-Stock Compensation (Topic 718): Scope of Modification Accounting,* which clarifies when to account for a change to the terms or conditions of a share-based payment award as a modification. Under this new guidance, entities will apply modification accounting if the fair value, vesting conditions or classification of the award (as equity or liability) changes as a result of a change in terms or conditions. The Company adopted this standard effective January 1, 2018, and the adoption of this standard did not have a material impact on the Company's financial statements.

Accounting Pronouncements Being Evaluated

In February 2016, the FASB issued ASU 2016-02, *Leases (Topic 842)*. This standard revises the principles for the recognition, measurement, presentation and disclosure of leases for both lessees and lessors. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than 12 months regardless of their classification. Leases with a term of 12 months or less may be accounted for in a similar manner as leases under existing guidance for operating leases. ASU 2016-02 supersedes the previous lease standard, *Leases (Topic 840)*. In 2018 and 2019, the FASB has issued and incorporated several additional ASUs to provide clarifying guidance associated with the application of certain principles within Topic 842. These ASUs are effective for public companies with annual periods and interim periods within those annual periods beginning after December 15, 2018. These standards are effective for the Company as of January 1, 2019. Management has conducted an initial assessment of the impact that the implementation of this standard will have on the Company's financial statements and does not expect the standard to have a material impact.

In June 2018, the FASB issued ASU 2018-07, *Compensation-Stock Compensation (Topic 718): Improvements to Non-employee Share-Based Payment Accounting*. ASU 2018-07 expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from non-employees. The standard is effective for the Company as of January 1, 2019, with early adoption permitted. Management has conducted the initial assessment of the impact that the implementation of this standard will have on the Company's financial statements and does not expect the standard to have a material impact. Beginning in the first quarter of 2019, the Company changed its expense recognition for share-based payments to non-employees to an amount determined at the grant or modification date instead of a variable amount to be re-measured each reporting period.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework - Changes to the Disclosure Requirements for Fair Value Measurement.* This standard no longer requires public companies to disclose transfers between Level 1 and Level 2 of the fair value hierarchy and adds additional disclosure requirements about the range and weighted average used to develop significant unobservable inputs for Level 3 fair value measurements. The guidance is effective for fiscal years beginning after December 15, 2019, and for interim periods within those fiscal years. Early adoption is permitted and the Company is currently evaluating the impact this standard will have on the Company's financial statements.

NOTE 2: LIQUIDITY AND GOING CONCERN

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. The Company has concluded that the prevailing conditions and ongoing liquidity risks faced by the Company raise substantial doubt about the Company's ability to continue as a going concern for at least one year following the date these financial statements are issued. Based on the Company's limited operating history and recurring operating losses, the Company will need substantial additional funding to support its planned and future operating activities, including progression of research and development programs. Management's plans with regard to these matters include entering into strategic partnerships or licensing arrangements

or seeking additional debt or equity financing arrangements or a combination of these activities. There can be no assurance that the Company will be able to obtain additional capital on terms acceptable to the Company, on a timely basis or at all. The failure to obtain sufficient additional funding could adversely affect the Company's ability to achieve its business objectives and product development timelines and could have a material adverse effect on the Company's results of operations. The accompanying financial statements do not include any adjustments that might be necessary should the Company be unable to continue as a going concern.

NOTE 3: MERGER AND FINANCING

As noted above, on January 29, 2018, Private Innovate and Monster completed the Merger in accordance with the terms of the Merger Agreement. Pursuant to the Merger Agreement, Merger Sub merged with and into IB Pharmaceuticals, with IB Pharmaceuticals surviving as the wholly owned subsidiary of Monster. Immediately following the Merger, Monster changed its name to Innovate Biopharmaceuticals, Inc. On March 29, 2018, IB Pharmaceuticals was merged into Innovate and ceased to exist.

Immediately prior to the closing of the Merger, accredited investors purchased shares of common stock of Private Innovate in a private placement for gross proceeds of approximately $18.1 million, or $16.5 million, net of approximately $1.6 million in placement agent fees and expenses (the "Equity Issuance"). Additionally, Private Innovate issued five-year warrants to each cash purchaser of common stock, or an aggregate of approximately 1.4 million warrants, with an exercise price of $3.18 after giving effect to the Exchange Ratio. The Company calculated the fair value of the warrants issued utilizing the Black-Scholes option pricing model with the following assumptions: expected dividend yield of 0.0%, expected stock price volatility of 84.8%, risk free rate of 2.5% and term of 5.0 years. The proceeds were allocated between common stock and warrants utilizing the relative fair value method with the allocated warrant value of approximately $2.0 million recorded as additional paid-in capital.

Private Innovate also issued 349,555 five-year warrants with an exercise price of $2.54 and 279,862 five-year warrants with an exercise price of $3.18 (after giving effect to the Exchange Ratio) to the respective placement agents and their affiliates. The Company calculated the fair value of the warrants issued utilizing the Black-Scholes option pricing model with the following assumptions: expected dividend yield of 0.0%, expected stock price volatility of 84.8%, risk free rate of 2.5% and term of 5.0 years. The total value for these warrants approximated $913,000 and was recorded as stock issuance costs and additional paid-in capital.

Concurrently with the Equity Issuance, convertible promissory notes issued by Private Innovate in the aggregate principal amount of approximately $8.6 million plus accrued interest of $582,000 were converted into shares of Private Innovate common stock at a price per share of $0.72, prior to the Exchange Ratio (the "Conversion"), which reflected a 25% discount relative to the shares issued pursuant to the Equity Issuance (the "Conversion Discount"). The Conversion Discount represented a beneficial conversion feature of approximately $3.1 million which was recorded as a charge to interest expense and a credit to additional paid-in capital.

NOTE 4: PROPERTY AND EQUIPMENT

Property and equipment consisted of the following as of December 31, 2018 and 2017:

	December 31,	
	2018	2017
Furniture and fixtures	$ 11,552	$ 9,382
Computer equipment	22,245	12,971
Leasehold improvements	27,446	24,947
Property and equipment, gross	$ 61,243	$ 47,300
Less: Accumulated depreciation	(26,148)	(6,593)
Property and equipment, net	$ 35,095	$ 40,707

Depreciation expense for property and equipment was approximately $20,000 and $6,000 for the years ended December 31, 2018 and 2017, respectively.

NOTE 5: RELATED PARTY TRANSACTIONS

As of December 31, 2017, there was approximately $195,000 of convertible promissory notes and approximately $25,000 of accrued interest owed to certain executives of the Company. The notes and accrued interest were converted into shares of the Company's common stock in January 2018 for a total of 308,021 shares.

As of December 31, 2017, there was $75,000 included in due from related party for a note receivable owed to the Company that was repaid in full in February 2018. In addition, certain relatives of the Company's former chief executive officer held convertible promissory notes totaling approximately $50,000 as of December 31, 2017. These convertible promissory notes were converted into shares of the Company's common stock in January 2018.

The Company obtains legal services from a law firm that owns a minority portion of the Company's common stock. During the years ended December 31, 2018 and 2017, the Company incurred expenses with this law firm of approximately $21,000 and $143,000, respectively. As of December 31, 2018 and 2017, approximately $1,000 and $143,000, respectively, was owed to this law firm and included in accounts payable on the accompanying balance sheets.

NOTE 6: DEBT

The Company's debt consisted of the following as of December 31:

	December 31,	
	2018	2017
Senior convertible note	$ 5,196,667	$ —
Convertible promissory notes	—	8,331,937
Convertible promissory notes, related party	—	245,399
Less debt discount	—	(3,475)
Total	$ 5,196,667	$ 8,573,861

Senior Convertible Note ("New Note")

On January 29, 2018, the Company entered into a Note Purchase Agreement and Senior Note Payable (the "Note") with a lender. The principal amount of the Note was $4.8 million ("Original Principal"). The Note was issued at a discount of $1.8 million and net of $20,000 for financing costs, for total proceeds of $3.0 million. The discount and additional repayment premium were amortized to interest expense using the effective interest method through the scheduled maturity date of September 30, 2018 ("Maturity Date"). Interest on the Note accrued from January 29, 2018, at a rate of 12.5% per annum and quarterly payments of interest only were due beginning on March 30, 2018 and compounded quarterly. The repayment amount was to be 105% of the Original Principal plus any accrued and unpaid interest. The Company entered into a Waiver Agreement with the noteholder that extended the Maturity Date until October 4, 2018. On October 4, 2018, the Company entered into an Amendment and Exchange Agreement ("Exchange Agreement") with the noteholder exchanging the Note for a new Senior Convertible Note (the "New Note").

The principal amount of the New Note is $5.2 million, and bears interest at a rate of eight percent (8%) per annum payable quarterly in cash, maturing on October 4, 2020. The New Note contains certain redemption features, conversion options, restrictions on specific transactions, non-financial covenants and penalties to the Company in the case of an event of default, as defined in the New Note. If an event of default occurs, the noteholder may require the Company to redeem all or any portion of the New Note (including all accrued and unpaid interest thereon), in cash, at a price equal to the greater of (i) up to 125% of the amount being redeemed, depending on the nature of the default, or (ii) the intrinsic value of the shares of Common Stock then issuable upon conversion of the New Note. The interest rate shall automatically increase if there is an event of default to 18% per annum during the default period. The Company evaluated the Exchange Agreement and the New Note and determined that the amendment to the Note constituted an extinguishment of debt, in accordance with authoritative guidance. The Company

determined that there was no difference between the reacquisition price of the new debt and the net carrying amount of the extinguished debt and thus there was no gain or loss from the extinguishment. The Company incurred $30,000 of legal fees associated with the New Note, which were recorded as debt issuance costs and are included in the amortization of debt discount disclosed below.

All amounts due under the New Note are convertible at any time, in whole or in part, at the option of the noteholder into shares of the Company's common stock at a fixed conversion price equal to $8.02 (the "Conversion Price"), with such Conversion Price adjusted downward to the price of any future issuances of the Company's common stock. This Conversion Price is also subject to adjustment for stock splits, combinations or similar events. In addition, all amounts due under the New Note are alternatively convertible at any time, in whole or in part, at the option of the noteholder, into shares of the Company's common stock at an alternate conversion price equal to the greater of (a) $3.08, (the "Floor Price") or (b) the lower of (I) the Conversion Price or (II) 93% of the volume weighted average price (the "VWAP") of the Company's common stock for the 10 days preceding the conversion, provided, that if the Company defaults then the noteholder is entitled to convert the New Note subject to an event of default redemption, in whole or in part, at the noteholder's option, at the value of such portion of the New Note subject to a potential event of default redemption (i.e., one hundred twenty percent (120%) of the amount then outstanding under the New Note).

If the VWAP of the Company's common stock is greater than $10.00 for ten consecutive days, subject to a 15-trading day written notice to the noteholder immediately thereafter and the satisfaction of certain equity conditions, the Company may, at its option, require the conversion, in whole or in part, of the New Note.

At any time the VWAP of the Company's common stock is greater than the Floor Price for ten consecutive days, subject to a 25 trading day written notice to the noteholder immediately thereafter and the satisfaction of certain equity conditions, the Company may, at its option, redeem all, but not less than all, of the New Note (including all accrued and unpaid interest thereon) or portion of the New Note still outstanding, in cash, at a price equal to 120% of the amount being redeemed.

In the event of transactions involving a change of control, the noteholder will have the right to require the Company to redeem all or any portion of the New Note it holds (including all accrued and unpaid interest thereon) at a price equal to the greater of 120% of the amount of the New Note being redeemed and the intrinsic value of the shares of the Company's common stock then issuable upon conversion of the portion of the New Note being redeemed.

If the VWAP of the Company's common stock is less than the Floor Price, unless the Company lowers the Floor Price, for ten consecutive days, the noteholder may, at any time at its option, require the Company to redeem all or any portion of the New Note (including all accrued and unpaid interest thereon), in cash, at a price equal to 100% of the amount being redeemed.

On January 7, 2019, the Company entered into an Option to Purchase Senior Convertible Note ("Option Agreement") with the noteholder. Immediately prior to entering into the Option Agreement, the noteholder issued a redemption notice to the Company requiring the Company to repay the noteholder $1,049,167 of principal and $1,399 of accrued interest. The principal balance of the New Note was reduced to $4,147,500 as a result of this repayment. The Company paid the noteholder $250,000 in consideration for the noteholder entering into the Option Agreement with the Company. The Option Agreement provides the Company with the ability to repay (purchase) the outstanding principal and accrued interest of the New Note any time from January 7, 2019 until March 31, 2019 ("Option Period"). The purchase amount of the New Note under the terms of the Option agreement is $5,196,667 (as reduced proportionally for any principal converted under the New Note during the Option Period), plus any accrued interest on such amount of 8% per annum to the date of exercise.

The Option Agreement also restricts the noteholder's ability to exercise the original redemption rights under the New Note during the Option Period. The noteholder may exercise its conversion rights under the Option Period but the noteholder is unable to require the Company to redeem the New Note in cash as a result of the VWAP of the Company's common stock being less than the Floor Price for ten consecutive days. The noteholder is able to force redemption under certain change of control, bankruptcy or other similar transactions as defined in the New Note and Exchange Agreement.

The various conversion and redemption features contained in the New Note are embedded derivative instruments, which were recorded as a debt discount and derivative liability at their estimated fair value of $420,000. During 2018, the VWAP of the Company's common stock was lower than the Floor price for more than ten consecutive days. As such, the noteholder had the right to require the Company to redeem the New Note prior to December 31, 2018, at its option. Therefore, the Company has amortized the entire debt discount to interest expense through the triggering of the redemption option, which occurred in 2018.

Amortization of the debt discount recorded as interest expense for the Note and New Note totaled approximately $2,510,000 for the year ended December 31, 2018.

Based on the conversion features, redemption features and subjective acceleration clauses contained in the New Note, the Company has recorded the New Note as a short-term obligation as of December 31, 2018. The Company is currently in compliance with the covenants of the New Note.

Convertible Promissory Notes

As of January 1, 2017, the Company had issued convertible promissory notes to investors and related parties totaling $3.4 million (the "2016 Notes"). The 2016 Notes bore interest at a rate of seven percent per annum with a maturity date of January 22, 2018. The 2016 Notes convert at 75% of the price paid per share upon a certain financing amount. The 2016 Notes included a debt discount for a modification of the embedded conversion feature of those notes. The debt discount was amortized to interest expense using the effective interest method over the term of the 2016 Notes through their maturity date of January 22, 2018. During 2017, the Company issued $2.5 million of additional 2016 Notes.

During 2017, the Company issued new convertible promissory notes (the "2017 Notes") to investors totaling $2.7 million. The 2017 Notes bore interest at a rate of seven percent per annum with a maturity date of June 30, 2018. The 2017 Notes convert at 75% of the price paid per share upon a certain financing amount.

During 2018, preceding the Equity Issuance, the Company issued additional 2016 Notes in the aggregate amount of $345,000 to investors and repaid certain investors $275,000 in outstanding principal and approximately $26,000 in accrued interest. The 2016 Notes and 2017 Notes and accrued interest were converted into shares of common stock as part of the Equity Issuance (see Note 3—Merger and Financing).

The amortization of debt discount recorded as interest expense for the convertible promissory notes totaled approximately $3,000 and $40,000 for the years ended December 31, 2018 and 2017, respectively.

NOTE 7: LICENSE AGREEMENTS

During 2016, the Company entered into a license agreement (the "Alba License") with Alba Therapeutics Corporation ("Alba") to obtain the rights to certain intellectual property relating to larazotide acetate and related compounds. The Company's initial area of focus for these assets relates to the treatment of celiac disease. These assets are now referred to as INN-202 by the Company.

Upon execution of the Alba License, the Company paid Alba a non-refundable license fee of $0.5 million. In addition, the Company is required to make milestone payments to Alba upon the achievement of certain clinical and regulatory milestones totaling up to $1.5 million and payments upon regulatory approval and commercial sales of a licensed product totaling up to $150 million, which is based on sales ranging from $100 million to $1.5 billion.

Upon the Company paying Alba $2.5 million for the first commercial sale of a licensed product, the Alba License becomes perpetual and irrevocable. Upon the achievement of net sales in a year exceeding $1.5 billion, the Alba License also becomes free of milestone fees. The Alba License provides Alba with certain termination rights, including failure of the Company to use Commercially Reasonable Efforts to develop the licensed products.

During 2013, the Company entered into an exclusive license agreement with Seachaid Pharmaceuticals, Inc. (the "Seachaid Agreement") to further develop and commercialize the licensed product, the compound known as APAZA. This product is now referred to as INN-108 by the Company. The agreement shall continue in effect on a country-by-country basis, unless terminated sooner in accordance with the termination provisions of the agreement, until the expiration of the royalty term for such product and such country. The royalty term for each such product and such country shall continue until the earlier of the expiration of certain patent rights (as defined in the agreement) or the date that the sales for one or more generic equivalents makes up a certain percentage of sales in an applicable country during a calendar year.

The Company was required to make an initial, non-refundable payment under the Seachaid Agreement in the amount of $0.2 million. The agreement also calls for milestone payments totaling up to $6.0 million to be paid when certain clinical and regulatory milestones are met. There are also commercialization milestone payments ranging from $1.0 million to $2.5 million depending on net sales of the products in a single calendar year, followed by royalty payments in the single digits based on net product sales.

During 2014, the Company entered into an Asset Purchase Agreement with Repligen Corporation ("Repligen") to acquire Repligen's RG-1068 program for the development of Secretin for the Pancreatic Imaging Market and Magnetic Resonance Cholangiopancreatography. This program is now referred to as INN-329 by the Company. As consideration for the Asset Purchase Agreement, the Company agreed to make a non-refundable cash payment on the date of the agreement and future royalty payments consisting of a percentage between five and fifteen of annual net sales, with the royalty payment percentage increasing as annual net sales increase. The royalty payments are made on a product-by-product and country-by-country basis and the obligation to make the payments expires with respect to each country upon the later of (i) the expiration of regulatory exclusivity for the product in that country or (ii) 10 years after the first commercial sale in that country. The royalty amount is subject to reduction in certain situations, such as the entry of generic competition in the market.

There were no milestone or royalty fees incurred during the years ended December 31, 2018 and 2017.

NOTE 8: STOCKHOLDERS' EQUITY

In conjunction with the Merger in January 2018, the Company further amended its amended certificate of incorporation and restated its bylaws. The amendment provides for 360,000,000 authorized shares of capital stock, par value 0.0001 per share, of which 350,000,000 shares are designated as common stock and 10,000,000 shares are designated as preferred stock.

Prior to the Merger, the Company was authorized to issue 250,000,000 shares of capital stock, which were designated as $0.001 par value common stock.

Preferred Stock

The Company's amended and restated certificate of incorporation authorizes the Company's board of directors to issue preferred stock in one or more classes or one or more series within any class from time to time. Voting powers, designations, preferences, qualifications, limitations, restrictions or other rights will be determined by the board of directors at that time. There were no shares of preferred stock issued and outstanding as of December 31, 2018 and 2017.

Common Stock

The holders of the Company's common stock (i) have equal ratable rights to dividends from funds legally available, therefore, when, as and if declared by the Company's board of directors; (ii) are entitled to share in all the Company's assets available for distribution to holders of common stock upon liquidation, dissolution or winding up of the Company's affairs; (iii) do not have preemptive, subscription or conversion rights and there are no redemption or sinking fund provisions or rights; and (iv) are entitled to one non-cumulative vote per share on all matters on which stockholders may vote.

The Company has 350,000,000 shares of authorized $0.0001 par value common stock. There were 26,088,820 and 11,888,240 shares of common stock outstanding as of December 31, 2018 and 2017, respectively. The Company had reserved shares of common stock for future issuance as follows:

	December 31,	
	2018	2017
Outstanding stock options	7,117,002	6,844,979
Warrants to purchase common stock	1,914,316	—
Shares issuable upon conversion of convertible debt	1,720,224	—
For possible future issuance under Private Innovate Plan	—	694,025
For possible future issuance under Amended Omnibus Plan	2,230,057	4,505
Total common shares reserved for future issuance	12,981,599	7,543,509

On October 26, 2018, the Company entered into a common stock sales agreement with H.C. Wainwright & Co., LLC and Ladenburg Thalmann & Co. Inc. and filed a prospectus with the Securities and Exchange Commission relating to such offering. The Company previously filed a Form S-3 that became effective July 13, 2018 that included the registration of $40 million of its shares of common stock in connection with a potential "at-the-market" ("ATM") offering. Pursuant to the sales agreement, the Company may issue and sell shares having an aggregate gross sales price of up to $40 million. The Company will pay the sales agents commissions of 3.0% of the gross sales price per share sold. As of December 31, 2018, the Company had sold 17,576 shares under the ATM for total net proceeds of approximately $43,000. The proceeds were received in January 2019 and were included in prepaids and other assets as of December 31, 2018.

NOTE 9: SHARE-BASED COMPENSATION

Upon consummation of the Merger, the Company had two stock option plans in existence, the Monster Digital, Inc. 2012 Omnibus Incentive Plan (the "Omnibus Plan") and the Innovate 2015 Stock Incentive Plan (the "Private Innovate Plan"). Effective September 7, 2018, the Company's board of directors approved an amendment to the Omnibus Plan to, among other things, formally change the name of the Omnibus Plan to the Innovate Biopharmaceuticals, Inc. 2012 Omnibus Incentive Plan (the "Amended Omnibus Plan") and increase the number of shares authorized for issuance under the Amended Omnibus Plan to 3,000,000 shares. The stockholders approved this amendment on December 4, 2018.

The terms of the option agreements are determined by the Company's board of directors. The Company's stock options vest based on the terms in the stock option agreements and typically vest over a period of three to four years. These stock options typically have a maximum term of ten years.

Private Innovate Plan

As of December 31, 2018, there were 6,340,871 stock options outstanding under the Private Innovate Plan. Following completion of the Merger, the Company does not intend to issue any additional awards from the Private Innovate Plan.

The range of assumptions used in estimating the fair value of the options granted or re-measured under the Private Innovate Plan using the Black-Scholes option pricing model for the periods presented were as follows:

	Year Ended December 31,	
	2018	2017
Expected dividend yield	0%	0%
Expected stock-price volatility	66% - 72%	73% - 76%
Risk-free interest rate	2.6% - 3.1%	1.3% - 2.4%
Expected term of options (in years)	8.2 - 9.9	5.0 - 10.0

The following table summarizes stock option activity under the Private Innovate Plan:

	Number of Shares	Weighted-Average Exercise Price	Aggregate Intrinsic Value	Weighted-Average Remaining Contractual Life (in years)
Outstanding at December 31, 2017	6,843,296	$ 1.56	$ 6,617,433	9.0
Options granted	—	—	—	—
Options forfeited	(414,719)	2.03	—	—
Options exercised	(87,706)	2.08	—	—
Outstanding at December 31, 2018	6,340,871	1.53	4,978,205	7.7
Exercisable at December 31, 2018	5,569,790	1.44	4,835,693	7.7
Vested and expected to vest at December 31, 2018	6,300,501	$ 1.52	$ 4,970,269	7.7

The weighted-average grant date fair value of options granted under the Private Innovate Plan was $1.59 during the year ended December 31, 2017. There were no options granted during the year ended December 31, 2018. The total intrinsic value of options exercised was $378,367 during the year ended December 31, 2018. There were no options exercised during the year ended December 31, 2017.

The total fair value of the stock option awards vested under the Private Innovate Plan was approximately $702,000 and $5,942,000 during the years ended December 31, 2018 and 2017, respectively. As of December 31, 2018, there was approximately $1.1 million of total unrecognized compensation cost related to unvested stock-based compensation arrangements under the Private Innovate Plan. This cost is expected to be recognized over a weighted average period of 2.3 years.

The Private Innovate Plan provides for accelerated vesting under certain change-of-control transactions, if approved by the Company's board of directors.

Amended Omnibus Plan

As of December 31, 2018, there were options and warrants to purchase 776,131 shares of Innovate common stock outstanding under the Amended Omnibus Plan and 2,230,057 shares available for future grants under the Amended Omnibus Plan.

The range of assumptions used in estimating the fair value of the options granted or re-measured under the Amended Omnibus Plan for the periods presented were as follows:

	Year Ended December 31, 2018
Expected dividend yield	0%
Expected stock-price volatility	65% - 73%
Risk-free interest rate	2.7% - 3.1%
Expected term of options (in years)	5.0 - 10.0

The following table summarizes stock option activity under the Amended Omnibus Plan:

	Number of Shares	Weighted-Average Exercise Price	Aggregate Intrinsic Value	Weighted-Average Remaining Contractual Life (in years)
Outstanding at December 31, 2017	1,683	$ 45.00		
Options granted	1,302,843	5.83		
Options forfeited	(528,395)	6.02		
Options exercised	—	—		
Outstanding at December 31, 2018	776,131	5.79	—	7.4
Exercisable at December 31, 2018	326,830	6.41	—	4.1
Vested and expected to vest at December 31, 2018	741,097	$ 5.81	$ —	7.3

The weighted-average grant date fair value of options granted under the Amended Omnibus Plan was $3.76 during the year ended December 31, 2018. There were no options granted during the year ended December 31, 2017.

The total fair value of stock option awards vested under the Amended Omnibus Plan was approximately $1,032,000 during the year ended December 31, 2018. As of December 31, 2018, there was approximately $0.9 million of total unrecognized compensation cost related to unvested stock-based compensation arrangements under the Amended Omnibus Plan. This cost is expected to be recognized over a weighted average period of 3.1 years.

The Amended Omnibus Plan provides for accelerated vesting under certain change-of-control transactions, if approved by the Company's board of directors.

Share-based compensation expense recognized in the Company's financial statements was as follows:

	Year Ended December 31,	
	2018	2017
Research and development	$ 2,445,000	$ 2,088,000
General and administrative	1,360,000	3,931,000
Total share-based compensation	$ 3,805,000	$ 6,019,000

NOTE 10: INCOME TAXES

No provision for federal and state income tax expense has been recorded for the years ended December 31, 2018 and 2017 due to the valuation allowance recorded against the net deferred tax asset and recurring losses.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and deferred tax liabilities are as follows:

	December 31,	
	2018	2017
Tax loss and contribution carryforwards	$ 4,336,800	$ 865,600
Tax credits	224,900	—
Share-based compensation	2,377,400	1,396,300
Intangible assets	1,677,600	1,588,700
Accrued expenses	151,800	—
Other	4,500	1,400
Valuation allowance	(8,773,000)	(3,852,000)
Total deferred tax assets, noncurrent	$ —	$ —

The Company has established a valuation allowance against its deferred tax assets due to the uncertainty surrounding the realization of such assets. During the years ended December 31, 2018 and 2017, the valuation allowance increased by $4,921,000 and $1,544,300, respectively.

The reasons for the difference between actual income tax expense (benefit) for the years ended December 31, 2018 and 2017, and the amount computed by applying the statutory federal income tax rate to losses before income tax (benefit) are as follows:

	2018		2017	
	Amount	% of Pretax Earnings	Amount	% of Pretax Earnings
Income tax benefit at statutory rate	$ (5,074,100)	(21.0)%	$ (3,946,000)	(34.0)%
State income taxes, net of federal tax benefit	(477,200)	(2.0)%	(157,700)	(1.4)%
Non-deductible expenses	333,600	1.4 %	342,400	3.0 %
Credits	(224,900)	(0.9)%	—	— %
Change in federal tax rate	—	— %	2,234,800	19.3 %
Change in state tax rate	(82,300)	(0.3)%	83,200	0.7 %
Other	603,900	2.5 %	(101,000)	(0.9)%
Change in valuation allowance	4,921,000	20.3 %	1,544,300	13.3 %
Income tax benefit	$ —	0.0 %	$ —	— %

On December 22, 2017, the Tax Cuts and Jobs Act was enacted into law, which reduced the federal corporation income tax rate to 21% for tax years beginning after December 31, 2017. As a result of the new enacted tax rate, the Company adjusted its deferred tax assets as of December 31, 2017 by applying the new 21% rate, which resulted in a decrease to the deferred tax assets and corresponding decrease to the valuation allowance of approximately $2.2 million.

As of December 31, 2018, the Company had net operating loss carryforwards for federal and state income tax purposes of $18,918,000 and $18,322,400, respectively. Federal loss carryforwards of $3,551,900 begin to expire in 2034 and $15,366,100 of the federal losses carryforward indefinitely. The state loss carryforwards begin to expire in 2029. As of December 31, 2018, the Company had contribution carryforwards of $10,700, which begin to expire in 2020. In addition, the Company has federal research and development credits of $224,900 which begin to expire in 2038.

The Internal Revenue Code of 1986, as amended, contains provisions which limit the ability to utilize the net operating loss and tax credit carryforwards in the case of certain events, including significant changes in ownership interests. If the Company's net operating loss and tax credit carryforwards are limited, and the Company has taxable income which exceeds the permissible yearly net operating loss and tax credit carryforwards, the Company would incur a federal income tax liability even though net operating loss and tax credit carryforwards would be available in future years.

As of December 31, 2018 and 2017, the Company had no unrecognized tax benefits and does not anticipate a significant change in total unrecognized tax benefits within the next 12 months.

The Company is subject to United States federal income tax and income tax in multiple state jurisdictions. The Company has analyzed its filing positions in all federal and state jurisdictions where it is required to file income tax returns, as well as open tax years in these jurisdictions. The Company is subject to United States federal, state and local tax examinations by tax authorities for all years of operation. No income tax returns are under examination by taxing authorities at this time.

The Company's policy for recording interest and penalties is to record them as a component of interest expense and general and administrative expenses, respectively. During December 31, 2018 and 2017, the Company did not record any interest and penalties related to uncertain tax positions.

NOTE 11: COMMITMENTS AND CONTINGENCIES

Clinical Trial Agreement

From time to time, the Company enters into agreements with contract research organizations and other service providers. In August 2018, the Company entered into such an agreement for its planned Phase 3 trial for the treatment of celiac disease. Under this agreement, the Company expects to pay approximately $1.1 million for data management over the course of the Phase 3 celiac disease trial for data management and biostatistics services.

Employment Agreements

Prior to March 11, 2018, the Company was party to employment agreements with certain executives of the Company. Under the terms of these agreements, the Company agreed to pay the executives certain payments upon the achievement of financial milestone events. These milestone events were based on total debt or equity funding received by the Company. During the year ended December 31, 2017, the initial funding milestone was reached and the executives in the aggregate were paid $145,000 in accordance with the terms of these agreements. During January 2018, additional financial milestone events were achieved through the Merger and Equity Issuance events and the Company paid these executives approximately $1.1 million in accordance with the agreements, which was included in accrued expenses as of December 31, 2017.

On March 11, 2018, the Company entered into amended and restated executive employment agreements with the executives and new executive employment agreements with certain new executives (the "Executive Agreements"). The Executive Agreements provide an annual base salary and the opportunity to participate in the Company's equity compensation, employee benefit and bonus plans once they are established and approved by the Company's board of directors. The Executive Agreements contain severance provisions if the executives are terminated under certain conditions that would provide the executive with 12 months of their base salary and up to 12 months of continuation of health insurance benefits.

In November 2018, the Company entered into a separation and general release agreement with a former executive of the Company that included separation benefits consistent with the former executive's employment agreement. The Company recognized severance expense totaling $320,000 during the year ended December 31, 2018. In addition, the severance agreement extended the period under which the former executive's vested stock options could be exercised for an additional six months from the date of separation. As a result of the modification to the executive's stock option agreement, an additional $154,000 in stock compensation expense was recorded in research and development expense during the year ended December 31, 2018. There were no severance-related expenses incurred during the year ended December 31, 2017.

Office Lease

In October 2017, the Company entered into a three-year lease for office space that expires on September 30, 2020. Base annual rent is $60,000, or $5,000 per month. The first two months of rent were paid in advance upon lease signing and the next ten months of rent were paid in advance on November 30, 2017. Beginning in October 2018, monthly payments of $5,000 are due and payable over the remaining 24-month term. A security deposit of $5,000 was paid in October 2017. The lease contains a two-year renewal option.

Legal

In November 2018, the Company received a letter and draft complaint regarding a former consultant of the Company who was compensated in cash and stock options for his services, demanding damages of up to approximately $3.6 million plus punitive damages in connection with a delay in such consultant's ability and timing to exercise options and sell shares of

the Company's common stock related to past consulting services. On January 8, 2019, M. Scott Harris and Middleburg Consultants, Inc. (collectively, "Harris") filed the claim in the Superior Court of the State of Delaware (the "Delaware Action"). As previously disclosed, the Company strongly denies any wrongdoing alleged in the threatened litigation and firmly believes the allegations in the complaint are entirely without merit and intends to defend against them vigorously. On February 25, 2019, the Company filed a motion to dismiss the Delaware Action. If the motion is not granted, the Company intends to dispute the factual basis of Harris' claims and also intends to assert affirmative defenses and counterclaims against Harris.

From time to time, the Company could become involved in disputes and various litigation matters that arise in the normal course of business. These may include disputes and lawsuits related to intellectual property, licensing, contract law and employee relations matters. Periodically, the Company reviews the status of significant matters, if any exist, and assesses its potential financial exposure. If the potential loss from any claim or legal claim is considered probable and the amount can be estimated, the Company accrues a liability for the estimated loss. Legal proceedings are subject to uncertainties, and the outcomes are difficult to predict; therefore, accruals are based on the best information available at the time. As additional information becomes available, the Company reassesses the potential liability related to pending claims and litigation.

NOTE 12: SUBSEQUENT EVENTS

Senior Convertible Note

During January 2019, the noteholder of the Company's senior convertible note issued a redemption notice and the Company repaid the noteholder $1,049,167 of principal and accrued interest of $1,399. The principal balance of the senior convertible note after this redemption was $4,147,500. In addition, the Company and the noteholder entered into an Option Agreement during January 2019, further described in Note 6—Debt. During March 2019, the Company exercised its repurchase rights from the Option Agreement and paid the noteholder of the New Note approximately $5,260,000, which was the full purchase amount, including interest, of the New Note pursuant to the terms of the Option Agreement. There are no further amounts outstanding under the New Note and the New Note has been canceled.

Unsecured Convertible Promissory Note

On March 8, 2019, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with a Convertible Noteholder. Pursuant to the Purchase Agreement, the Company issued the Convertible Noteholder an unsecured Convertible Promissory Note (the "Convertible Note") in the principal amount of $5,500,000. The Convertible Noteholder may elect to convert all or a portion of the Convertible Note at any time and from time to time into the Company's common stock at a conversion price of $3.25 per share, subject to adjustment for stock splits, dividends, combinations and similar events. The Company may prepay all or a portion of the Convertible Note at any time for an amount equal to 115% of any then outstanding obligations or the portion of the obligations the Company is prepaying. The purchase price of the Convertible Note was $5,000,000, and the Convertible Note carries an original issuance discount of $500,000, which is included in the principal amount of the Convertible Note. In addition, the Company agreed to pay $20,000 of transaction expenses, which were netted out of the purchase price of the Convertible Note.

The Convertible Note bears interest at the rate of 10% (which will increase to 18% upon and during the continuance of an event of default) per annum, compounding on a daily basis. All principal and accrued interest on the Convertible Note is due on the second-year anniversary of the Convertible Note's issuance.

At any time after the six month anniversary of the issuance of the Convertible Note, (i) if the average volume weighted average price over twenty trading dates exceeds $10.00 per share, the Company may generally require that the Convertible Note convert into shares of its common stock at the $3.25 (as adjusted) conversion price, and (ii) the Convertible Noteholder may elect to require all or a portion of the Convertible Note be redeemed by the Company. If the Convertible Noteholder requires a redemption, the Company, at its discretion, may pay the redeemed portion of the Convertible Note in cash or in the Company's common stock at a conversion rate equal to the lesser of (i) the $3.25 (as adjusted) conversion rate or (ii) 80% of the average of the five lowest volume weighted average price of the Company's Common Stock over the preceding twenty trading days. The Convertible Noteholder may not redeem more than $500,000 per calendar month during the period between the six months anniversary of the date of issuance until the first year anniversary of the date of issuance and $750,000 per calendar month thereafter. The obligation or right of the Company to deliver its shares upon the conversion or redemption of the Convertible Note is subject to a 19.99% cap and subject to a floor price trading price of $3.25 (unless waived by the Company). Any amounts redeemed or converted once the cap is reached or if the market price is less than the $3.25 floor price must be paid in cash.

If there is an Event of Default under the Convertible Note, the Convertible Noteholder may accelerate the Company's obligations or elect to increase the outstanding obligations under the Convertible Note. The amount of the increase ranges from 5% to 15% depending on the type of default (as defined in the Convertible Note). In addition, the Convertible Note obligations will be increased if there are delays in the Company's delivery requirements for the shares or cash issuable upon the conversion or redemption of the Convertible Note in certain circumstances.

If the Company issues convertible debt in the future with any terms, including conversion terms, that are more favorable to the terms of the Convertible Note, the Convertible Noteholder may elect to incorporate the more favorable terms into the Convertible Note.

Stock Issued under At-the-Market Sales Agreement

During 2019, the Company issued 705,714 shares of common stock under the "at-the-market" offering for net proceeds of approximately $1.7 million.

Severance Agreement

In February 2019, the Company entered into a separation and general release agreement with a former executive of the Company that included separation benefits consistent with the former executive's employment agreement of $300,000. In addition, all of the former executive's unvested stock options that would have vested in the twelve-month period following the separation date will continue to vest in accordance with the vesting terms set forth in the original grant agreement, so long as the former executive remains a consultant to the Company.

Securities Purchase Agreement

On March 17, 2019, the Company entered into a Securities Purchase Agreement (the "SPA") to offer up to 4,291,845 shares of the Company's common stock at a price of $2.33 per share. In a concurrent private placement, the Company offered warrants to purchase up to an aggregate of 6,866,952 shares of common stock. Under the terms of the SPA, each purchaser is eligible to receive a long-term warrant and a short-term warrant to purchase up to a number of shares of the Company's common stock equal to 60% of the number of common shares purchased and equal to 100% of the number of common shares purchased by such purchaser, respectively.

The long-term warrants issued will be exercisable commencing on the six-month anniversary of March 18, 2019 ("Closing Date") and have an expiration date of March 18, 2024. Any long-term warrant that has not been exercised by the expiration date are automatically exercised via cashless exercise. The exercise price of the long-term warrants is equal to the greater of (i) 125% of the volume weighted average price of the Company's common stock during the twenty-day trading period immediately prior to the Closing Date and (ii) the closing price of the Company's common stock on the trading day immediately prior to the Closing Date, subject to adjustment as specified in the SPA. The short-term warrants are exercisable as of the Closing Date, have an expiration date of March 18, 2020 and have an exercise price of $4.00, provided that the exercise price may be higher under certain circumstances to conform to Nasdaq Capital Market rules. If at any time after March 18, 2019, the weighted-average price of the Company's common stock exceeds $5.25 for ten consecutive trading days, the Company may call the outstanding short-term warrants and require that they be exercised in cash, except to the extent that such exercise would surpass the beneficial ownership limitations, as specified in the SPA.

If the Company sells all of the shares offered in the prospectus supplement filed with the SEC on March 18, 2019, the gross proceeds received prior to deduction of offering expenses would be $9,999,999. However, there can be no assurance that the Company will sell all or any of the securities being offered.

Corporate Headquarters

Innovate Biopharmaceuticals, Inc.
8480 Honeycutt Road, Suite 120
Raleigh, NC 27615
Phone: (919) 275-1933
www.innovatebiopharma.com

Stock Information

Traded on the Nasdaq Capital Market
under the symbol INNT

Investor Relations

Phone: (919) 275-1933
Email: investor.relations@innovatebiopharma.com

Transfer Agent and Registrar

Corporate Stock Transfer, Inc.
3200 Cherry Creek South Drive, Suite 430
Denver, CO 80209
Phone: (303) 282-4800

Independent Registered Public Accounting Firm

Mayer Hoffman McCann P.C.
Irvine, CA

Stockholder Information

A copy of our Annual Report on Form 10-K, as amended, including the exhibits thereto, as filed with the Securities and Exchange Commission, is available on our website, www.innovatebiopharma.com under Investors > Financial Information. A printed copy is also available without charge upon written request to:

Innovate Biopharmaceuticals, Inc.
Attn: Corporate Secretary
8480 Honeycutt Road, Suite 120
Raleigh, NC 27615

Annual Meeting of Stockholders

The 2019 Annual Meeting of Stockholders will be held on Friday, May 31, 2019, at 11:00 a.m. Eastern Time at:

150 Fayetteville Street, Suite 2300
Raleigh, NC 27601

Sandeep Laumas, M.D.
Executive Chairman, Chief Executive Officer and Director

Jay Madan, M.S.
President, Chief Business Officer,
Interim Principal Financial Officer,
Interim Principal Accounting Officer and Director

Sandeep Laumas, M.D.
Executive Chairman, Chief Executive Officer and Director

Jay Madan, M.S.
President, Chief Business Officer,
Interim Principal Financial Officer,
Interim Principal Accounting Officer and Director

Lorin K. Johnson, Ph.D.
Founder and Chief Scientist of Glycyx PharmaVentures, Ltd.

Anthony E. Maida III, Ph.D., M.A., M.B.A.
Senior Vice President - Clinical Research for
Northwest Biotherapeutics, Inc.

Roy Proujansky, M.D.
Executive Vice President and Chief Executive of Nemours
Delaware Valley Operations

Saira Ramasastry, M.S., M.Phil.
Managing Partner of Life Sciences Advisory, LLC