UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 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, 2021

OR

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

Commission File Number: 001-36577

ContraFect Corporation
(Exact name of registrant as specified in its charter)

Delaware	**39-2072586**
(State or other jurisdiction of incorporation or organization)	**(IRS Employer Identification No.)**
28 Wells Avenue, 3rd Floor Yonkers, NY	**10701**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (914) 207-2300

Securities registered pursuant to Section 12(b) of the Act:

Title of Class	Trading Symbol(s)	Name of Exchange on Which Registered
Common Stock, Par Value $0.0001 per share	**CFRX**	**Nasdaq Capital Market**

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 registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the 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 every Interactive Data File required to be submitted 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 such files). Yes ☒ No ☐

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

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

If an emerging growth company, indicate by check mark 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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

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

As of June 30, 2021, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was approximately $173.1 million, based on the closing price of the registrant's common stock on the Nasdaq Capital Market on June 30, 2021 of $4.40 per share.

As of March 17, 2022, there were 39,332,721 shares of common stock, $0.0001 par value per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement relating to its 2022 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission are incorporated by reference into Part III of this Annual Report on Form 10-K.

Auditor Firm Id: 00042 Auditor Name: Ernst & Young, LLP Auditor Location: Hartford, Connecticut

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REFERENCES TO CONTRAFECT

Throughout this Annual Report on Form 10-K, the "Company," "ContraFect," "we," "us," and "our," except where the context requires otherwise, refer to ContraFect Corporation, and "our board of directors" refers to the board of directors of ContraFect Corporation.

All brand names or trademarks appearing in this Annual Report on Form 10-K are the property of their respective holders.

FORWARD LOOKING STATEMENTS

The information in this Annual Report on Form 10-K contains forward-looking statements and information within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, which are subject to the "safe harbor" created by those sections. These forward-looking statements include, but are not limited to, statements concerning our strategy, future operations, future financial position, future revenues, our ability to continue as a going concern, projected costs, prospects and plans and objectives of management. The words "anticipates", "believes", "estimates", "expects", "intends", "targets", "may", "plans", "projects", "potential", "will", "would", "could" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. All such forward-looking statements involve significant risks and uncertainties, including, but not limited to, statements regarding:

- the success, cost, timing and potential indications of our product development activities and clinical trials;
- our ability to advance into and through clinical development and ultimately obtain U.S. Food and Drug Administration ("FDA") approval for our product candidates;
- our research and development plans and ability to bring forward additional product candidates into preclinical and clinical development;
- our expectations regarding the impact of COVID-19 on our business, operations and financial performance and position;
- our contract with the Biomedical Advanced Research and Development Authority ("BARDA") (the "BARDA Contract") and any exercise of BARDA's options to extend the BARDA Contract;
- our grant awards from the Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator ("CARB-X") and the Military Infectious Diseases Research Program, United States Army Medical Research and Development Command ("USAMRDC") and the respective options in each award for continued funding;
- the rate and degree of market acceptance of our product candidates and our expectations regarding the size of the commercial markets for our product candidates;
- our future marketing and sales programs;
- the effect of competition and proprietary rights of third parties;
- our recurring losses from operations raise substantial doubt regarding our ability to continue as a going concern;
- the availability of and our ability to obtain additional financing;
- the effects of existing and future federal, state and foreign regulations;
- the seeking of joint development, licensing or distribution and collaboration and marketing arrangements with third parties; and
- the period of time for which our existing cash and cash equivalents will enable us to fund our operations.

As more fully described under the heading "Risk Factors" contained elsewhere in this Annual Report on Form10-K, many important factors affect our ability to achieve our stated objectives and to develop and commercialize any product candidates. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. These forward-looking statements involve risks and uncertainties that could cause our actual results to differ materially from those in the forward-looking statements, including, without limitation, the risks and uncertainties set forth in our filings with the SEC. You should read this Annual Report on Form 10-K and the documents that we have filed as exhibits to this Annual Report on Form 10-K completely and with the understanding that our actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements that we make. The forward-looking statements are applicable only as of the date on which they are made, and we do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

RISK FACTOR SUMMARY

Our business is subject to numerous risks and uncertainties, including those described in Part I, Item 1A. "Risk Factors" in this Annual Report on Form 10-K. You should carefully consider these risks and uncertainties when investing in our common stock. The principal risks and uncertainties affecting our business include the following:

- We have incurred significant losses since our inception. We expect to incur losses for at least the next several years and may never achieve or maintain profitability.
- Our recurring losses from operations raise substantial doubt regarding our ability to continue as a going concern.
- We currently have no source of product revenue and have not yet generated any revenues from product sales.
- We have a need for substantial additional funding. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.
- If BARDA were to eliminate, reduce, or delay funding for our BARDA Contract, we would experience a negative impact on our programs associated with such funding.
- Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.
- The timing of the milestone and royalty payments we are required to make to The Rockefeller University ("Rockefeller") under certain agreements is uncertain and could adversely affect our cash flows and results of operations.
- Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.
- The COVID-19 pandemic or another pandemic, epidemic or outbreak of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials.
- We are heavily dependent on the success of our leading product candidate, exebacase. If we are ultimately unable to obtain regulatory approval for exebacase or any other product candidate our business will be substantially harmed.
- If clinical trials of exebacase or any other product candidate that we develop fail to demonstrate safety and efficacy, or the manufacturing for the commercial supply of exebacase drug substance or drug product fails to demonstrate robustness, stability, purity and potency to the satisfaction of the FDA or

similar international regulatory authorities or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete the development and commercialization of exebacase or any other product candidate.

- We may be required to suspend or discontinue clinical trials due to adverse side effects or other safety risks that could preclude approval of exebacase or any other product candidates.
- Delays in clinical trials are common and have many causes, and any such delays could result in increased costs to us and jeopardize, delay or prevent our ability to obtain regulatory approval and commence product sales as currently contemplated.
- We are significantly dependent on our license agreements with Rockefeller that relate to exebacase.
- We rely on Contract Research Organizations ("CROs") to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be delayed in obtaining, or may ultimately not be able to obtain, regulatory approval for commercialization of exebacase or any other product candidates.
- We rely on contract manufacturing organizations ("CMOs") to manufacture clinical and commercial supplies of our product candidates. In addition to the risks associated with the manufacture of our product candidates, which could include cost overruns, new impurities, difficulties in process or formulation development, scaling up or reproducing manufacturing processes and lack of timely availability of raw materials, if these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be delayed in obtaining, or may ultimately not be able to obtain, regulatory approval for commercialization of exebacase or any other product candidates.
- Even if the FDA approves exebacase or any other product candidates, adverse effects discovered after approval could adversely affect our markets.
- Any Breakthrough Therapy designation that we may receive from the FDA for our product candidates may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.
- Developments by competitors may render our products or technologies obsolete ornon-competitive.
- The level of commercial success of exebacase or any other product candidates that we develop will depend upon significant market acceptance of these products among physicians and payors.
- Coverage and reimbursement may not be available for exebacase or any other product candidates that we develop.
- If we are unable to establish our own marketing and sales capabilities, or enter into agreements with third parties, to market and sell our products after they are approved, we may not be able to generate revenues.
- Interim, "topline" and preliminary data from our clinical trials that we announce or publish from time to time may change as more patient data become available and are subject to audit and verification procedures that could result in material changes in the final data.
- Risks related to regulatory approval of our product candidates and other legal and compliance matters.
- Risks related to employee matters and managing growth.
- Risks related to our intellectual property.
- Risks related to our securities and organizational documents.
- Security breaches, cybersecurity attacks, failure of our data and personal information protections and other disruptions could compromise our information and technology systems and expose us to liability, which would cause our business and reputation to suffer.

- Our collection, control, processing, sharing, disclosure and otherwise use of personal data could give rise to liabilities as a result of governmental regulation, conflicting legal requirements, and evolving laws concerning data privacy in the European Union ("EU") and European Economic Area ("E.E.A.").

Item 1. Business

We are a late clinical-stage biotechnology company focused on the discovery and development of direct lytic agents ("DLAs"), including lysins and amurin peptides, as new medical modalities for the treatment of life-threatening, antibiotic-resistant infections. We believe DLAs are fundamentally different than antibiotics and offer a potential paradigm shift in the treatment of antibiotic-resistant infections. According to one of the most recent and comprehensive reports on the global burden of bacterial antimicrobial resistance ("AMR"), there were an estimated 4.95 million deaths associated with bacterial AMR in 2019, including 1.27 million deaths directly attributable to bacterial AMR. The six leading pathogens for deaths associated with resistance (*Escherichia coli ("E. coli")*, *Staphylococcus aureus ("S. aureus")*, *Klebsiella pneumoniae ("K. pneumoniae")*, *Streptococcus pneumoniae*, *Acinetobacter baumannii ("A. baumannii")*, and *Pseudomonas aeruginosa* ("*P. aeruginosa*")) were responsible for 929,000 deaths. Only one pathogen–drug combination, methicillin-resistant *S. aureus* ("MRSA"), caused more than 100,000 deaths in 2019.

Our lead DLA product candidate, exebacase, was granted Breakthrough Therapy designation for the treatment of MRSA bloodstream infections (bacteremia), including right-sided endocarditis, when used in addition to standard-of-care ("SOC") anti-staphylococcal antibiotics in adult patients, by the U.S. Food and Drug Administration ("FDA") in February 2020 and is currently being studied in an ongoing Phase 3 superiority design study. In addition to bacteremia, *S. aureus* is also a common cause of pneumonia and osteomyelitis as well as biofilm-associated infections of heart valves (endocarditis), prosthetic joints, indwelling devices and catheters. These infections result in significant morbidity and mortality despite currently available antibiotic therapies.

Our next product candidate, CF-370, is designed to target a range of gram-negative bacteria including *P. aeruginosa* and has demonstrated potent *in vivo* activity against extensively drug-resistant ("XDR") strains. *P. aeruginosa* is a major cause of morbidity and mortality in patients with hospital-acquired or ventilator-associated pneumonia and a major medical challenge for cystic fibrosis patients with chronic lung infections. CF-370 has also shown promising activity against *E. coli*, *K. pneumoniae* and *A. baumannii* in *in vitro* studies.

Lysins are recombinantly-produced enzymes, that when applied to bacteria cleave a key component of the target bacteria's peptidoglycan cell wall, resulting in rapid bacterial cell death. In addition to the speed of action and potent cidality, we believe lysins are differentiated by their other hallmark features, which include the demonstrated ability to eradicate biofilms and synergistically boost the efficacy of conventional antibiotics in animal models. Amurin peptides are a new class of DLAs, discovered in our laboratories, which disrupt the outer membrane of gram-negative bacteria, resulting in rapid bacterial cell death, offering a distinct mechanism of action from lysins. Amurins have a potent, broad spectrum of *in vitro* activity against a wide range of gram-negative pathogens, including deadly, drug-resistant *P. aeruginosa*, *K. pneumoniae, E. coli, A. baumannii* and *Enterobacter cloacae* bacteria species as well as difficult to treat pathogens such as *Stenotrophomonas, Achromobacter* and some *Burkholderia* species. The highly differentiated properties of DLAs underscore their potential use in addition to antibiotics with the goal of improving clinical outcomes compared to antibiotics alone. The development of DLAs involves a novel clinical and regulatory strategy, using superiority design clinical trials with the goal of delivering significantly improved clinical outcomes for patients with serious, antibiotic-resistant bacterial infections, including biofilm-associated infections. We believe this approach affords potential clinical benefits to patients as well as the potential ability to mitigate against further development of antibiotic resistance.

In December 2019, we initiated the Phase 3 DISRUPT (Direct Lysis of *S. aureus* Resistant Pathogen Trial) superiority design study of exebacase. The DISRUPT study is a randomized, double-blind, placebo-controlled Phase 3 clinical trial conducted in the U.S. alone to assess the efficacy and safety of exebacase in approximately 350 adult and adolescent patients with complicated *S. aureus* bacteremia, including right-sided endocarditis. Patients entering the study will be randomized 2:1 to either exebacase or placebo, with all patients receiving SOC antistaphylococcal antibiotics. The primary efficacy endpoint of the study is clinical response at Day 14 in

patients with MRSA bacteremia, including right-sided endocarditis. Secondary endpoints include clinical response at Day 14 in the All *S. aureus* patient group (MRSA and methicillin-sensitive *S. aureus* ("MSSA")), 30-day all-cause mortality in MRSA patients, and clinical response at later timepoints. We will also evaluate the impact of treatment with exebacase on health resource utilization, including hospital length of stay, ICU length of stay and 30-day readmission rates. We plan to conduct an interim futility analysis following the enrollment of approximately 60% of the MRSA population (the primary endpoint study population). We obtained feedback from the U.S. Food and Drug Administration ("FDA") regarding the Phase 3 study protocol at an End-of-Phase 2 meeting with the FDA in September 2019, including the key design features of the study population, the endpoints and the size of the safety database that would be needed to support submission of a Biologics License Application ("BLA") for approval of exebacase.

We completed a Phase 2 superiority design study of exebacase that evaluated its safety, tolerability, efficacy and pharmacokinetics ("PK") when used in addition to SOC antibiotics compared to SOC antibiotics alone for the treatment of *S. aureus* bacteremia, including endocarditis in adult patients. The results from this study showed clinically meaningful improvement in clinical responder rates among patients treated with exebacase in addition to SOC antibiotics compared to SOC antibiotics alone. In the primary efficacy analysis population of 116 patients with documented *S. aureus* bacteremia, including endocarditis, who received a single intravenous ("IV") infusion of blinded study drug, the clinical responder rate at Day 14 was 70.4% for patients treated with exebacase and 60.0% for patients dosed with SOC antibiotics alone (p=0.314).

In a pre-specified analysis of MRSA-infected patients, the clinical responder rate at Day 14 in patients treated with exebacase was nearly 43-percentage points higher than in patients treated with SOC antibiotics alone (74.1% for patients treated with exebacase compared to 31.3% for patients treated with SOC antibiotics alone (p=0.010)). In addition to the higher rate of clinical response, MRSA-infected patients treated with exebacase showed a 21-percentage point reduction in 30-day all-cause mortality (p=0.056), a four day lower mean length of hospital stay and meaningful reductions in hospital readmission rates. Additional pre-specified analyses showed a clinical responder rate at Day 14 in the subset of patients with bacteremia including right-sided endocarditis of 80.0% for patients treated with exebacase compared to 59.5% for patients treated with SOC antibiotics alone, an increase of 20.5% (p=0.028). In the subset of patients with bacteremia alone, the clinical responder rate at Day 14 was 81.8% for patients treated with exebacase compared to 61.5% for patients treated with SOC antibiotics alone, an increase of 20.3% (p=0.035).

Exebacase was well-tolerated and treatment emergent adverse events, including serious treatment-emergent serious adverse events ("SAEs") were balanced between the treatment groups. There were no SAEs that we determined to be related to exebacase, there were no reports of hypersensitivity related to exebacase and no patients discontinued treatment with study drug in either treatment group.

We also performed a post-hoc Phase 3 simulation analysis using the Phase 2 data to evaluate the clinical outcomes for the Phase 2 patient population that would meet the Phase 3 inclusion criteria. In this simulated Phase 3 analysis population of 84 U.S. patients with documented *S. aureus* bacteremia, including right-sided endocarditis, who received a single IV infusion of blinded study drug, the clinical responder rate at Day 14 was 83.7% for patients treated with exebacase and 54.3% for patients dosed with SOC antibiotics alone, an improvement in the responder rate of over 29-percentage points. The clinical responder rate at Day 14 in the subset of patients with MRSA bacteremia including right-sided endocarditis was 82.6% for patients treated with exebacase compared to 33.3% for patients treated with SOC antibiotics alone, an improvement in the responder rate of over 49-percentage points. In the subset of patients with MSSA bacteremia including right-sided endocarditis, the clinical responder rate at Day 14 was 84.6% for patients treated with exebacase compared to 66.7% for patients treated with SOC antibiotics alone, an increase of nearly 18-percentage points.

We believe these data established proof of concept for exebacase and for DLAs as therapeutic agents. In particular, the data for MRSA-infected patients treated with exebacase, which, in the Phase 2 superiority study, demonstrated superior outcomes in clinical response at Day 14 and in 30-day all-cause mortality as well as health

economics benefits, provided the basis for the FDA to grant Breakthrough Therapy designation to exebacase for the treatment of MRSA bloodstream infections (bacteremia), including right-sided endocarditis, when used in addition to SOC anti-staphylococcal antibiotics in adult patients. Breakthrough Therapy designation is a program designed by the FDA to expedite the development and review of medicines for serious or life-threatening diseases where preliminary clinical evidence suggests that the investigational therapy may demonstrate substantial improvement on at least one clinically significant endpoint over available therapies. The Breakthrough Therapy designation provides additional benefits, such as expedited interactions with the FDA and the potential for priority review, in addition to the Fast Track designation granted to exebacase in August 2015.

On March 10, 2021, we entered into a cost-share contract (the "BARDA Contract") with BARDA, a division of the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response. Under the BARDA Contract, we will receive funding of up to an estimated $86.8 million to advance the development of exebacase. The base period for the BARDA Contract includes government funding of up to $9.8 million to reimburse expenses for approximately one year to support the conduct of the ongoing Phase 3 clinical trial and futility analysis. Following successful completion of the base period, the BARDA Contract provides for approximately $77.0 million of additional BARDA funding for five option stages in support of the completion of the Phase 3 clinical trial of exebacase, further clinical and non-clinical studies, manufacturing, supply chain, clinical, regulatory and administrative activities. The contract period-of-performance (base period plus option exercises) is up to approximately six years. The BARDA Contract contains terms and conditions that are customary for contracts with BARDA of this nature, including provisions giving the government the right to terminate the contract at any time for its convenience.

Our Portfolio

We intend to develop and commercialize novel therapeutic agents to treat life-threatening infections, including those caused by antibiotic-resistant pathogens. The increasing prevalence of antibiotic resistance among bacterial pathogens has been widely recognized as an urgent public health threat by the U.S. Center for Disease Control ("CDC"), the World Health Organization ("WHO") and the Infectious Disease Society of America ("IDSA"). According to the IDSA, as of 2010 the estimated cost to the U.S. healthcare system of antibiotic-resistant infections was approximately $21 billion to $34 billion annually, a substantial portion of which is due to increased length of hospital stays necessary to treat these patients. Antibiotic resistance has limited the effectiveness of many conventional antibiotics and the discovery and development of new therapeutics to address resistance has not kept pace with the increasing incidence of these difficult-to-treat microbial infections. As Dr. Tedros Adhanom Ghebreyesus, Director-General of WHO, has accordingly stated "never has the threat of antimicrobial resistance been more immediate and the need for solutions more urgent. Numerous initiatives are underway to reduce resistance, but we also need countries and the pharmaceutical industry to step up and contribute with sustainable funding and innovative new medicines."

We take this mandate very seriously and have focused our research and discovery efforts on those pathogens that are considered to be urgent or serious threats to global health by the CDC or considered critical priority by the WHO. In particular, species of bacteria that are part of the ESKAPE pathogens (*Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Enterobacter species*) are urgent or serious threats, and are also the leading causes of hospital acquired infections throughout the world. We believe that our DLA product candidates, if successfully developed and approved, will be highly complementary to conventional antibiotics in addressing these infections. We aim to improve outcomes in patient with these life-threatening bacterial infections through use of our DLA candidates developed from our novel lysin and amurin platforms.

We have made further advancements with our novel lytic agents across our portfolio. In addition to the ongoing Phase 3 DISRUPT study of exebacase, we initiated an expanded access program to provide exebacase for the treatment of persistent bacteremia caused by MRSA in patients with COVID-19. We have also continued the investigator-initiated access program for compassionate use of exebacase for individual named patients with

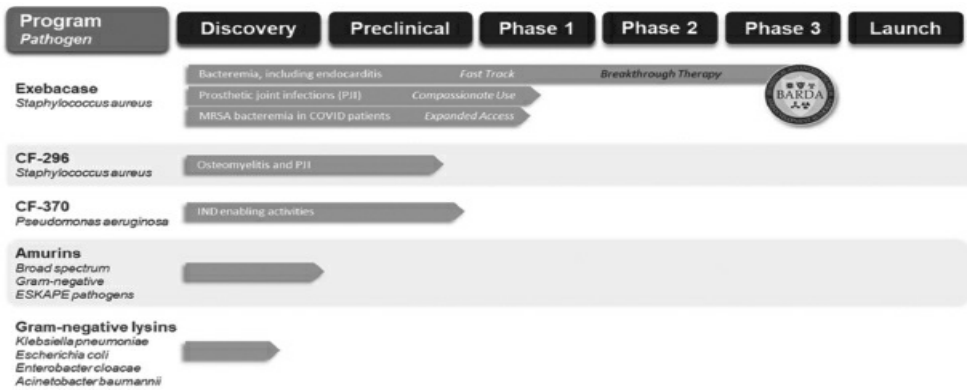
chronic prosthetic joint infections ("PJIs") under Temporary Authorizations for Use from the French National Agency for Medicines and Health Products Safety in collaboration with Dr. Tristan Ferry at the Hôpital de la Croix Rousse in Lyon, France. We have developed a novel, engineered variant of exebacase, known as CF-296, which we believe provides an additional opportunity to advance a potential targeted therapy for deep-seated, invasive biofilm-associated *S. aureus* infections. We are conducting further *in vitro* and *in vivo* characterization of CF-296 to evaluate the full profile of this compound. In 2019, we were awarded up to $7.2 million of funding from USAMRDC over the course of three years to advance CF-296 through Investigational New Drug application ("IND")-enabling studies.

In July 2020, we were granted an award of up to $18.9 million in funding from CARB-X, including initial funding of $4.9 million, in support of the advancement of CF-370 through IND-enabling activities. Any additional funding beyond the $4.9 million is at the discretion of CARB-X and based on factors such as available funding, achievement of project milestones and mutual agreement on future milestones. We expect CF-370 to be our next DLA to enter clinical studies.

In addition, we have entered into two funding agreements with the Cystic Fibrosis Foundation to investigate the potential utility of DLAs against resistant gram-negative pathogens which afflict Cystic Fibrosis ("CF") patients. The first agreement provided funding for the assessment of the *in vitro* activity of CF-370 and amurin peptides against bacterial specimens obtained from CF patients at different stages of disease. The second agreement will provide funding for assessing the *in vitro* and *in vivo* activity of exebacase against *S. aureus* isolates obtained from CF patients. If we obtain supportive data, we plan to evaluate potential future clinical development of DLA product candidates for the treatment of exacerbations in CF lung disease.

Beyond our lysin programs, we continue our research to advance potential product candidates from our amurin peptide platform. We are evaluating our most promising amurins in preclinical animal studies with the goal of determining our next product candidate and moving this program towards clinical studies as soon as possible.

In summary, we now have three modalities within the DLA therapeutic umbrella, including (i) native lysins for gram-positive pathogens (ii) engineered lysins for gram-negative pathogens and (iii) amurins for a wide spectrum of gram-negative pathogens. Our current portfolio of programs is reflected below:



Our Strategy

Our strategy is to use our novel, highly differentiated therapeutic DLAs, if approved, to achieve a leading market position in the treatment of life-threatening infectious diseases, including those caused by antibiotic-

resistant pathogens. We plan to pursue commercialization of therapeutic products through discovery, acquisition and development as follows:

- Advance exebacase through Phase 3 clinical development and demonstrate superiority of our therapeutic candidate used in addition to SOC antibiotics over SOC antibiotics alone for the treatment of *S. aureus* bacteremia, including right-sided endocarditis. If our Phase 3 clinical program confirms the results of the Phase 2 study, demonstrating the superiority of exebacase, used in addition to SOC antibiotics as compared to antibiotics alone, we would seek marketing authorization with a superiority claim which, if exebacase is approved, we believe would be highly differentiated from conventional antibiotics and would lead to rapid uptake by providers, favorable reimbursements from payors and potential reductions in health care utilization and the overall cost of treatment per patient;
- Evaluate exebacase for potential efficacy in additional proposed indications, including as a treatment for chronic PJIs;
- Advance additional product candidates from our portfolio, including CF-370 and other direct lytic agents targeting gram-negative bacteria, to clinical development as rapidly as possible;
- Acquire additional technologies that enable the efficient discovery of anti-infective agents;
- Acquire clinical stage therapies that treat infectious diseases through unique mechanisms of action; and
- Establish collaborations to further develop and commercialize our product candidates.

Our Lead Program: Exebacase (CF-301)

Medical Opportunity

S. aureus bacteremia is a serious bacterial infection associated with high morbidity and mortality. In the U.S. alone, there are approximately 200,000 hospitalizations for *S. aureus* bacteremia annually. Mortality rates from this bloodstream infection have been reported as ranging from 20-40% despite conventional antibiotics. The last new agent for *S. aureus* bacteremia and right-sided endocarditis, daptomycin, was approved over 13 years ago based on non-inferiority to vancomycin (approved in 1958) with clinical cure rates of less than 50% in the Phase 3 study that led to its approval.

S. aureus bacteremia can lead to infectious endocarditis, a serious infection affecting the heart valves. The incidence of infective endocarditis in the U.S. has increased over the past decade and is likely due to the growth of the at-risk populations, such as older, diabetic and hemodialysis patients. *S. aureus* endocarditis remains difficult to treat with current standard of care antibiotics. One reason for this is biofilm formation which prevents antibiotics from eradicating the bacteria, leading to the need for long courses of antibiotic therapy, which are often unsuccessful and necessitate surgery to eradicate bacteria from infected heart valves. Mortality attributed to *S. aureus* bacteremia is higher when the infection is caused by MRSA as compared to methicillin-susceptible *S. aureus* ("MSSA"). MRSA is considered a serious threat to global health by the CDC and a high priority threat by the WHO. Emerging resistance to conventional antibiotics such as vancomycin and daptomycin, which are used to treat MSSA and MRSA, represents an additional serious threat which may have serious consequences in terms of increasing morbidity, mortality and health care utilization.

Exebacase Development

Exebacase is the first lysin to enter U.S. clinical trials and represents a first-in-class anti-bacterial therapeutic candidate. Exebacase has been granted both Breakthrough Therapy and Fast Track designations by the FDA for the treatment of MRSA bloodstream infections (bacteremia), including right-sided endocarditis, when used in addition to SOC anti-staphylococcal antibiotics in adult patients. If we are able to obtain regulatory approval of exebacase for this initial indication, we believe exebacase, and/or engineered variants, may be further developed for the treatment of other serious diseases caused by *S. aureus* including biofilm-related infections in prosthetic joints and indwelling devices, as well as pneumonia and osteomyelitis.

Clinical Studies

Phase 3 DISRUPT Clinical Study

We are conducting a multi-center Phase 3 clinical study of exebacase for the treatment of *S. aureus* bacteremia, including right-sided endocarditis, caused by MRSA or MSSA. This randomized, double-blind, placebo-controlled study compares the efficacy, safety and tolerability of exebacase used in addition to SOC antibiotics to SOC antibiotics alone. The study is targeting enrollment of approximately 350 patients randomized 2:1 to receive either a single dose of exebacase administered as a 2-hour IV infusion in addition to SOC antibiotics or placebo plus SOC antibiotics. The primary efficacy endpoint is clinical response at Day 14 in patients with MRSA bacteremia, including right-sided endocarditis. Secondary endpoints include clinical response at Day 14 in the All *S. aureus* patient group (MRSA and MSSA), 30-day all-cause mortality in MRSA patients, and clinical response at Day 30 and Day 60 in both the MRSA and the All *S. aureus* patient groups. A summary of the statistical parameters of the key efficacy endpoints is shown in Table 1 below.

Table 1

	Primary Efficacy Endpoint: Clinical Response at Day 14 (MRSA Patients)	**Secondary Efficacy Endpoint: Clinical Response at Day 14 (All *S. aureus* Patients)**	**Secondary Efficacy Endpoint: Mortality (MRSA Patients)**
Target difference	28% increase over SOC antibiotics alone	16% increase over SOC antibiotics alone	17% decrease from SOC antibiotics alone
Power	86%	83%	80%
Sample size	135 patients	339 patients	135 patients

Clinical response is defined by objective clinical response criteria including (1) resolution of signs and symptoms attributable to *S. aureus* bacteremia/right-sided endocarditis ("SAB/RIE") that were present at baseline, (2) no new signs and symptoms attributable to SAB/RIE, (3) no new complications of SAB/RIE (e.g. no development of a new foci of *S. aureus* infection after Day 7 and no septic emboli), (4) no changes in anti-staphylococcal antibiotics after treatment with study drug due to persistence, worsening or recurrence of signs or symptoms of SAB/RIE, (5) Blood culture(s) negative for *S. aureus* by Day 14 and (6) the patient is alive. Clinical response will be determined by an independent, blinded clinical adjudication committee.

We will evaluate the impact of treatment with exebacase on health resource utilization, including length of hospital stay, length of stay in the intensive care unit and 30-day readmission rates for both all-cause and *S. aureus* infection readmissions. The independent Data Safety Monitoring Board ("DSMB") will review data from an interim futility analysis after approximately 60% of the MRSA population (the primary endpoint study population) completes the Day 14 primary endpoint study visit.

Based on feedback from our End-of-Phase 2 meeting with the FDA, including the advancement of exebacase under the streamlined development pathway, we believe that this single confirmatory Phase 3 clinical trial evaluating the superiority of exebacase used in addition to SOC antibiotics compared to SOC antibiotics alone for the treatment of *S. aureus* bacteremia, including right-sided endocarditis, if the results are positive, together with the full package of Phase 1 and Phase 2 clinical data, along with a robust non-clinical and PK/PD data package, will be sufficient to support a biologics license application ("BLA") submission. If the Phase 3 study demonstrates superiority of exebacase, used in addition to SOC antibiotics as compared to antibiotics alone, we would seek inclusion of a superiority claim in the product labeling, which we believe would be highly differentiated from conventional antibiotics and would lead to rapid uptake by providers and favorable reimbursements from payors.

Phase 2 Clinical Study

We completed a multi-national Phase 2 clinical study of exebacase for the treatment of *S. aureus* bacteremia, including endocarditis, caused by MRSA or MSSA. This randomized, double-blind, placebo-

controlled study compared the efficacy, safety and tolerability of exebacase used in addition to SOC antibiotics to SOC antibiotics alone. The study enrolled 121 patients randomized 3:2 to receive either a single dose of exebacase administered as a 2-hour IV infusion in addition to SOC antibiotics or placebo plus SOC antibiotics. The primary efficacy analysis population (also known as the microbiological intent-to-treat population, or "mITT") consisted of 116 patients with confirmed *S. aureus* infection based on blood culture who received study drug, of which 71 patients received exebacase and 45 patients received placebo. All patients were treated with SOC antibiotics as prescribed by the study investigators, consisting of vancomycin or daptomycin for MRSA and a semi-synthetic penicillin or first-generation cephalosporin for MSSA, prescribed in accordance with treatment guidelines, accepted medical practice and the study protocol. The majority of patients were enrolled in the U.S. (79.3%) with the remainder of patient enrolled from sites in Europe, Latin America, Russia and Israel. A total of 38.8% of exebacase-treated and 35.5% of placebo patients, respectively, had a MRSA infection. The majority of patients in both treatment groups had bacteremia, 77.5% of the exebacase-treated group and 86.7% of the placebo group. Final diagnosis was determined by an independent, blinded clinical adjudication committee.

Topline efficacy results from the core study demonstrated the clinical responder rate was 70.4% for patients treated with exebacase and 60.0% for patients treated with SOC antibiotics alone (p=0.314). In a pre-specified analysis of MRSA-infected patients, the clinical responder rate was nearly 43-percentage points higher in the exebacase group compared to the SOC antibiotics alone group (74.1% for patients treated with exebacase compared to 31.3% for patients dosed with SOC antibiotics alone (p=0.010)). In addition to the higher rate of clinical response, MRSA-infected patients treated with exebacase showed a 21-percentage point reduction in 30-day all-cause mortality (p=0.056), a four day lower mean length of hospital stay and meaningful reductions in hospital readmission rates.

The clinical responder rate in the subset of patients with bacteremia, including right-sided endocarditis was 80.0% for patients treated with exebacase compared to 59.5% for patients treated with SOC antibiotics alone, an increase of 20.5% (p=0.028). Similarly, in the subset of patients with bacteremia alone, the clinical responder rate was 81.8% for patients treated with exebacase compared to 61.5% for patients treated with SOC antibiotics alone, an increase of 20.3% (p=0.035).

Based on these efficacy data, summarized in Table 2 below, treatment with exebacase in addition to SOC antibiotics resulted in clinically meaningful improvements in outcomes compared to antibiotic therapy alone.

Table 2

Clinical response at Day 14	Exebacase*	Antibiotics alone	p-value
Overall mITT population	70.4%	60.0%	0.314
MRSA infection	74.1%	31.3%	0.010
Bacteremia + right-sided endocarditis	80.0%	59.5%	0.028
Bacteremia only	81.8%	61.5%	0.035
Mortality			
30-day all-cause mortality in MRSA patients	3.7%	25.0%	0.056

* used in addition to antibiotics

Another primary objective of the study was to describe the safety and tolerability of exebacase used in addition to SOC antibacterial therapy compared to SOC antibiotics alone in hospitalized patients with *S. aureus* bacteremia, including endocarditis. An independent DSMB reviewed unblinded safety and pharmacokinetic data during the study. Treatment emergent adverse events ("TEAEs") were defined as an untoward medical event reported from the study drug administration until 28 days after last dose of standard of care antibiotics, regardless

of whether or not the event was considered related to study drug. The incidence of TEAEs was balanced between the treatment groups (88.9% and 85.1% of the exebacase and SOC antibiotics alone groups, respectively), with incidence rates as expected for this population, given the severity of the disease under study and that patients had multiple co-morbidities. The incidence rates of TEAEs reported within approximately one week after administration of the single dose of study drug were also balanced between the treatment groups (66.7% and 66.0% in the exebacase and SOC antibiotics alone groups, respectively). The overall rate of SAEs through day 180 was also similar between the treatment groups (62.5% for the exebacase group and 59.5% for the SOC antibiotics alone group). Among all patients who received study drug, 23.6% of exebacase patients and 19.1% of placebo patients died through day 180. There were no SAEs, including deaths, that we determined to be related to exebacase. Exebacase was well-tolerated and there were no reports of hypersensitivity related to exebacase and no patients prematurely discontinued study drug in either treatment group.

Based on these safety and tolerability data, summarized in Table 3 below, we concluded that exebacase was well-tolerated in this study.

Table 3

	Exebacase* N=72 n (%)	**Antibiotics alone** N=47 n (%)
TEAE	64 (88.9)	40 (85.1)
TEAE through day 7	48 (66.7)	31 (66.0)
TEAE leading to study drug withdrawal	0	0
SAEs through day 180	45 (62.5)	28 (59.5)
SAEs determined to be related to exebacase	0	0
Total deaths through day 180	17 (23.6)	9 (19.1)

* used in addition to antibiotics

The Phase 2 Clinical Study Report, as well as PK/PD modeling and any additional *in vitro* or *in vivo* studies were submitted and an End-of-Phase 2 Meeting with FDA was conducted prior to advancing into Phase 3.

Phase 1 Clinical Study

In 2015, we concluded a Phase 1 single ascending dose study in healthy volunteers. This trial was a randomized, double-blind, placebo-controlled trial designed to evaluate the safety, tolerability and PK of four different intravenous doses of exebacase. Healthy normal subjects were randomized to receive a single IV dose of exebacase or placebo, each administered as a 2-hour IV infusion.

In this Phase 1 study, exebacase was generally well tolerated and there were no clinical adverse safety signals. No SAEs or hypersensitivity adverse events ("AEs") related to exebacase were reported, and no study stopping rules were met. A total of five non-serious AEs were reporting during the study as follows: two subjects who received exebacase reported a total of three non-serious AEs (headache, contact dermatitis, and allergic rhinitis); two subjects who received placebo reported a total of two non-serious AEs (viral upper respiratory tract infection and viral infection). All of these events were mild in intensity and resolved. No patients withdrew from the study due to an AE. There were no clinically relevant changes in inflammatory markers (e.g., erythrocyte sedimentation rate, high sensitivity c-reactive protein, or complement factors including total hemolytic complement (CH50) associated with exebacase dosing.

Nine out of 13 subjects dosed with exebacase developed anti-drug antibodies ("ADAs") in the study. These ADAs were waning or absent by day 180, and were not correlated with mediators of allergic immune response. Exposure was generally linear, dose dependent and intra-subject variability was low. A pharmacometric analysis of the relationship between exebacase exposure and heart rate ("HR"), blood pressure and QT interval parameters showed no significant changes in systolic or diastolic blood pressure, HR or HR-corrected QT intervals with increases in exebacase plasma concentration at the doses tested in the Phase 1 study.

Estimated effective exposure of exebacase, based on *in vivo* pharmacology, PK/PD exposure target attainment analysis and PK/PD modeling was attained at the 0.25mg/kg dose in healthy subjects. The Phase 1 Clinical Study Report, as well as reports of the animal studies, PK/PD modeling and *in vitro* clinical microbiology studies were submitted to the regulatory authorities and anEnd-of-Phase 1 Meeting with FDA was conducted prior to advancing into Phase 2.

In vitro Microbiologic Studies and Animal Models Demonstrate the Therapeutic Potential of Exebacase

We believe exebacase is well differentiated from conventional antibiotics by its spectrum of activity, including:

- ***Eradication of biofilms.*** Exebacase has been shown to clear biofilms *in vitro* studies and in animal models. Biofilm matrices associated with serious *S. aureus* infections form on human tissues (e.g., valve in endocarditis or bone in osteomyelitis) and/or on the abiotic surfaces (e.g., prosthetic joints, catheters and other devices) and protect bacteria from immune defenses. Biofilms pose significant therapeutic challenges by increasing antibiotic tolerance up to 1,000-fold because conventional antibiotics are generally unable to clear or penetrate biofilms and kill dormant *S. aureus* bacteria harbored within the biofilms. Hence, surgical removal of infected tissue, catheters, prosthetic joints and other indwelling devices containing *S. aureus* biofilms is generally required to eradicate the infections.
- ***Rapid, potent and selective bactericidal activity.*** *In vitro*, exebacase kills *S. aureus* bacteria within seconds, thereby exerting a bactericidal effect, defined as a 3-log (99.9%) drop in colony forming units ("CFU") per mL, within about 30 minutes. Exebacase has exhibited potent antibacterial activity against *S. aureus* strains that are sensitive to methicillin as well as strains resistant to methicillin, vancomycin, daptomycin, or linezolid. Exebacase is highly targeted against *staphylococcal* and some *streptococcal* species, with no demonstrable activity against gram negative organisms. We believe that this targeted effect will reduce the possible negative effects of exebacase on normal, healthy human bacterial flora, known as the microbiome, in the GI tract, in contrast to broad spectrum antibiotics which are widely known to have deleterious effects on the human GI microbiome.
- ***Potentiation of the efficacy of conventional anti-staphylococcal antibiotics.*** We have demonstrated strong synergy between exebacase and a wide range of antibiotics in preclinical studies, which we believe may enable exebacase to potentiate the efficacy of current standards of care for the treatment of *S. aureus* bacteremia, including daptomycin, vancomycin and oxacillin. Because of this and the aforementioned features of exebacase which are also complementary to antibiotics, we believe the use of exebacase, in addition to conventional anti-staphylococcal antibiotics will provide significantly improved clinical cure rates, compared to antibiotics alone.
- ***Low propensity for the development of resistance.*** *In vitro* models designed to induce the emergence of antibiotic resistance, such as 26-day serial passage studies, have shown a low propensity for bacteria to develop resistance to exebacase. In comparison, resistance to standard of care antibiotics such as daptomycin can readily be induced in the same model. Importantly, the addition of exebacase to daptomycin or other antibiotics in the same model was observed to suppress the emergence of resistance to conventional antibiotics.

We believe exebacase has other competitive advantages as well, including:

- ***No direct competition.*** Vancomycin and daptomycin are the only two antibiotics with label indications in the U.S. for the treatment of MRSA bacteremia, including right-sided endocarditis. Daptomycin, the most recently FDA approved drug for this indication, was approved in 2005. Clinical cure rates at the test of cure visit in the Phase 3 non-inferiority study which led to daptomycin's approval were less than 50% for both daptomycin and the standard of care comparator. Exebacase has been shown to act synergistically with both daptomycin and vancomycin to improve eradication of *S. aureus* in animal studies of *S. aureus* endocarditis conducted in different species. As such exebacase is intended to be used in addition to, not as a replacement for, SOC antibiotics. No other agents have been shown to provide improved outcomes over SOC antibiotics.
- ***Patent protection.*** Our issued patent with composition of matter claims and issued patent with method claims for killing *S. aureus* stains both provide protection through 2032, our issued patent with method claims for disrupting or treating biofilm provides protection until 2033 and additional patents, if issued as we expect, could provide further protection beyond 2033.

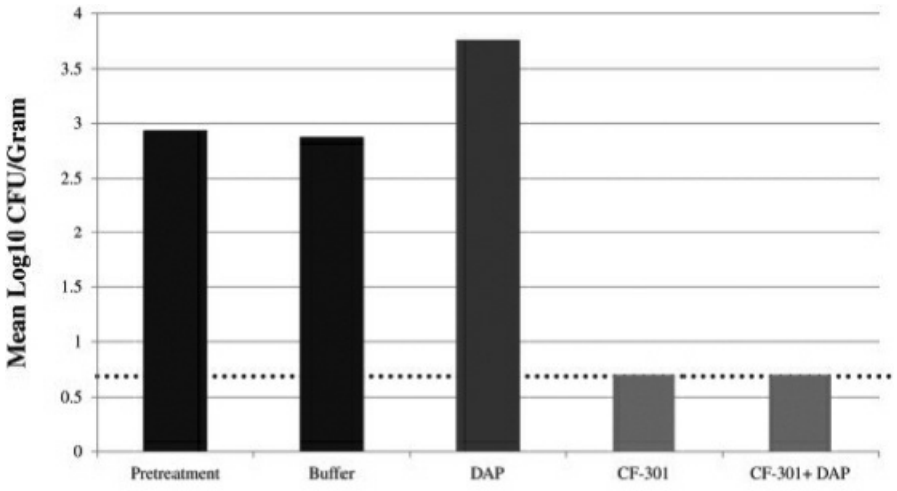
Eradication of Antibiotic-Resistant Biofilms

Biofilm formation is a common characteristic of certain pathogenic bacteria such as *S. aureus* and *P. aeruginosa* and represents a major therapeutic challenge. Biofilms are characterized by densely packed bacterial cells that grow in communities and are enclosed within a complex matrix of dead bacteria and excess cell wall components. Bacteria harbored within biofilms exhibit significant tolerance to conventional antibiotics and can be up to 1,000-fold less susceptible than planktonic (or, free-floating) bacteria. Infected human tissues, such as the heart valve in endocarditis or bone in osteomyelitis, and the abiotic surfaces of indwelling medical devices, such as central venous catheters, prosthetic joints and cardiac devices are common sites for biofilm formation in the setting of systemic *S. aureus* infections. Because conventional antibiotics are relatively ineffective at penetrating biofilms, long courses of antibiotics are generally required and are often unsuccessful, necessitating surgery (e.g., heart valve or prosthetic joint removal and replacement to eradicate the infection). There is a significant unmet medical need for novel treatment strategies to eradicate biofilms, as there are no medical products currently indicated for, or effective in, the eradication of biofilms.

Because exebacase disrupts the cell wall of *S. aureus* bacteria by enzymatic lysis, we expected exebacase to be highly active against biofilms and we have performed an extensive battery of studies to profile exebacase's activity against *S. aureus* biofilms. These studies tested exebacase against biofilms formed on a range of surfaces, including polystyrene (i.e., microtiter plates), glass (i.e., chamber slides), and PVC (i.e., catheter tubing), as well as in human serum, plasma, blood and synovial fluid. The results of these studies as detailed and recently published in Antimicrobial Agents and Chemotherapy (Schuch, et al, AAC, July 2017), provide evidence that exebacase is a potent anti-staphylococcal biofilm agent.

We conducted a pilot study evaluating exebacase's ability to eradicate *S. aureus* biofilm from the inside of a hemodialysis catheter removed from an infected patient. The endpoint of the model was a reduction in the amount of bacteria (measured in CFUs). Segments of the catheter were assigned to one of three different treatment groups: exebacase, daptomycin (DAP) or exebacase + DAP at the clinically relevant concentration of 1 µg/mL. As shown in Figure 1 below, exebacase eradicated the biofilm at 1 µg/mL whereas daptomycin alone did not clear biofilm at 1 µg/mL. The addition of exebacase with daptomycin resulted in the same clearance of biofilm as exebacase alone. The catheter biofilm contained MRSA as well as other *Staph* species. We believe these data provide important translation of the previously reported potent efficacy of exebacase against biofilms formed in vitro and in animal models, to biofilms formed in the setting of human disease.

Figure 1: Sensitivity of MRSA Biofilms on Explanted Human Catheter to Exebacase (CF-301)



"" The dotted line indicates the limit of detection of CFUs/Gram.

In view of the lack of efficacy of conventional antibiotics against biofilms, we believe exebacase, if approved, may provide an important new therapeutic option to address the biofilm components of invasive *S. aureus* infections and potentially forestall or eliminate the need for surgical intervention.

Rapid, potent and selective bactericidal activity

Lysins have demonstrated rapid bactericidal activity. We have performed timekill assays comparing the time it has taken exebacase to kill bacteria *in vitro* and exert a bactericidal effect to the time required for daptomycin or vancomycin to do the same. All drugs were administered at a concentration of 1x minimal inhibitory concentration ("MIC"). Exebacase reduced the number of *S. aureus* bacteria in tests on 62 strains (20 MSSA and 42 MRSA strains) by 3-logs within 30 minutes. In contrast, daptomycin required six hours to achieve the same level of cell killing, while vancomycin failed to achieve a 2-log, or 99%, cell kill during the same six-hour test period. The rapid bactericidal activity of exebacase is one of the important reasons that we believe it could be a highly desirable therapeutic option, if approved, for the treatment of *S. aureus* infections.

Exebacase has been bactericidal against all *S. aureus* isolates tested to date, regardless of their antibiotic-resistance profile. We have tested over 250 different drug sensitive and resistant isolates of *S. aureus*. The isolates tested can be classified by the particular drugs to which they are sensitive or resistant, including MSSA, MRSA, VRSA, linezolid-resistant ("LRSA") and daptomycin-resistant ("DRSA") *S. aureus*. Exebacase was shown to be active against all the strains tested. Our Standard Bacteremia Model utilizes animals infected with 10 million (10^7) CFU of MRSA and treated 3 hours later with various doses of therapy or buffer. In this model, exebacase produced a dose-dependent increase in survival rates, with mice receiving at least 0.5 mg/kg of exebacase having demonstrated at least 90% survival, whereas doses below 0.5 mg/kg resulted in lower survival.

Synergy with Standard-of-Care Antibiotics

Synergy is defined as the interaction of two or more agents so that their combined effect is greater than the sum of their individual effects. We identified a strong synergy between lysins and a wide range of anti-staphylococcal

antibiotics, including daptomycin, vancomycin and oxacillin through *in vitro* synergy assays. In these tests, synergy was assessed by checkerboard assay using the fractional inhibitory concentration index ("FICI") for each combination. An FICI mean was derived from each checkerboard based on two consecutive FIC values along the growth/no growth interface. Synergy was defined as an FICI of ≤0.5; strongly additive was >0.5-<1; indifference was 1 to <2; and antagonism was ≥2.

To test and demonstrate this synergy *in vivo*, we developed the Drug Failure Bacteremia Model where exebacase could be tested in combination with a SOC antibiotic. The Drug Failure Bacteremia Model utilizes an extremely high infection burden of one billion (10^9) CFU. This produces such an overwhelming infection in the animals such that SOC antibiotics used as monotherapies at their human equivalent doses failed to produce significant cure rates. We tested daptomycin, vancomycin and oxacillin in this model. We then adjusted the dose of exebacase so that monotherapy with exebacase would also fail to have significant cure rates under these intense infection conditions. To test and demonstrate whether the synergy that we had observed *in vitro* between exebacase and SOC antibiotics would lead to improved efficacy *in vivo*, we then treated groups of animals in the Drug Failure Bacteremia Model with the drugs as monotherapies and also in combination to evaluate if there was an improvement in efficacy.

In the Drug Failure Bacteremia Model, all control mice treated with buffer succumbed to bacterial infection within 12 hours. Administration of a clinical dose of daptomycin as a single agent resulted in clinical failure, as only 31% of mice survived. Similarly, when exebacase was dosed as a single agent at this chosen dose, only 18% of mice survived. In contrast, when mice received the exebacase *in addition to* daptomycin, 82% survived the bacterial challenge, demonstrating superiority of the combination therapy over either of the single-drug regimens, with a significantly higher survival rate than the sum of the results from the two monotherapies.

We have tested the combination of exebacase with daptomycin, vancomycin and oxacillin in multiple experiments with the Drug Failure Bacteremia Model. In each experiment, the combination therapy was shown to be superior to monotherapy with a single drug alone. We have also studied the combination of exebacase with other anti-staphylococcal agents, including linezolid, televancin, nafcillin, cefazolin, clindamycin and azithromycin, *in vitro* and found exebacase to be synergistic or strongly additive with each agent against both MSSA and MRSA strains.

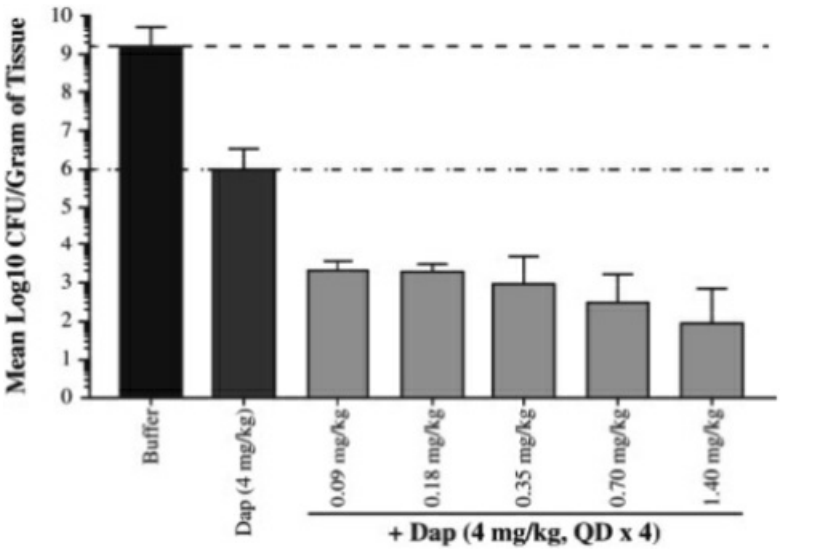
To further explore the activity of exebacase in combination with SOC antibiotics for the treatment of life-threatening, drug-resistant infections, we engaged the LA Biomed Research Institute at Harbor-UCLA Medical Center ("UCLA") to perform studies in their standard, well characterized rat and rabbit infective endocarditis models. The endpoint of the model is a reduction in the amount of bacteria (measured as CFUs) on the heart valve, in the kidney and in the spleen. The studies examined the activity of exebacase in combination with daptomycin, in UCLA's prototypical high-burden biofilm-based model.

In this study, a single dose of exebacase used in addition to daptomycin resulted in an additional substantial reduction in CFUs, on top of the reduction in CFUs by daptomycin alone. This study is highly relevant to our understanding of the therapeutic potential of exebacase and the intended clinical application in a difficult to treat biofilm-based infection. This study demonstrated that a single dose of exebacase, when combined with four days of daptomycin treatment, resulted in a 3-log drop in bacterial burden in the cardiac vegetations and >2-log drop in the kidney and spleen of infected animals relative to daptomycin treatment alone. Importantly, four out of nine animals treated with exebacase and daptomycin were found to have sterilized kidney, spleen and heart valve vegetations, whereas none of the animals treated with daptomycin alone had tissues that were sterilized.

We have subsequently conducted additional experiments at UCLA in the rabbit infective endocarditis model in order to both replicate the results of the rat study, but also to examine a range of exebacase doses used in addition to daptomycin as compared to both buffer and daptomycin alone. The results of a dose-ranging study, where a range of single doses of exebacase was assessed when administered in addition to four days of daptomycin treatment are shown in Figure 2 below. As seen in the rat studies, administration of daptomycin

alone resulted in a 3-log reduction in CFUs in the heart valve vegetations in these animals infected with MRSA. The addition of a single dose of exebacase, resulted in an additional ~3-log reduction in CFUs in the cardiac vegetations compared to daptomycin alone at all doses of exebacase tested ($p \leq 0.002$). Using conventional allometric scaling, the 0.7 mg/kg dose of exebacase approximates the human clinical dose of 0.25mg/kg, which is the dose being studied in our Phase 2 clinical trial. This dose together with daptomycin resulted in a 6-log reduction in CFUs compared to buffer ($p \leq 0.001$). Of note, efficacy was maintained even at the lowest dose of exebacase tested (0.09 mg/kg) in this study ($p \leq 0.001$).

Figure 2: Dose Ranging Study of Exebacase (CF-301) with Daptomycin in Rabbit Infective Endocarditis Model



Collectively, we believe these preclinical data provided significant support to the design of our clinical trials.

Non-Clinical Activities

Chemistry, Manufacturing and Controls ("CMC")

Exebacase is manufactured using a proprietary engineered *E. coli* strain that expresses the product in a recombinant manner during the fermentation process. This technology allows production of up to nine grams of exebacase per liter of fermentation broth. After fermentation, the broth containing exebacase is separated and purified through a process containing two chromatographic columns. The resulting product has greater than 99% purity.

We achieved concurrence with the FDA on our CMC plans for Phase 3 and registration. We have further optimized the manufacturing process for increased purity and yield and completed the manufacture of Phase 3 materials. The process will be validated in a series of manufacturing batches to demonstrate consistency. In parallel to the validation, we intend to conduct a comparability program that demonstrates comparability between the final product used in Phase 3 and commercial manufacturing. We intend to include the results in the BLA that

we expect to submit to the FDA. Following submission, we expect that the FDA will conduct pre-approval inspections of all manufacturing facilities and determine whether it agrees that our commercial material is sufficiently comparable to our Phase 3 material.

Safety Pharmacology and Toxicology

We conducted non-clinical safety pharmacology and toxicology studies in connection with our IND application for exebacase. In these studies, exebacase was well-tolerated in rats for a single two-hour IV administration of doses up to 25mg/kg (determined by us to be the no observable adverse effect level, or "NOAEL") and that a single dose of 2.5 mg/kg was not associated with any effects, adverse or not, and was therefore determined to be the no observable effect level ("NOEL"). Exebacase was well tolerated in these studies in both rats and dogs for seven consecutive days of once daily two-hour IV infusions of up to 2.5 mg/kg. In a non-GLP pilot study in rats, 1.0 mg/kg/day was well tolerated for up to seven consecutive days of once daily two-hour IV infusions or IV boluses.

Dose-dependent adverse effects were seen in both species at doses above 25 mg/kg/day for 1 day in the rat and above 2.5 mg/kg/day for seven-consecutive days in both the rat and the dog. The dose limiting toxicity observed was a localized microscopic histopathological change surrounding certain blood vessels. In accordance with industry practice, we have studied exebacase in clinical trials at doses much lower than those that caused adverse effects in animals, and we believe these doses to be within the efficacious range of the drug.

Upon first exposure to exebacase, no hypersensitivity reaction was observed in any of our animal studies. Upon administration of a second course of exebacase, given two weeks after completion of the first course, including multiple-day courses, hypersensitivity or hypersensitivity-like findings were observed in mice, rats and dogs. In a dedicated hypersensitivity study in rats, using a model intended to elicit hypersensitivity, findings consistent with hypersensitivity were observed after a two-week delayed re-challenge with a second course of exebacase and were not dose-dependent. In general, in humans, Type I hypersensitivity is an allergic anaphylaxis-like response (e.g., an immediate and potentially life-threatening allergic reaction) and Type III hypersensitivity is a serum sickness-like response (e.g., fever, joint pain, protein in urine, vascular changes). While the nature of hypersensitivity reactions in rats may not necessarily be predictive of hypersensitivity reactions that may occur in humans, we have also considered the risk of hypersensitivity occurring upon first administration of exebacase due to potential prior exposure to the active protein component of exebacase from the environment, as it is a naturally occurring protein. Testing for anti-drug antibodies was performed in Phase 1 subjects and Phase 2 patients. No clinical hypersensitivity related to exebacase was observed in subjects dosed in our Phase 1 or Phase 2 study.

CF-296: An Engineered Lysin for Invasive *Staph aureus* Infections

We have engineered a lysin variant of exebacase which we believe may suitable for the potential treatment of the most challenging invasive infections caused by *S. aureus* including biofilm-related infections in prosthetic joints and indwelling devices and osteomyelitis. Based on the safety pharmacology and toxicology profile of exebacase described above, our objectives for the program were to maintain the spectrum of activity of an anti-staphylococcal lysin while improving the non-clinical safety profile.

We are conducting further *in vitro* and *in vivo* preclinical studies of CF-296 to further characterize this compound. In June 2019, we were awarded up to $7.2 million of funding from USAMRDC over the course of three years to advance CF-296 through IND-enabling studies.

CF-370: A Novel Engineered Lysin for *P. aeruginosa* Infections

Medical Opportunity

P. aeruginosa is a gram-negative pathogen that is common in the environment and is an important and much-feared potential pathogen in hospitals. *P. aeruginosa* readily develops resistance to conventional

antibiotics resulting in the emergence of multidrug resistant ("MDR") strains, which have become common in some hospitals and regions*P. aeruginosa* is a major cause of hospital-acquired infections and is a particularly important cause of infections in immunocompromised hosts, and is also a major pathogen in burn and surgical wound infections. *P. aeruginosa* is also the most common pathogen isolated from adults with cystic fibrosis, the most common cause of respiratory failure in cystic fibrosis and responsible for the deaths of the majority of these patients.

Invasive *P. aeruginosa* infections, including ventilator associated pneumonia, blood stream infections, complicated urinary tract infections, and infections following surgery carry some of the highest risks of mortality among hospital acquired infections. More than 32,000 *P. aeruginosa* infections are multidrug-resistant, with roughly 2,700 deaths per year attributed to these infections. Infections caused by multidrug resistant *P. aeruginosa* are associated with high all-cause mortality, hospital mortality and higher health-care related costs compared to infections caused by susceptible strains.

CF-370 Development

CF-370 is an investigational first-in-class anti-bacterial therapeutic candidate targeting a gram-negative pathogen. CF-370 has been engineered to bypass the outer membrane of the bacteria and to enable potent activity in human serum. We believe this is a significant milestone for direct lytic agents as native lysins are typically unable to penetrate the outer membrane of gram-negative bacteria and consequently are unable to kill these pathogens. CF-370 has exhibited the hallmark *in vitro* features of the lysin class, including rapid and potent bactericidal activity, synergy with a broad range of standard of care agents and the eradication of biofilms in preclinical studies.

We have studied the *in vivo* activity of CF-370 against *P. aeruginosa* in a rabbit pneumonia model. CF-370 was well-tolerated and conferred a survival advantage to animals with 100% of animals receiving CF-370 surviving, compared to only 40% survival among vehicle control animals. In animals receiving either meropenem or CF-370 alone, the mean bacterial lung counts decreased by 1.5-2$\log_{10}$ CFU/g versus pretreatment or vehicle-treated controls ($p \leq 0.0016$). CF-370 (10 mg/kg) in addition to meropenem was synergistic, with bacterial counts in all target tissues decreasing by an additional 2$\log_{10}$ CFU/g versus meropenem or CF-370 alone ($p \leq 0.02$).

We have also studied CF-370 against *P. aeruginosa* in the rabbit infective endocarditis model. CF-370 was well-tolerated and in the analysis of the right ventricle, the primary target organ of the study where cardiac vegetations and dense biofilms were present, three days of CF-370 dosing at 10 mg/kg in addition to meropenem was synergistic, providing >2$\log_{10}$ CFU/g reduction, as compared to meropenem alone. In further analysis of the kidney, spleen and lungs, CF-370 showed additive activity when administered with meropenem, and reduced the mean bacterial lung counts by an additional0.7-1.6log10 CFU/g versus meropenem alone.

We believe the results from these studies provide *in vivo* proof-of-concept for CF-370 as a potential treatment for *P. aeruginosa* infections and for lysins as a potential new modality to combat the threat of multidrug-resistant gram-negative pathogens. We continue to progress CF-370 through IND-enabling activities and we expect it to be our next molecule in clinical studies. In July 2020, we were awarded up to $18.9 million in funding from CARB-X in support of the advancement of CF-370 toward Phase 1 clinical trials.

Lysin Discovery Platform

The main objective of our lysin discovery platform has been to bring forth a portfolio of lysins that selectively target the largest threats of resistant bacteria, commonly referred to as the ESKAPE pathogens (*Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter species*), which are the leading causes of hospital acquired infections throughout the world.

In nature, lysins are potent enzymatic killers of bacteria produced by bacteriophage, which are viruses that infect bacteria. When recombinantly produced from genetic sequences as purified proteins and then applied to bacteria, lysins cleave a key component of the target bacteria's peptidoglycan cell wall, resulting in rapid bacterial cell death. Conventional antibiotics require bacterial cell division and metabolism to occur in order to exert their effect (i.e., cell death or cessation of growth). Based on *in vitro* tests, lysins, however, are fundamentally different in that they kill bacteria rapidly by enzymatic cleavage of the bacterial cell wall without need for bacterial growth and cell division. In addition to the speed of action and potent cidality, we believe lysins are differentiated by their other hallmark features which include the demonstrated ability to eradicate biofilms and synergistically boost the efficacy of conventional antibiotics in animal models. Naturally occurring lysins targeting gram-positive pathogens have a "narrow spectrum" of activity and are not expected to have negative effects on the beneficial, normal human GI microbiome in contrast to conventional "broad spectrum" antibiotics which can kill the body's normal, beneficial bacteria. We believe that the potential therapeutic profile of lysins is complementary to that of conventional antibiotics. As such, our approach includes the use of lysins in addition to conventional antibiotics for the treatment of serious, drug-resistant bacterial infections, including biofilm-associated infections, in an effort to achieve greater efficacy and improve clinical outcomes, as well as potentially protect against antibiotic resistance.

We employ bioinformatics and a series of metagenomic-based techniques to identify lysins from bacterial, viral, and environmental sources. The field of metagenomics is based on the bulk extraction of DNA/RNA from environmental samples (e.g., soil, water, etc.) without prior isolation of individual microbial sources. This is useful when one considers that less than 1% of microbes are culturable under standard laboratory conditions. Once extracted, the metagenomic DNA can then be examined using sequence-based methods or by proprietary functional screens. These functional screens for lysin activity form the major component of our lysin discovery work. Once cloned, our scientists also employ a variety of techniques to further optimize and 'engineer' changes to the lysins to introduce specific characteristics which we believe may be favorable for potential therapeutic use.

For the functional metagenomic work that we perform, environmental genes are expressed in a recombinant format in a standard host organism (i.e., *Escherichia coli*) and cells are monitored for the acquisition of a desired phenotype. We can vary both the source of environmental DNA and the way we monitor for desired phenotypes to focus only on environmental populations enriched for bacteriophage lysins that can actively kill a pathogen of interest. We sample various DNA sources including viral, prophage, and pathogen-amplified viral metagenomics. Multiple methods for both DNA library construction and for functional screening are used in parallel in order to maximize lysin identification.

The application of these methods enables the large scale identification of lysins, enabling the production of lysin banks specific for any particular pathogen. We believe the ability to rapidly identify lysins specific for any pathogen of interest, either by in vitro or in silico methods, will provide a steady pipeline of novel lysins for consideration as potential antimicrobial therapeutic candidates.

The focus of our research and discovery efforts is on identifying lysins which selectively kill specific species of gram-negative bacteria that are considered to be urgent or serious threats to global health by the CDC or critical priorities by the WHO. Emerging strains of multi-drug resistant gram-negative pathogens that are resistant to all or nearly all available antibiotics are considered to be a major global health threat. We believe that lysins targeting gram-negative pathogens have the potential to be important therapeutics to combat antimicrobial resistance due to their novel mechanism of action and therapeutic profile, which is complementary to conventional antibiotics.

We have discovered and engineered a novel lysin, CF-370, an investigational first-in-class anti-bacterial therapeutic candidate targeting a gram-negative pathogen, *P. aeruginosa*. CF-370 has been engineered to bypass the outer membrane of the bacteria and to enable potent activity in human serum. We will continue to pursue new lysins that target other gram-negative pathogens, such as the *Enterobacteriaceae* family of bacteria.

Enterobacteriaceae

The *Enterobacteriaceae* family of gram-negative bacteria includes *Klebsiella pneumoniae* ("*K. pneumoniae*"), *Enterobacter species* ("*Enterobacter"* e.g. Enterobacter cloacae) and *Escherichia coli* ("*E. coli*"), all of which can cause serious, life-threatening infections, and have demonstrated concerning resistance patterns.

- *K. pneumoniae* are common causes of serious, potentially life-threatening invasive infections (e.g. pneumonia, complicated urinary tract, intra-abdominal infections) in hospital settings, particularly in intensive care units and among vulnerable patients with impaired immune systems, diabetes or alcohol-use disorders. The mortality rates for hospital-acquired pneumonia due to *K. pneumonia*e can exceed 50% in vulnerable patients.
- *Enterobacter cloacae* can cause a wide range of invasive infections, and potentially contaminate intravenous fluids and medical devices as the source of deadly outbreaks in the hospital.
- *E. coli* is the most frequent cause of community and hospital acquired urinary tract infections and a frequent cause of bloodstream infection. Patients in hospitals, nursing homes, and other healthcare settings whose care requires devices like ventilators (breathing machines), urinary (bladder) catheters, or intravenous (vein) catheters, and patients who are taking long courses of certain antibiotics are most at risk for infection.

The emergence and spread of antimicrobial resistance among *Enterobacteriaceae* are recognized public health threats which complicate the treatment of serious nosocomial infections.

Enterobacteriaceae can produce enzymes (e.g., "extended-spectrum beta-lactamases ("ESBL")) that confer resistance to most beta-lactam antibiotics, including penicillins, cephalosporins, and the monobactam aztreonam. Infections with ESBL-producing organisms have been associated with poor outcomes. Approximately 20% of *K. pneumoniae* infections and 31% of *Enterobacter* infections in intensive care units in the United States now involve strains which are not susceptible to third-generation cephalosporins. Community and hospital-acquired ESBL-producing *Enterobacteriaceae* are prevalent worldwide, and their prevalence may be underestimated because reliable identification of ESBL-producing organisms in clinical laboratories can be challenging.

Carbapenem antibiotics are considered to be the best currently available antimicrobial agent to treat infections caused by ESBL-producing Enterobacteriaceae. However, resistance to carbapenems is becoming increasingly prevalent, and the resulting Carbapenem-resistant *Enterobacteriaceae* ("CRE"), have high levels of resistance to antibiotics. *K. pneumoniae* and *E. coli* are a normal part of the human gut bacteria that can become carbapenem-resistant due to enzymes that breakdown carbapenem antibiotics and make them ineffective. *Klebsiella pneumoniae* carbapenemase ("KPC") and New Delhi Metallo-beta-lactamase ("NDM") are two such enzymes that break down carbapenems and make them ineffective. Both of these enzymes have also been reported in *P. aeruginosa.* CRE infections typically occur in hospitals, nursing homes, and other healthcare settings. Patients who require devices like ventilators (breathing machines), urinary (bladder) catheters, or intravenous (vein) catheters, and/or patients who are taking long courses of certain antibiotics are most at risk for CRE infections. Some CRE bacteria have become resistant to most available antibiotics, are very difficult to treat, and can lead to death in up to 50% of patients who become infected.

We believe that lysins which target *K. pneumoniae*, *Enterobacter* and *E. coli* may be important therapeutic options for the treatment of serious, potentially life-threatening invasive infections caused by multidrug resistant pathogens. Because of the novel mechanism by which lysins kill bacterial, no cross resistance to conventional antibiotics, and as such, KPC, NDM and similar enzymes are not expected to have any effect on the activity of lysins. We believe that lysins may help to improve clinical outcomes of infections caused by these pathogens and thus we are also focusing research efforts to identify and develop lysins which target them.

Gram-positive lysins

In addition to our proprietary lysin discovery program, we hold worldwide exclusive license rights to patents for composition of matter for nine lysins from The Rockefeller University ("Rockefeller"). The lysins each target a specific species of gram-positive bacteria, including drug-sensitive and drug-resistant forms as exemplified in Table 4 below.

Table 4: Lysins Licensed From The Rockefeller University

Pathogen	CDC Threat Level	WHO Priority Level	Lysins
Staphylococcus aureus	Serious	High	CF-301, CF-302
Streptococcus pneumoniae	Serious	Medium	CF-303, CF-309
Enterococcus faecalis	Serious	High	CF-304
Group B *streptococcus*	Concerning	—	CF-305, CF-307
Bacillus anthracis	—	—	CF-306, CF-308

Amurin Discovery Program

Amurin peptides are a class of novel, phage-derived lytic agents discovered in our laboratories. In preclinical studies, amurin peptides have shown some features common to lysins, including potent bacteriocidality, including antibiotic-resistant strains, the ability to clear biofilms and synergize with conventional antibiotics. However, amurin peptides are further differentiated in their potential ability to exert these actions on the full range of gram-negative ESKAPE pathogens, as well as a range of additional, serious and difficult to treat gram-negative bacteria, including some strains of *Burkholderia* and *Stenotrophomonas*, in the context of human serum, without apparent 'off target' effects against gram-negatives. As such, amurin peptides have shown a highly differentiated spectrum of action, and we believe, if successfully developed, would be extremely well suited as potential treatments for patients suffering from polymicrobial gram-negative infections, such as cystic fibrosis, ventilator-associated pneumonia, intra-abdominal infections, and serious burns or certain chronic wound infections. Given their powerful *in vitro* activity against a broad range of resistant pathogens, as shown in Table 5 below, we believe that amurin peptides have the potential to become a powerful addition to our armamentarium against strains of gram-negative pathogens which have extreme- or pan- drug resistance to all or almost all currently available antibiotics.

Table 5: *In Vitro* Activity (minimal inhibitory concentrations) of Amurin Candidates (AM1, AM2 and AM3) Observed Against Carbapenem-Resistant Pathogens*

Pathogen	AM1	AM2	AM3	Colistin	Meropenem
Escherichia coli	0.5	0.25	0.625	0.5	>8
Enterobacter cloacae	0.25	0.125	0.0625	1	>8
Klebsiella pneumoniae	0.5	0.5	0.0625	>8	8
Acinetobacter baumannii	1	1	0.25	>8	>8

* strains listed are representative of >100 strains tested

Similar to the pilot study performed with exebacase, we evaluated the ability of one of our lead amurins, AM1, to eradicate *Stenotrophomonas maltophilia* biofilms from the inside of hemodialysis catheters removed from infected patients. The endpoint of the model was a reduction in the amount of bacteria (measured in CFUs) in sections of the catheters treated with amurin AM1 compared to a control group (sections with no treatment) and sections treated with clinically relevant concentrations of meropenem. Treatment with amurin AM1 resulted in the reduction in the amount of bacteria below the limit of detection, 0.7 $\log_{10}$ CFU/g, while both the control

groups and sections treated with meropenem had CFU counts >3.0 $\log_{10}$ CFU/g. We believe these results provide important *ex vivo* translation of the *in vivo* activity to biofilms formed in the setting of human disease.

We plan to progress our amurin peptide program as rapidly as possible through preclinical profiling and into clinical studies. We are currently evaluating the *in vivo* profiles of the amurins as we continue to advance the program.

Intellectual Property

Our goal is to obtain, maintain and enforce patent protection for our products, formulations, processes, methods and other proprietary technologies, preserve our trade secrets, and operate without infringing on the valid proprietary rights of other parties, both in the United States and in other countries. Our policy is to actively seek to obtain, where appropriate, the broadest intellectual property protection possible for our product candidates, proprietary information and proprietary technology through a combination of contractual arrangements and patents, both in the United States and abroad. However, patent protection does not always afford us with complete protection against competitors who seek to circumvent our patents.

We also depend upon the skills, knowledge, experience and know-how of our management and research and development personnel, as well as that of our advisors, consultants and other contractors. To help protect our proprietary know-how, which is not patentable, and for certain inventions, in accordance with our business strategies, we currently rely and will in the future rely on trade secret protection and confidentiality agreements to protect our interests. To this end, we will require all of our employees, consultants, and other contractors (including any consultants or contractors we may retain for purposes of any of our ad hoc Clinical Advisory Boards) to enter into confidentiality agreements that prohibit the disclosure of confidential information and, where applicable, require disclosure and assignment to us of the ideas, developments, discoveries and inventions important to our business.

Our DLA portfolio consists of twenty-seven (27) U.S. patents, one-hundred and fifty-two (152) issued foreign patents and two hundred and thirty-six (236) pending U.S. and international patent applications that we have licensed from Rockefeller and/or developed in-house. Our patents and patent applications include those that are directed to compositions and methods for the treatment of infections caused by Gram-positive bacteria (Group B *Streptococci, S. aureus, Streptococcus pneumonia, Bacillus anthracis* (anthrax)*, Enterococcus faecalis* and *Enterococcus faecium*) and infections caused by Gram-negative bacteria (*P. aeruginosa, K. pneumoniae*, *Enterobacter cloacae* and *E. coli)*. If patents are granted on our patent applications, which include certain patent applications related to exebacase, CF-296 and the Gram-negative lysins, they would expire between 2029 and 2042.

The U.S. patent system permits the filing of provisional and non-provisional patent applications. A non-provisional patent application is examined by the United States Patent and Trademark Office ("USPTO"), and can issue as a patent once the USPTO determines that the claimed invention meets the various standards for patentability. A provisional patent application is not examined or prosecuted, and automatically expires 12 months after its filing date if a non-provisional application is not filed based on the provisional application within that 12-month period. Provisional applications are often used, among other things, to establish a priority filing date for the subsequently filed non-provisional patent application. The term of individual patents depends upon the legal term for patents in the countries in which they are filed. In most countries in which we file, the patent term is 20 years from the earliest filing date of a non-provisional patent application. In the United States, a patent's term may be lengthened by patent term adjustment, which compensates a patentee for administrative delays by the USPTO in granting a patent. Alternatively, a patent's term may be shortened if a patent is terminally disclaimed over another patent.

The term of a patent that covers an FDA-approved drug may also be eligible for patent term extension ("PTE"), which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process. The Drug Price Competition and Patent Term Restoration Act of 1984, or the Hatch-

Waxman Amendments, permits a PTE of up to five years beyond the expiration of the patent. The length of the PTE is related to the length of time the drug is under regulatory review. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval and only one patent applicable to an approved drug may be extended. Similar provisions are available in Europe and certain other foreign jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our pharmaceutical product candidates receive FDA or other regulatory approval, we may be able to apply for or receive the benefit of PTEs on patents covering those products.

License Agreements—The Rockefeller University

We have entered into the following license agreements with Rockefeller:

- On July 12, 2011, we entered into a license agreement for the worldwide, exclusive right to a provisional patent application, upon which a non-provisional patent application has since been filed, covering the composition of matter for the lysin PlySS2 for the treatment and prevention of diseases caused by gram-positive bacteria (the "CF-301 License"). We rebranded PlySS2 as CF-301, or exebacase. This license gives us the right to exclusively develop, make, have made, use, import, lease, sell and offer for sale products that would fall within the scope of claims in the patent application or otherwise infringe a claim of the patent.
- On June 1, 2011, we entered into a license agreement for the exclusive rights to Rockefeller's interest in a joint patent application, which have granted patents covering the method of delivering antibodies through the cell wall of a gram-positive bacteria to the periplasmic space. This intellectual property was developed as a result of the sponsored research agreement between us and Rockefeller, and was jointly discovered and filed by the two parties.
- On September 23, 2010, we entered into a license agreement for the worldwide, exclusive right to develop, make, have made, use, import, lease and sell, and offer for sale products that would otherwise infringe or fall within the scope of a claim of the suite of patents and patent applications covering the composition of matter for eight individual lysin molecules for the treatment and prevention of diseases caused by gram-positive bacteria. The lysins in this suite have activity against Group B *Streptococci*, *S. aureus*, *Streptococcus pneumonia*, *Bacillus anthracis*, *Enterococcus faecalis* and *Enterococcus faecium*.

In consideration for the licenses, we paid Rockefeller license initiation fees in cash and stock and may be required to pay an annual maintenance fee, milestone payments and royalties on net sales from products to Rockefeller. We are allowed to grant sublicenses to third parties without prior approval, subject to certain conditions and the payment of a certain percentage of all payments we receive from sublicensees.

Each license agreement terminates upon the later of (i) the expiration or abandonment of the last licensed patent under the license agreement to expire or become abandoned, or (ii) 10 years after the first commercial sale of the first licensed product. Rockefeller may terminate any license agreement in the event of a breach of such agreement by us or if we challenge the validity or enforceability of the underlying patent rights. We may terminate any license agreement at any time on 60 days' notice.

Competition

The pharmaceutical and biotechnology industries are intensely competitive. While we believe that our technology and scientific knowledge provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies and academic and research organizations in developing therapies to treat diseases.

Exebacase is a potential first-in-class drug candidate and we believe it is the first lysin to enter human clinical trials in the U.S. We believe there is currently no clinical competitor to exebacase, which is highly

differentiated from conventional antibiotics by at least six attributes that no single antibiotic possesses, including: (1) a novel mechanism of action, (2) specificity for a target bacteria (only *S. aureus*), (3) rapid speed of action, (4) activity across all drug-sensitive and drug-resistant strains of the target bacteria (including MRSA, VRSA and DRSA), (5) the ability to eradicate biofilms, and (6) synergy with antibiotics.

S. aureus bacteremia is typically treated with oxacillin or other semi-synthetic penicillin or first-generation cephalosporin, or for MRSA strains, daptomycin or vancomycin. We do not see market competition with these drugs, as our strategy is to administer exebacase in addition to these drugs with the goal of achieving clinical superiority over any one of those SOC antibiotics alone. We are aware of several other clinical trials currently being conducted or recently concluded in patients with *S. aureus* bacteremia. Most of these agents are small molecules being studied in non-inferiority trials. We believe that exebacase has demonstrated synergy *in vitro* with a broad range of conventional anti-staphylococcal agents of different classes and, in the event any of these non-inferior small molecules are approved, we believe that exebacase will also be synergistic and non-competitive with them.

Based on recent data published by the WHO, there are only five biologic agents, other than ours, in clinical development for *S. aureus* infections from iNtRon Biotechnology, Inc., ("iNtRon"), Aridis Pharmaceuticals, Inc. ("Aridis"), MedImmune (a subsidiary of AstraZenenca plc), XBiotech, Inc ("XBiotech") and Genentech, Inc. ("Genentech"). Aridis is studying AR-301, a monoclonal antibody, in *S. aureus* pneumonia, not bacteremia. MedImmune has been studying MEDI-4893, a monoclonal antibody, for the prevention of *S. aureus* pneumonia in a Phase 2 study since 2014. XBiotech is planning to study 514G3, a monoclonal antibody, for the prevention of *S. aureus* infection in hemodialysis patients. Genentech has been studying DSTA-4637S, an antibody-drug conjugate, in a Phase 1 study since 2017. Depending on the outcomes of these and future trials, exebacase may compete with these products. We believe iNtRon, a biotechnology company located in South Korea, is currently conducting a human clinical trial in South Korea alone for SAL-200, an endolysin-based drug candidate, to evaluate it as a treatment for *S. aureus* bacteremia. Additionally, in November 2018, iNtRon announced a licensing arrangement with Roivant Sciences with a stated purpose to pursue the global development and commercialization of its endolysin products, including SAL-200. We will continue to monitor the advancement of SAL-200 as data and information become available. We are not aware of SAL-200 or any other anti-staphylococcal lysins having been applied for under an IND for clinical development in the United States.

Many of our competitors may have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved medicines than we do. We compete with companies that have products on the market or in development for the same indications as our product candidates. Mergers and acquisitions in the pharmaceutical, biotechnology and diagnostic industries may result in even more resources being concentrated among a smaller number of our competitors. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

The key competitive factors affecting the success of all of our product candidates, if approved, are likely to be their efficacy, safety, convenience, price and the availability of reimbursement from government and other third-party payors. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize medicines that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any medicines that we may develop. Our competitors also may obtain FDA or other regulatory approval for their medicines more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

Manufacturing

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We currently rely, and expect to continue to rely, on third parties for the manufacture of our product candidates for

preclinical or clinical manufacturing, testing, as well as for commercial manufacture of any products that we may commercialize. Prior to 2021, we employed the services of Fujifilm Diosynth Biotechnologies UK LTD ("Fujifilm UK") to supply the drug substance for exebacase. In the fourth quarter of 2020, we were notified by Fujifilm UK that they experienced equipment failures that would impact their manufacturing timelines. To mitigate this delay, Fujifilm UK has proposed the transition of the exebacase manufacturing process to Fujifilm Diosynth Biotechnologies USA Inc. ("Fujifilm USA"). We have successfully transferred the manufacturing process and expect to complete the process validation and initial commercial manufacturing of drug substance with Fujifilm USA in support of a potential BLA submission for exebacase. While steps have been and will continue to be taken to mitigate risks, we may still experience delays to the manufacturing timeline.

We do not yet have contracts to produce a commercial supply of the drug substance for exebacase; however, we intend to pursue agreements with Fujifilm USA to do so. We employ the services of multiple vendors to produce exebacase in its final vialed drug product form. We intend to pursue agreements with third party manufacturers regarding commercial supply of vialed drug product at an appropriate future time. We may choose to locate additional fill finish third party manufacturers to supply other world regions such as the EU or Asia.

Sales, Marketing and Distribution

We do not currently have an organization for the sales, marketing and distribution of pharmaceutical products. We may rely on licensing and co-promotion agreements with strategic partners for the commercialization of our products in the United States and other territories. If we choose to build a commercial infrastructure to support marketing in the United States, such commercial infrastructure could be expected to include a targeted sales force supported by sales management, internal sales support, an internal marketing group and distribution support. To develop the appropriate commercial infrastructure internally, we would have to invest financial and management resources, some of which would have to be deployed prior to any confirmation that any of our other products will be approved.

Government Regulation

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 biologics such as those we are developing. We, along with third-party contractors, 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 applicable federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources.

U.S. Regulation of Drugs and Biologics

In the United States, the FDA regulates biological products under the Federal Food, Drug, and Cosmetic Act ("FDCA") and the Public Health Service Act ("PHSA"), and their implementing regulations, and biologics under the FDCA and the Public Health Service Act ("PHSA"), and its implementing regulations. FDA approval is required before any new unapproved drug or dosage form, including a new use of a previously approved drug, can be marketed in the United States. Drugs and biologics are also subject to other federal, state, and local statutes and regulations. The process required by the FDA before product candidates may be marketed in the United States generally involves the following:

- completion of extensive preclinical laboratory tests and preclinical animal studies, all performed in accordance with Good Laboratory Practices ("GLP") regulations;
- submission to the FDA of an IND, which must become effective before human clinical studies may begin and must be updated annually;

- approval by an independent institutional review board ("IRB") or ethics committee representing each clinical site before each clinical study may be initiated;
- performance of adequate and well-controlled human clinical studies in accordance with Good Clinical Practice ("GCP"), requirements to establish the safety and efficacy, or with respect to biologics, the safety, purity and potency of the product candidate for each proposed indication;
- preparation of and submission to the FDA of a BLA after completion of all pivotal clinical studies;
- a determination by the FDA within 60 days of its receipt of a BLA to file the application for review;
- potential review of the product application by an FDA advisory committee, where appropriate and if applicable;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facilities where the proposed product drug substance is produced to assess compliance with current Good Manufacturing Practices ("cGMP"), and audits of selected clinical trial sites to ensure compliance with GCP; and
- FDA review and approval of an NDA or BLA prior to any commercial marketing or sale of a biological product in the United States.

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 or protocols for preclinical studies and clinical trials. 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 ("CMC") 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 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 GCP, which includes 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. While the IND is active, progress reports summarizing the results of the clinical trials and nonclinical studies performed since the last progress report, among other information, must be submitted at least annually to the FDA, and written IND safety reports must be submitted to the FDA and investigators for serious and unexpected suspected adverse events, findings from other studies suggesting a significant risk to humans exposed to the drug, findings from animal or in vitro testing suggesting a significant risk to humans exposed to the drug, and any clinically important increased rate of a serious suspected adverse reaction compared to that listed in the protocol or investigator brochure.

Furthermore, an independent 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 preclinical studies and clinical trials and clinical study results to public registries.

The clinical investigation of a drug is generally divided into three phases. Although the phases are usually conducted sequentially, they may overlap or be combined.

- Phase 1. The investigational product is initially introduced into healthy human subjects or patients with the target disease or condition. These studies are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.
- Phase 2. The investigational product is administered to a limited patient population with a specified disease or condition to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks. Multiple Phase 2 clinical trials may be conducted to obtain information prior to beginning larger and more expensive Phase 3 clinical trials.
- Phase 3. The investigational product is administered to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval.

In some cases, the FDA may condition approval of a BLA for a product candidate on the sponsor's agreement to conduct additional clinical studies after approval. In other cases, a sponsor may voluntarily conduct additional clinical studies after approval to gain more information about the drug. Such post-approval studies are typically referred to as Phase 4 clinical studies. Concurrent with clinical trials, companies may complete additional animal studies and develop additional information about the biological 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 and, among other things, must develop methods for testing the identity, strength, quality and purity of the final product, or for biologics, the safety, purity and potency

BLA Review Process

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 a BLA requesting approval to market the product for one or more indications. The BLA must include all relevant data available from pertinent preclinical studies and clinical trials, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's CMC and proposed labeling, among other things. Data can come from company-sponsored clinical studies intended to test the safety and effectiveness of the product, or from a number of alternative sources, including studies initiated and sponsored by investigators. The submission of a BLA requires payment of a substantial application user fee to the FDA, unless a waiver or exemption applies.

In addition, under the Pediatric Research Equity Act ("PREA"), a BLA or supplement to a BLA must contain data to assess the safety and effectiveness of the biological product candidate for the claimed indications in all relevant pediatric subpopulations and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. FDA requires that a sponsor who is planning to submit a marketing application for a drug or biological product that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration submit an initial pediatric study plan within sixty days after an end-of-Phase 2 meeting or as may be agreed between the sponsor and FDA. Unless otherwise required by regulation, PREA does not apply to any drug or biological product for an indication for which orphan designation has been granted.

Within 60 days following submission of the application, the FDA reviews the submitted BLA to determine if the application is substantially complete before the agency accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the BLA must be resubmitted with the additional information. Once a BLA has been accepted for filing, the FDA's goal is to review standard applications within ten months after the filing date, or, if the application qualifies for priority review, six months after the FDA accepts the application for filing. The FDA reviews a BLA to determine, among other things, whether a product is safe, pure and potent and the facility in which it is manufactured, processed, packed or held meets standards designed to assure the product's continued safety, purity and potency. In both standard and priority reviews, the review process may also be extended by FDA requests for additional information or clarification. When reviewing a BLA, the FDA may convene an advisory committee to provide clinical insight on application review questions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

Before approving a BLA, 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 a BLA, the FDA will typically inspect one or more clinical sites to assure compliance with GCP.

After the FDA evaluates the BLA 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 ("CRL"). An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A CRL will describe all of the deficiencies that the FDA has identified in the BLA, except that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the CRL without first conducting required inspections, testing submitted product lots and/or reviewing proposed labeling. In issuing the CRL, the FDA may recommend actions that the applicant might take to place the BLA in condition for approval, including requests for additional information or clarification. The FDA may delay or refuse approval of a BLA 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 will be granted for particular indications and may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the BLA with a Risk Evaluation and Mitigation Strategy ("REMS"), to ensure the benefits of the product outweigh its risks. A REMS is a safety strategy to manage a known or potential serious risk associated with a product and to enable patients to have continued access to such medicines by managing their safe use, and 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 requirements 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.

FDA Expedited Review Programs

The FDA administers a number of programs to facilitate the development, and expedite the review, of drugs or biologics that are intended for the treatment of serious or life-threatening diseases or conditions. For example, the fast track program is intended to expedite or facilitate the process for reviewing product candidates that meet certain criteria. Specifically, product candidates are eligible for fast track designation if they are intended to treat

a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. Fast track designation applies to the combination of the product candidate and the specific indication for which it is being studied. The sponsor of a fast track product candidate has opportunities for more frequent interactions with the review team during product development and, once a BLA is submitted, the product may be eligible for priority review. A fast track product candidate may also be eligible for rolling review, where the FDA may consider for review sections of the BLA on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the BLA, the FDA agrees to accept sections of the BLA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the BLA.

A product candidate intended to treat a serious or life-threatening disease or condition may also be eligible for breakthrough therapy designation to expedite its development and review. A product candidate can receive breakthrough therapy designation if preliminary clinical evidence indicates that the product, alone or in combination with one or more other drugs or biologics, may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The designation includes all of the fast track program features, as well as more intensive FDA interaction and guidance beginning as early as Phase 1 and an organizational commitment to expedite the development and review of the product candidate, including involvement of senior managers.

Any marketing application for a drug or biologic submitted to the FDA for approval, including a product candidate with a fast track designation and/or breakthrough therapy designation, may be eligible for other types of FDA programs intended to expedite the FDA review and approval process, such as priority review and accelerated approval. A BLA is eligible for priority review if the product candidate has the potential to provide a significant improvement in the treatment, diagnosis or prevention of a serious disease or condition. For original BLAs, priority review designation means the FDA's goal is to take action on the marketing application within six months of the 60-day filing date (as compared to ten months under standard review).

Additionally, product candidates studied for their safety and effectiveness in treating serious or life-threatening diseases or conditions may receive accelerated approval upon a determination that the product candidate has an effect on 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. As a condition of accelerated approval, the FDA will generally require the sponsor to perform adequate and well-controlled post-marketing clinical studies to verify and describe the anticipated effect on irreversible morbidity or mortality or other clinical benefit. Products receiving accelerated approval may be subject to expedited withdrawal procedures if the sponsor fails to conduct the required post-marketing studies or if such studies fail to verify the predicted clinical benefit. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

Fast track designation, breakthrough therapy designation, priority review, and accelerated approval do not change the standards for approval but may expedite the development or approval process. Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Post-Approval Requirements

Any products manufactured or distributed 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, product sampling and distribution, and advertising and promotion of the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. There also are continuing user fee

requirements, under which the FDA assesses an annual program fee for each product identified in an approved BLA. Drug and biologic 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 cGMPs, 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 cGMPs 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 cGMPs and other aspects of regulatory compliance.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical 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 untitled letters;
- clinical holds on clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the marketing, labeling, advertising and promotion of biologics. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. 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.

Biosimilars and Reference Product Exclusivity

The Biologics Price Competition and Innovation Act of 2009 ("BPCIA""), created an abbreviated approval pathway for biological products that are highly similar, or "biosimilar," to or interchangeable with an

FDA-approved reference biological product. Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, is generally shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. A product shown to be biosimilar or interchangeable with an FDA-approved reference biological product may rely in part on the FDA's previous determination of safety and effectiveness for the reference product for approval, which can potentially reduce the cost and time required to obtain approval to market the product.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing that applicant's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product. The BPCIA also created certain exclusivity periods for biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed "interchangeable" by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law.

A biological product can also obtain pediatric market exclusivity in the United States. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued "Written Request" for such a study.

Additional Controls for Biologics

To help reduce the increased risk of the introduction of adventitious agents, the PHSA emphasizes the importance of manufacturing controls for products whose attributes cannot be precisely defined. The PHSA also provides authority to the FDA to immediately suspend licenses in situations where there exists a danger to public health, to prepare or procure products in the event of shortages and critical public health needs, and to authorize the creation and enforcement of regulations to prevent the introduction or spread of communicable diseases in the United States and between states.

After a BLA is approved, the product may also be subject to official lot release as a condition of approval. As part of the manufacturing process, the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official release by the FDA, the manufacturer submits samples of each lot of product to the FDA together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot. The FDA may also perform certain confirmatory tests on lots of some products, such as viral vaccines, before releasing the lots for distribution by the manufacturer. In addition, the FDA conducts laboratory research related to the regulatory standards on the safety, purity, potency, and effectiveness of biological products. As with drugs, after approval of biologics, manufacturers must address any safety issues that arise, are subject to recalls or a halt in manufacturing, and are subject to periodic inspection after approval.

Other U.S. Regulatory Requirements

In the United States, the research, manufacturing, distribution, sale, and promotion of drug and biological products are potentially subject to regulation by various federal, state, and local authorities in addition to the FDA, including the Centers for Medicare and Medicaid Services, other divisions of the United States Department

of Health and Human Services (e.g., the Office of the Inspector General), the United States Department of Justice and individual United States Attorneys' offices within the Department of Justice, and state and local governments. For example, sales, marketing, and scientific/educational grant programs must comply with the anti-fraud and abuse provisions of the Social Security Act and the False Claims Act. Pricing and rebate programs must comply with the Medicaid rebate requirements of the Omnibus Budget Reconciliation Act of 1990 and the Veterans Health Care Act of 1992, each as amended. If products are made available to authorized users of the Federal Supply Schedule of the General Services Administration, additional laws and requirements apply. All of these activities are also potentially subject to federal and state consumer protection, unfair competition, and other laws, and violations of these laws may result in imprisonment, criminal fines, civil monetary penalties and exclusion from participation in federal healthcare programs.

The federal Anti-Kickback Statute prohibits, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for the purchase, lease or order of any healthcare item or service reimbursable under Medicare, Medicaid or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. In addition, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. Violations of the Anti-Kickback Statute are punishable by imprisonment, criminal fines, civil monetary penalties and exclusion from participation in federal healthcare programs. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor.

Federal false claims laws, including the False Claims Act, prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government, or knowingly making, or causing to be made, a false statement to have a false claim paid. Recently, several pharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly inflating drug prices they report to pricing services, which in turn were used by the government to set Medicare and Medicaid reimbursement rates, and for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. In addition, certain marketing practices, including off-label promotion, may also violate false claims laws. Moreover, the government may assert that a claim including items and services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act. The majority of states also have statutes or regulations similar to the federal anti-kickback law and false claims laws, which apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

HIPAA also created new federal criminal statutes that prohibit among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and 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. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

There has also 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 (collectively, the "ACA"), among other things, imposes new reporting requirements on drug manufacturers for payments made by them to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain non-physician practitioners (physician assistants, nurse practitioners, clinical nurse specialists, certified nurse anesthetists, anesthesiologist assistants and certified

nurse midwives), and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members. Failure to submit required information may result in significant civil monetary penalties and additional penalties 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. Drug manufacturers are required to submit reports to the government by the 90th day of each calendar year. Certain states also mandate implementation of compliance programs, impose restrictions on drug manufacturer marketing practices and/or require the tracking and reporting of gifts, compensation and other remuneration to physicians.

Violations of any of the laws described above or any other governmental regulations that apply to us may result in significant administrative, civil and criminal penalties, damages, fines, exclusion from participation in governmental health care programs, additional reporting obligations and oversight if we become subject to a corporate integrity agreement or other agreement to resolve allegations of non-compliance with these laws, imprisonment, and the curtailment or restructuring of our operations.

Moreover, ContraFect is now, and in the future may become, subject to additional federal, state, and local laws, regulations, and policies relating to safe working conditions, laboratory practices, the experimental use of animals, and/or the use, storage, handling, transportation, and disposal of human tissue, waste, and hazardous substances, including radioactive and toxic materials and infectious disease agents used in conjunction with our research work.

Physician Drug Samples

As part of the sales and marketing process, pharmaceutical companies frequently provide samples of approved drugs to physicians. The Prescription Drug Marketing Act, or the PDMA, imposes requirements and limitations upon the provision of drug samples to physicians, as well as prohibits states from licensing distributors of prescription drugs unless the state licensing program meets certain federal guidelines that include minimum standards for storage, handling and record keeping. In addition, the PDMA sets forth civil and criminal penalties for violations.

New Legislation and Regulations

From time to time, legislation is drafted, introduced and passed in Congress that could significantly change the statutory provisions governing the testing, approval, manufacturing and marketing of products regulated by the FDA. In addition to new legislation, FDA regulations and policies are often revised or interpreted by the agency in ways that may significantly affect our business and our products. It is impossible to predict whether further legislative changes will be enacted or whether FDA regulations, guidance, policies or interpretations changed or what the effect of such changes, if any, may be.

For example, in December 2016, the 21st Century Cures act, or Cures Act, was signed into law. The Cures Act, among other things, is intended to modernize the regulation of drugs and biologics and spur innovation, but its ultimate implementation remains unclear. Among other things, the Cures Act provides a new "limited population" approval pathway for antibacterial and antifungal drugs intended to treat serious or life-threatening infections.

Government Contracts and Regulation

We currently contract with the federal government. The BARDA Contract could result in payments to us of up to approximately $86.8 million and consists of a one-year base period-of-performance and a total contract period-of-performance (base period plus option exercises) of up to six years in support of the completion of the Phase 3 clinical trial of exebacase, further clinical and non-clinical studies, manufacturing, supply chain, clinical, regulatory and administrative activities. As a government contractor, we are subject to complex and wide-ranging

federal and agency-specific regulations and contractual requirements that not only govern how we perform under the contract but also impose other requirements that affect our operations, including socio-economic obligations such as obligations related to affirmative action or maintaining a drug-free workplace. While some of our employees have been involved in government contracts previously, many of these government contracting requirements are new to us as a company. The costs of compliance with these requirements may be significant. Failure to comply with government contracting requirements could result in termination of our contract or the imposition of penalties.

Foreign Regulation

In addition to regulations in the United States, we may become subject to widely varying foreign regulations governing, among other things, clinical trials, manufacture, product registration and approval, and pharmaceutical sales. Whether or not FDA approval has been obtained, we must obtain a separate approval for a product by the comparable regulatory authorities of foreign countries prior to the commencement of clinical studies or marketing of the product in these countries. The requirements and process governing the conduct of clinical studies, approval process, product licensing, pricing and reimbursement vary from country to country. Failure to comply with applicable foreign regulatory requirements, may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Non-clinical studies and clinical trials

Similar to the United States, the various phases ofnon-clinical and clinical research in the European Union, or EU, are subject to significant regulatory controls.

Non-clinical studies are performed to demonstrate the health or environmental safety of new chemical or biological substances.Non-clinical studies must be conducted in compliance with the principles of good laboratory practice, or GLP, as set forth in EU Directive 2004/10/EC. In particular, non-clinical studies, both in vitro and in vivo, must be planned, performed, monitored, recorded, reported and archived in accordance with the GLP principles, which define a set of rules and criteria for a quality system for the organizational process and the conditions for non-clinical studies. These GLP standards reflect the Organization for Economic Co-operation and Development requirements.

Clinical trials of medicinal products in the EU must be conducted in accordance with EU and national regulations and the International Conference on Harmonization (“ICH”) guidelines on GCP as well as the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki. If the sponsor of the clinical trial is not established within the EU, it must appoint an EU entity to act as its legal representative. The sponsor must take out a clinical trial insurance policy, and in most EU member states, the sponsor is liable to provide ‘no fault’ compensation to any study subject injured in the clinical trial.

The regulatory landscape related to clinical trials in the EU has been subject to recent changes. The EU Clinical Trials Regulation, or CTR, which was adopted in April 2014 and repeals the EU Clinical Trials Directive, became applicable on January 31, 2022. Unlike directives, the CTR is directly applicable in all EU member states without the need for member states to further implement it into national law. The CTR notably harmonizes the assessment and supervision processes for clinical trials throughout the EU via a Clinical Trials Information System, which contains a centralized EU portal and database.

While the Clinical Trials Directive required a separate clinical trial application, or CTA, to be submitted in each member state, to both the competent national health authority and an independent ethics committee, much like the FDA and IRB respectively, the CTR introduces a centralized process and only requires the submission of a single application to all member states concerned. The CTR allows sponsors to make a single submission to both the competent authority and an ethics committee in each member state, leading to a single decision per

member state. The CTA must include, among other things, a copy of the trial protocol and an investigational medicinal product dossier containing information about the manufacture and quality of the medicinal product under investigation. The assessment procedure of the CTA has been harmonized as well, including a joint assessment by all member states concerned, and a separate assessment by each member state with respect to specific requirements related to its own territory, including ethics rules. Each member state's decision is communicated to the sponsor via the centralized EU portal. Once the CTA is approved, clinical study development may proceed.

The CTR foresees a three-year transition period. The extent to which ongoing and new clinical trials will be governed by the CTR varies. For clinical trials whose CTA was made under the Clinical Trials Directive before January 31, 2022, the Clinical Trials Directive will continue to apply on a transitional basis for three years. Additionally, sponsors may still choose to submit a CTA under either the Clinical Trials Directive or the CTR until January 31, 2023 and, if authorized, those will be governed by the Clinical Trials Directive until January 31, 2025. By that date, all ongoing trials will become subject to the provisions of the CTR.

Medicines used in clinical trials must be manufactured in accordance with Good Manufacturing Practice, or GMP. Other national and EU-wide regulatory requirements may also apply.

Marketing Authorization

In order to market our future product candidates in the EU and many other foreign jurisdictions, we must obtain separate regulatory approvals. More concretely, in the EU, medicinal product candidates can only be commercialized after obtaining a marketing authorization, or MA. To obtain regulatory approval of an investigational medicinal product under EU regulatory systems, we must submit a marketing authorization application, or MAA. The process for doing this depends, among other things, on the nature of the medicinal product. There are two types of MAs:

- "Centralized MAs" are issued by the European Commission through the centralized procedure based on the opinion of the Committee for Human Medicinal Products, or CHMP, of the European Medicines Agency, or EMA, and are valid throughout the EU. The centralized procedure is compulsory for certain types of product candidates such as: (i) medicinal products derived from biotechnology processes, such as genetic engineering, (ii) medicinal products containing a new active substance indicated for the treatment of certain diseases, such as HIV/AIDS, cancer, diabetes, neurodegenerative diseases, autoimmune and other immune dysfunctions and viral diseases, (iii) designated orphan medicines and (iv) advanced therapy medicinal products, or ATMPs, such as gene therapy, somatic cell therapy or tissue-engineered medicines. The centralized procedure may at the request of the applicant also be used in certain other cases and in particular for any other products containing new active substances not authorized in the EU or for product candidates which constitute a significant therapeutic, scientific, or technical innovation or for which the granting of authorization would be in the interests of public health in the EU.
- "National MAs" are issued by the competent authorities of the EU member states, only cover their respective territory, and are available for products not falling within the mandatory scope of the centralized procedure. Where a product has already been authorized for marketing in an EU member state, this national MA can be recognized in another member state through the mutual recognition procedure. If the product has not received a national MA in any member state at the time of application, it can be approved simultaneously in various member states through the decentralized procedure. Under the decentralized procedure an identical dossier is submitted to the national competent authority of each of the member states in which the MA is sought, one of which is selected by the applicant as the reference member state.

Under the centralized procedure, the maximum timeframe for the evaluation of an MAA by the EMA is 210 days. In exceptional cases, the CHMP might perform an accelerated review of an MAA in no more than 150 days

(not including clock stops). Innovative products that target an unmet medical need and are expected to be of major public health interest may be eligible for a number of expedited development and review programs, such as the PRIME scheme, which provides incentives similar to the breakthrough therapy designation in the U.S. PRIME is a voluntary scheme aimed at enhancing the EMA's support for the development of medicines that target unmet medical needs. It is based on increased interaction and early dialogue with companies developing promising medicines, to optimize their product development plans and speed up their evaluation to help them reach patients earlier. Many benefits accrue to sponsors of product candidates with PRIME designation, including but not limited to, early and proactive regulatory dialogue with the EMA, frequent discussions on clinical trial designs and other development program elements, and accelerated MAA assessment once a dossier has been submitted. Importantly, a dedicated contact and rapporteur from the CHMP is appointed early in the PRIME scheme facilitating increased understanding of the product at EMA's committee level. An initial meeting initiates these relationships and includes a team of multidisciplinary experts at the EMA to provide guidance on the overall development and regulatory strategies.

MAs have an initial duration of five years. After these five years, the authorization may be renewed for an unlimited period on the basis of a reevaluation of the risk-benefit balance.

Data and Marketing Exclusivity

The EU also provides opportunities for market exclusivity. Upon receiving MA, reference products generally receive eight years of data exclusivity and an additional two years of market exclusivity. If granted, data exclusivity prevents regulatory authorities in the EU from referencing the innovator's data to assess a generic or biosimilar application. During the additional two-year period of market exclusivity, a generic or biosimilar MAA can be submitted, and the innovator's data may be referenced, but no generic or biosimilar product can be marketed until the expiration of the market exclusivity. The overall ten-year market exclusivity period may be extended to a maximum of eleven years if, during the first eight years a new therapeutic indication with significant clinical benefit over existing therapies is approved. However, there is no guarantee that a product will be considered by the EU's regulatory authorities to be a new chemical or biological entity, and products may not qualify for data exclusivity.

There is a special regime for biosimilars, or biological medicinal products that are similar to a reference medicinal product but that do not meet the definition of a generic medicinal product, for example, because of differences in raw materials or manufacturing processes. For such products, the results of appropriate preclinical or clinical trials must be provided, and guidelines from the EMA detail the type of quantity of supplementary data to be provided for different types of biological product. There are no such guidelines for complex biological products, such as gene or cell therapy medicinal products, and so it is unlikely that biosimilars of those products will currently be approved in the European Union. However, guidance from the EMA states that they will be considered in the future in light of the scientific knowledge and regulatory experience gained at the time.

Failure to comply with EU and member state laws that apply to the conduct of clinical trials, manufacturing approval, MA of medicinal products and marketing of such products, both before and after grant of the MA, manufacturing of pharmaceutical products, statutory health insurance, bribery and anti-corruption or with other applicable regulatory requirements may result in administrative, civil or criminal penalties. These penalties could include delays or refusal to authorize the conduct of clinical trials, or to grant MA, product withdrawals and recalls, product seizures, suspension, withdrawal or variation of the marketing authorization, total or partial suspension of production, distribution, manufacturing or clinical trials, operating restrictions, injunctions, suspension of licenses, fines and criminal penalties. The aforementioned EU rules are generally applicable in the European Economic Area, or EEA, which consists of the 27 EU member states plus Norway, Liechtenstein and Iceland.

Brexit and the Regulatory Framework in the United Kingdom

The United Kingdom, or UK, left the EU on January 31, 2020, following which existing EU medicinal product legislation continued to apply in the UK during the transition period under the terms of the EU-UK Withdrawal Agreement. The transition period, which ended on December 31, 2020, maintained access to the EU single market and to the global trade deals negotiated by the EU on behalf of its members. The transition period provided time for the UK and EU to negotiate a framework for partnership for the future, which was then crystallized in the Trade and Cooperation Agreement, or TCA, and became effective on the January 1, 2021. The TCA includes specific provisions concerning pharmaceuticals, which include the mutual recognition of GMP inspections of manufacturing facilities for medicinal products and GMP documents issued, but does not foresee wholesale mutual recognition of UK and EU pharmaceutical regulations.

For other countries outside of Europe, such as countries in Latin America or Asia, the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical studies are conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

European Medicines Agency – Small and Medium Enterprise ("SME") Designation

The SME designation was established by the EMA to promote innovation and the development of new medicinal products by smaller companies established in the EEA. Companies with SME status are eligible to receive financial incentives as well as administrative and regulatory support through national and regional level programs. These benefits include access to dedicated EMA personnel during the clinical development process as well as reductions in fees associated with regulatory procedures such as scientific advice, pre- and post-authorization regulatory procedures, and inspections. Companies with SME status can apply for the PRIME scheme at an earlier stage of development when they have compelling non-clinical data and tolerability data from initial clinical trials. They may also request a fee waiver for scientific advice.

Data Privacy and Security Laws

Numerous state, federal and foreign laws and regulations govern the collection, dissemination, use, access to, confidentiality and security of personal information, including health-related information. In the United States, numerous federal and state laws and regulations, including data breach notification laws, health information privacy and security laws, including the Health Insurance Portability and Accountability Act of 1996, as amended ("HIPAA"), and federal and state consumer protection laws and regulations (e.g., Section 5 of the FTC Act), that govern the collection, use, disclosure, and protection of health-related and other personal information could apply to our operations or the operations of our partners. In addition, certain state and non-U.S. laws, such as the California Consumer Privacy Act ("CCPA"), the California Privacy Rights Act ("CPRA"), the European Union General Data Protection Regulation ("GDPR") and the United Kingdom GDPR ("UK GDPR"), govern the privacy and security of personal information, including health-related information in certain circumstances, some of which are more stringent than HIPAA and many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. Failure to comply with these laws, where applicable, can result in the imposition of significant civil and/or criminal penalties and private litigation. Privacy and security laws, regulations, and other obligations are constantly evolving, may conflict with each other to complicate compliance efforts, and can result in investigations, proceedings, or actions that lead to significant civil and/or criminal penalties and restrictions on data processing.

Pharmaceutical Coverage, Pricing and Reimbursement

Our ability to commercialize our product candidates successfully will depend in part on the extent to which the United States and foreign governmental authorities, private health insurers and other third-party payors establish appropriate coverage and reimbursement levels for our product candidates and related treatments. In

many of the markets where we would commercialize a product following regulatory approval, the prices of pharmaceutical products are subject to direct price controls (by law) and to drug reimbursement programs with varying price control mechanisms. Public and private health care payors control costs and influence drug pricing through a variety of mechanisms, including through negotiating discounts with the manufacturers and through the use of tiered formularies and other mechanisms that provide preferential access to certain drugs over others within a therapeutic class. Payors also set other criteria to govern the uses of a drug that will be deemed medically appropriate and therefore reimbursed or otherwise covered. In particular, many public and private health care payors limit reimbursement and coverage to the uses of a drug that are either approved by the FDA or that are supported by other appropriate evidence (for example, published medical literature) and appear in a recognized drug compendium. Drug compendia are publications that summarize the available medical evidence for particular drug products and identify which uses of a drug are supported or not supported by the available evidence, whether or not such uses have been approved by the FDA.

Healthcare Reform

In the United States, there have been a number of legislative and regulatory changes to the healthcare system in ways that could affect our future revenues and profitability and the future revenues and profitability of our potential customers. For example, in March 2010, the Affordable Care Act ("ACA"), was passed, which substantially changed the way health care is financed by both governmental and private insurers, and significantly impacted the U.S. pharmaceutical industry. The ACA, among other things, subjected biologic products to potential competition by lower-cost biosimilars, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, established annual fees and taxes on manufacturers of certain branded prescription drugs, and a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 70% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D.

Since its enactment, there have been judicial, executive and Congressional challenges to certain aspects of the ACA. On June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Prior to the Supreme Court's decision, President Biden issued an executive order to initiate a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace, which began on February 15, 2021 and remained open through August 15, 2021. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how other healthcare reform measures of the Biden administration will impact our business.

In addition, other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. For example, the Budget Control Act of 2011 among other things, resulted in aggregate reductions of Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013 and due to subsequent legislative amendments to the statute, will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional Congressional action is taken. Further, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Recently there has also been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted legislation designed to, among other things,

reform government program reimbursement methodologies. For example, the Cures Act changes the reimbursement methodology for infusion drugs and biologics furnished through durable medical equipment in an attempt to remedy over- and underpayment of certain drugs.

If additional state and federal healthcare reform measures are adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, we could expect such measures to result in reduced demand for our product candidates or additional pricing pressures.

Segment Reporting

We are engaged solely in the discovery and development of therapeutic protein and antibody products for life-threatening, drug-resistant infectious diseases. Accordingly, we have determined that we operate in one operating segment.

Human Capital

As of March 17, 2022, we had 38 full-time employees. We consider our staff relations to be good. Our company operates within an industry with a complex regulatory environment. The unique demands of our industry, together with the challenges of running a company focused on the discovery, development and manufacture of innovative therapeutics, require talent that is highly educated and/or has significant industry experience. Additionally, for certain key functions, we require specific scientific expertise to oversee and conduct these activities. To attract and retain a high-quality, experienced workforce, we offer a competitive mix of compensation and insurance benefits for our employees, as well as participation in our equity programs. Employees working 40 hours or more a week are eligible to participate in our medical, prescription, dental, vision, Flexible Spending Account and life insurance and disability plans. To assist employees with rising healthcare costs, we pay up to 100% of an employee's costs to obtain the coverage and benefits of these plans. We also offer employees an annual bonus plan and a 401(k) retirement plan with a company match. All employees are awarded new hire equity option grants and are eligible to receive additional annual equity option grants. Accordingly, of our full-time employees, 28 employees are engaged in research and development activities, and 21 employees have advanced degrees. None of our employees is represented by a labor union or covered by a collective bargaining agreement.

Our Corporate Information

We were incorporated under the laws of the State of Delaware in March 2008. Our executive offices are located at 28 Wells Avenue, 3rd Floor, Yonkers, NY 10701, and our telephone number is (914) 207-2300.

Our website address is www.contrafect.com. References to our website are inactive textual references only and the content of our website should not be deemed incorporated by reference into this Form 10-K.

Available Information

Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, are available free of charge on our website located at www.contrafect.com as soon as reasonably practicable after they are filed with or furnished to the Securities and Exchange Commission (the "SEC"). These reports are also available at the SEC's Internet website at www.sec.gov.

Item 1A. Risk Factors

You should carefully consider the following risk factors, as well as the other information in this report, and in our other public filings. Our business, financial condition and operating results can be affected by a number of important factors, whether currently known or unknown, including but not limited to those described below, any one or more of which could, directly or indirectly, cause the Company's actual results of operations and financial condition to vary materially from past, or from anticipated future, results of operations and financial condition. Any of these factors, in whole or in part, could materially and adversely affect the Company's business, financial condition, results of operations and common stock price. Other factors may exist that we do not consider significant based on information that is currently available. In addition, new risks may emerge at any time, and we cannot predict those risks or estimate the extent to which they may affect us. Past financial performance should not be considered to be a reliable indicator of future performance, and investors should not use historical trends to anticipate results or trends in future periods.

Risks Related to Our Financial Position and Need for Additional Capital

We have incurred significant losses since our inception. We expect to incur losses for at least the next several years and may never achieve or maintain profitability.

We are a clinical-stage biopharmaceutical company with no approved products, and we have not generated any revenue from product sales to date. To date, we have focused exclusively on developing our product candidates and have funded our operations primarily through the sale of common stock and warrants, convertible preferred stock and issuances of convertible debt to our investors, and to a lesser extent, grant funding. We have not yet demonstrated an ability to overcome many of the risks and uncertainties frequently encountered by companies in the pharmaceutical industry, and you should analyze our company in light of such risks and uncertainties.

Since inception, we have incurred significant operating losses. Our losses from operations for the years ended December 31, 2021, 2020 and 2019 were $47.3 million, $34.2 million and $27.9 million, respectively. We have devoted substantially all of our efforts to research and development. We expect to continue to incur significant expenses and increasing operating losses for at least the next several years. The net losses we incur may fluctuate significantly from quarter to quarter and year to year.

We anticipate that our expenses will increase substantially as clinical trials for any of our product candidates commence or progress. Our expenses will increase if and as we:

- seek to discover or develop additional product candidates;
- seek marketing approvals for any of our product candidates that successfully complete clinical trials;
- in-license or acquire other products and technologies;
- maintain, expand and protect our intellectual property portfolio;
- hire additional clinical, quality control and scientific personnel; and
- add operational, financial and management information systems and personnel, including personnel to support our product development and planned future commercialization efforts.

Our recurring losses from operations raise substantial doubt regarding our ability to continue as a going concern.

We currently operate with limited resources. We have incurred significant losses since our inception and have never generated revenue or profit, and it is possible we will never generate revenue or profit. Based on our current operating plans, and without additional funding, we believe we will not have sufficient funds to meet our

obligations within the next twelve months from the issuance of our audited consolidated financial statements that are included elsewhere in this Annual Report on Form 10-K. These factors raise substantial doubt about our ability to continue as a going concern. We have relied on our ability to fund our operations primarily through public and private debt and equity financings, and, to a lesser extent, funding received from government contracts and granting organizations, but there can be no assurances that such financing or funding will continue to be available to us on satisfactory terms, or at all.

Securing additional financing may divert our management from ourday-to-day activities, which may adversely affect our ability to develop and commercialize exebacase or any of our other product candidates. In addition, we cannot guarantee that future financing will be available in sufficient amounts or on terms acceptable to us, if at all. If we are unable to obtain funding, we would be forced to delay, reduce or eliminate our research and development programs, which would adversely affect our business prospects. In addition, if we are unable to raise capital, we will also need to implement cost reductions, and any failure to effectively do so will harm our business, results of operations and future prospects.

Substantial doubt about our ability to continue as a going concern may materially and adversely affect the price per share of our common stock, and it may be more difficult for us to obtain financing. If potential collaborators decline to do business with us or potential investors decline to participate in any future financings due to such concerns, our ability to increase our cash position may be limited. The perception that we may not be able to continue as a going concern may cause others to choose not to deal with us due to concerns about our ability to meet our contractual obligations.

We have prepared our consolidated financial statements on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the normal course of business. Our audited consolidated financial statements included in this Annual Report on Form 10-K do not include any adjustments to reflect the possible inability of the Company to continue as a going concern within one year after the issuance of such financial statements. If we are unable to continue as a going concern, you could lose all or part of your investment in our Company.

We currently have no source of product revenue and have not yet generated any revenues from product sales.

To date, we have not completed the development of any products and have not generated any revenues from product sales. Our ability to generate revenue from product sales and achieve profitability will depend upon our ability to successfully commercialize products, including any of our current product candidates, or other product candidates that we may in-license or acquire in the future. Even if we are able to successfully achieve regulatory approval for these product candidates, we may never generate revenues that are significant enough to achieve profitability. Our ability to generate revenue from product sales from our current or future product candidates also depends on a number of additional factors, including our ability to:

- successfully complete development activities, including the necessary clinical trials;
- complete and submit BLAs to the FDA, and obtain regulatory approval for indications for which there is a commercial market;
- complete and submit applications to, and obtain approval from, foreign regulatory authorities;
- set a commercially viable price for our products;
- develop a commercial organization capable of sales, marketing and distribution for any products we intend to sell ourselves in the markets which we choose to commercialize on our own;
- find suitable distribution partners to help us market, sell and distribute our products in other markets; and
- obtain coverage and adequate reimbursement from third parties, including government and private payors.

In addition, because of the numerous risks and uncertainties associated with product development, including that any of our product candidates may not advance through development or achieve the desired endpoints of applicable clinical trials, we are unable to predict the timing or amount of increased expenses, or when or if we will be able to achieve or maintain profitability. Even if we are able to complete the development and regulatory process for any product candidates, we anticipate incurring significant costs associated with commercializing these products.

Even if we are able to generate revenues from the sale of our products, we may not become profitable. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to raise capital to expand our business or continue our operations. A decline in the value of our company could also cause you to lose all or part of your investment.

We have a need for substantial additional funding. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.

We expect our expenses to increase in connection with our ongoing activities, particularly as we continue the clinical development of exebacase and possibly acquire and develop new product candidates or technologies. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or eliminate our research and development programs or any future commercialization efforts. For example, the trading prices for our and other biopharmaceutical companies' stock have been highly volatile as a result of the COVID-19 pandemic and the current conflict between Russia and Ukraine. As a result, we may face difficulties raising capital through sales of our common stock and any such sales may be on unfavorable terms.

Our future capital requirements will depend on many factors, including:

- the complexity, timing and results of our clinical trials of our product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of developing our product candidates for additional indications;
- the timing and amount of actual reimbursements under the BARDA Contract;
- the continuation of funding under our CARB-X and USAMRDC grants;
- our ability to establish scientific or business collaborations on favorable terms, if at all;
- the costs of preparing, filing and prosecuting patent or other intellectual property applications, maintaining and protecting our intellectual property rights and defending against intellectual property-related claims;
- the extent to which we in-license or acquire other product candidates or technologies; and
- the scope, progress, results and costs of product development for our product candidates;
- the effects of the COVID-19 pandemic on, among other things, our financial performance, business and operations.

Conducting clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results to obtain marketing approval and achieve product sales. In addition, if approved, exebacase or any other product candidate that we develop may not achieve commercial success. Accordingly, we may need to continue to rely on additional financing to achieve our business objectives and to continue as a going concern. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. Adequate additional financing may not be available to us on acceptable terms, or at all.

Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial product revenues, we may finance our cash needs through a combination of equity offerings, debt financings, grants, collaborations, strategic alliances and marketing, distribution or licensing arrangements. We do not have any committed external source of funds. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends.

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

The timing of the milestone and royalty payments we are required to make under certain agreements to Rockefeller is uncertain and could adversely affect our cash flows and results of operations.

We are party to certain agreements with Rockefeller pursuant to which we have acquired licenses to certain patents and patent applications and other intellectual property related to a series of compounds, including exebacase to develop and commercialize therapeutics. Under our agreements with Rockefeller, we have obligations to achieve diligence minimums and to make payments upon achievement of specified development and regulatory milestones. We will also make additional payments upon the achievement of future sales milestones and for royalties on future net sales.

The timing of milestone payments under our licenses and sponsored research agreements is subject to factors relating to the clinical and regulatory development and commercialization of products, many of which are beyond our control. We may become obligated to make a milestone payment when we do not have the cash on hand to make such payment, which could require us to delay our clinical trials, curtail our operations, scale back our commercialization and marketing efforts or seek funds to meet these obligations on terms unfavorable to us.

If BARDA were to eliminate, reduce, or delay funding for our BARDA Contract, we would experience a negative impact on our programs associated with such funding.

On March 10, 2021, we executed a cost-share contract from BARDA, part of the Office of the Assistant Secretary for Preparedness and Response at the U.S. Department of Health and Human Services. Under the terms of the BARDA Contract, the Company will receive $9.8 million in initial funding during the base period. Following successful completion of the base period, the BARDA Contract provides for approximately $77.0 million of additional BARDA funding for five option stages in support of the completion of the Phase 3 clinical trial of exebacase, further clinical and non-clinical studies, manufacturing, supply chain, clinical, regulatory and administrative activities. The BARDA Contract contains terms and conditions that are customary for contracts with BARDA of this nature, including provisions giving the government the right to terminate the contract at any time for its convenience. If BARDA were to eliminate, reduce, or delay funding under the BARDA Contract or prohibit reimbursement of some of our incurred costs, we would have to seek additional funding to complete our ongoing Phase 3 DISRUPT superiority trial of exebacase or advance exebacase through FDA product approval and completion of post-approval commitments.

The BARDA Contract includes special requirements, which subject us to the risk of a reduction or loss of funding.

Our BARDA Contract subjects us to various U.S. government contract requirements, including general clauses for a cost-reimbursement research and development contract, which may limit our reimbursement. In addition, if we are found to be in violation of the BARDA Contract, it could result in termination. If BARDA terminates the BARDA Contract with us for its convenience, or if we default by failing to perform in accordance with the contract schedule and terms, a significant negative impact on our cash flows and operations could result.

U.S. government contracts, such as our BARDA Contract, generally contain unfavorable termination provisions, which may subject us to additional risks as compared to our competitors that have not entered into such contracts. These risks include the ability of the U.S. government to unilaterally:

- terminate or reduce the scope of our contract with or without cause;
- interpret relevant regulations (federal acquisition regulation clauses);
- require performance under circumstances that may not be favorable to us;
- require an in-process review where the U.S. government will review the project and its options under the contract;
- control the timing and amount of funding, which impacts the development progress of exebacase; and
- audit and object to our contract-related costs and fees, including allocated indirect costs.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

Under Section 382 and related provisions of the Internal Revenue Code of 1986, as amended (the "Code"), if a corporation undergoes an "ownership change" (generally defined as a greater than 50% change (by value) in its equity ownership over a three year period), the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes to offset its post-change income may be limited. As a result of our past transactions, we may have experienced an "ownership change." At this time, we have not completed a study to assess whether an ownership change under Section 382 of the Code has occurred, or whether there have been multiple ownership changes since our formation, due to the costs and complexities associated with such a study. We may also experience ownership changes in the future as a result of subsequent shifts in our stock ownership. Thus, our ability to utilize carryforwards of our net operating losses and other tax attributes to reduce future tax liabilities may be substantially restricted. Further, U.S. tax laws limit the time during which these carryforwards may be applied against future taxes. Therefore, we may not be able to take full advantage of these carryforwards for federal or state tax purposes. As of December 31, 2021, we had federal and state net operating loss carryforwards of approximately $275.5 million and $293.9 million, respectively, and federal research and development credits of approximately $5.0 million, the use of which could be limited or eliminated by virtue of one or more "ownership changes."

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

The COVID-19 pandemic or other pandemics, epidemics or outbreaks of an infectious disease may materially and adversely impact our business, including our preclinical studies and clinical trials.

The measures taken in response to the ongoingCOVID-19 pandemic have had a significant impact on the economy and, to a lesser extent, both directly and indirectly, on our business. We adjusted our business operations, with a majority of our employees working remotely. Our Phase 3 DISRUPT clinical trial was also affected, as clinical sites experienced periodic delays in new patient enrollment.

The COVID-19 pandemic worsened across the country earlier this year as new variants circulate and the number ofCOVID-19 infections and hospitalizations increased rapidly. We are continuing to see effects of the pandemic on our trial with our patient enrollment rate slowed during certain months. Efforts we take to mitigate

slowed enrollment may not be effective and the progress of our study may continue to be adversely affected. If patient enrollment continues to be delayed during future months, our related corporate milestones, such as our planned interim futility analysis of the Phase 3 DISRUPT clinical trial, could be further delayed.

As a result of the COVID-19 pandemic, the spread of variants of the virus or another pandemic, epidemic or outbreak of an infectious disease, we may experience disruptions that could severely impact our business, preclinical studies and clinical trials, including:

- delays or difficulties in enrolling patients in our clinical trials;
- delays or difficulties in clinical site initiation, including difficulties in recruiting clinical site investigators and staff;
- increased rates of patients withdrawing from our clinical trials following enrollment as a result of contracting COVID-19 or other health conditions or being forced to quarantine;
- interruption of key clinical trial activities, such as clinical trial site data monitoring and efficacy and safety data collection, processing and analyses, due to limitations on travel imposed or recommended by federal, state or local governments, employers and others or interruption of clinical trial subject visits, which may impact the collection and integrity of subject data and clinical study endpoints;
- interruption of, or delays in receiving, supplies of our products and product candidates from our contract manufacturing organizations due to staffing shortages, production slowdowns or stoppages and disruptions in supply or delivery systems;
- delays in receiving authorization from local regulatory authorities to initiate our planned clinical trials;
- changes in regulations as part of a response to the COVID-19 pandemic which may require us to change the ways in which our clinical trials are conducted, which may result in unexpected costs, or to discontinue the clinical trials altogether;
- delays in necessary interactions with regulators, ethics committees and other important agencies and contractors due to limitations in employee resources or forced furlough of government or contractor personnel;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of hospitals serving as our clinical trial sites and hospital staff supporting the conduct of our clinical trials;
- delays in preclinical studies due to restricted or limited operations resulting from restrictions on our on-site activities;
- interruption or delays of our sourced discovery and clinical activities; and
- the ability of our contract research organizations ("CROs"), contract manufacturing organizations and suppliers to meet their contractual obligations in connection with the conduct of our clinical trial for our current product candidate and for any future product candidate.

The extent to which the pandemic further impacts our business, results of operations and financial condition, including expenses, research and development costs, procurement of raw materials for our supply chain, and clinical trial progress, will depend on future developments, which are highly uncertain and cannot be predicted with confidence, such as the duration of the pandemic and future waves of infection, including the spread of variants of the virus, the availability, adoption and effectiveness of vaccines and treatments, travel restrictions and social distancing in the United States and other countries, business closures or business disruptions and the effectiveness of actions taken in the United States and other countries to contain and treat the disease. If we or any of the third parties with whom we engage were to experience shutdowns or other business disruptions, our ability to conduct our business in the manner and on the timelines presently planned could be materially and negatively impacted. Additionally, concerns over the economic impact of COVID-19 pandemic have caused extreme volatility in financial and other capital markets which has and may continue to adversely impact our stock price and our ability to access capital markets.

We are heavily dependent on the success of our leading product candidate, exebacase. The approval process of the FDA and comparable foreign regulatory authorities is lengthy, time consuming and inherently unpredictable, and if we are ultimately unable to obtain regulatory approval for exebacase or any other product candidate our business will be substantially harmed.

Our near-term business prospects are substantially dependent on our ability to develop and commercialize exebacase. We cannot market or sell exebacase or any other product candidate in the United States without FDA approval, but this approval, if ever issued, is more than a year away. To commercialize exebacase or any other product candidate outside of the United States, we will need applicable foreign regulatory approvals. The clinical development of exebacase or any other product candidate is susceptible to the inherent risks of any drug development program, including a failure to achieve efficacy across a broad population of patients, the potential occurrence of severe adverse events and the risks that the FDA or any applicable foreign regulatory authority will determine that a drug product is not approvable.

The process required to obtain approval for commercialization from the FDA and similar foreign authorities is unpredictable, and typically takes many years even after the commencement of clinical trials, depending on numerous factors. In addition, approval policies, regulations, or the type and amount of clinical data necessary to obtain regulatory approval may change during the course of a product's clinical development may vary among jurisdictions. We have not obtained regulatory approval for any product candidate and it is possible that any product candidates we may seek to develop in the future will never obtain regulatory approval. Neither we nor any future collaborator is permitted to market any of our product candidates in the United States until we receive regulatory approval of a BLA from the FDA or outside the United States, until we receive similar approval from foreign regulatory authorities.

Prior to obtaining approval to commercialize a product candidate in the United States or abroad, we or our collaborators must demonstrate with substantial evidence from well-controlled clinical trials, and to the satisfaction of the FDA or foreign regulatory agencies, that such product candidates are safe and effective, or in the case of biologics, safe, pure, and potent, for their intended uses. Results from nonclinical studies and clinical trials can be interpreted in different ways. Even if we believe the nonclinical or clinical data for our product candidates are promising, such data may not be sufficient to support approval by the FDA and other regulatory authorities. The FDA or other regulatory authorities also require us to conduct additional preclinical studies or clinical trials for our product candidates either prior to or post-approval, or it may object to elements of our clinical development program.

We may fail to obtain regulatory approval for exebacase or any other product candidate for many reasons, including the following:

- we may not be able to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that exebacase or any other product candidate is safe and effective for any indication;
- the results of clinical trials may not meet the level of clinical or statistical significance required for approval by the FDA or comparable foreign regulatory authorities;
- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may not be able to demonstrate that exebacase or any other product candidate's clinical and other benefits outweigh its safety risks;
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from preclinical studies or clinical trials;
- the FDA or comparable foreign regulatory authorities may identify deficiencies in data generated at our clinical trial sites;

- the FDA or comparable foreign regulatory authorities may identify deficiencies in the clinical practices of the third-party CROs we use for clinical trials; and
- the FDA or comparable foreign regulatory authorities may identify deficiencies in the manufacturing processes or facilities of third-party manufacturers with which we or our collaborators enter into agreements for clinical and commercial supplies.

This lengthy approval process as well as the unpredictability of future clinical trial results may prevent us from obtaining regulatory approval to market exebacase or any other product candidate, which would significantly harm our business. In addition, disruptions caused by the COVID-19 pandemic may increase the likelihood that we encounter such difficulties or delays in obtaining regulatory review and approval. Of the large number of drugs in development, only a small percentage successfully complete the FDA or foreign regulatory approval processes and are commercialized. The lengthy approval process as well as the unpredictability of future clinical trial results may result in our failing to obtain regulatory approval to market our product candidates, which would significantly harm our business, results of operations and prospects.

If clinical trials of exebacase or any other product candidate that we develop fail to demonstrate safety and efficacy, or the manufacturing for the commercial supply of exebacase drug substance or drug product fails to demonstrate robustness, stability, purity and potency to the satisfaction of the FDA or similar regulatory authorities outside the United States or do not otherwise produce positive results, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of exebacase or any other product candidate.

Before obtaining marketing approval from regulatory authorities for the sale of exebacase or any other product candidate, we must complete preclinical development, perform extensive process validation and complete the manufacturing of our initial commercial supply of product to demonstrate robustness, stability, purity and potency of our drug product, and conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Clinical testing is expensive, difficult to design and implement, can take many years to complete and is uncertain as to outcome. A failure of one or more clinical trials can occur at any stage of testing. The outcome of preclinical testing and early clinical trials may not be predictive of the success of later clinical trials, and interim results of a clinical trial do not necessarily predict final results. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products.

We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or commercialize our product candidates, including:

- clinical trials of our product candidates may produce negative or inconclusive results, or significant adverse side effects, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- regulators or IRBs (or independent Ethics Committees ("IECs")) may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may have delays in reaching or fail to reach agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- we may voluntarily suspend or terminate clinical trials of our product candidates for various reasons, including a finding that the participants are being exposed to unacceptable health risks;

- regulators or IRBs may require that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements or a finding that the participants are being exposed to unacceptable health risks;
- the cost of clinical trials of our product candidates may be greater than we anticipate;
- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate;
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators or IRBs (or IECs) to suspend or terminate the trials; or
- the effects of the COVID-19 pandemic.

If we are required to conduct additional clinical trials or other testing of exebacase or any other product candidate that we develop beyond those that we contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval or sales revenues for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings, including boxed warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our product development costs will also increase if we experience delays in testing or marketing approvals. We do not know whether any clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or may allow our competitors to bring products to market before we do and may impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

In addition, the FDA's and other regulatory authorities' policies with respect to clinical trials may change and additional government regulations may be enacted. For instance, the regulatory landscape related to clinical trials in the European Union, or EU, recently evolved. The EU Clinical Trials Regulation, or CTR, which was adopted in April 2014 and repeals the EU Clinical Trials Directive, became applicable on January 31, 2022. While the Clinical Trials Directive required a separate clinical trial application, or CTA to be submitted in each member state, to both the competent national health authority and an independent ethics committee, the CTR introduces a centralized process and only requires the submission of a single application to all member states concerned. The CTR allows sponsors to make a single submission to both the competent authority and an ethics committee in each member state, leading to a single decision per member state. The assessment procedure of the CTA has been harmonized as well, including a joint assessment by all member states concerned, and a separate assessment by each member state with respect to specific requirements related to its own territory, including ethics rules. Each member state's decision is communicated to the sponsor via the centralized EU portal. Once the CTA is approved, clinical study development may proceed. The CTR foresees a three-year transition period. The extent to which ongoing and new clinical trials will be governed by the CTR varies. For clinical trials whose CTA was made under the Clinical Trials Directive before January 31, 2022, the Clinical Trials Directive will continue to apply on a transitional basis for three years. Additionally, sponsors may still choose to submit a CTA under either the Clinical Trials Directive or the CTR until January 31, 2023 and, if authorized, those will be governed by the Clinical Trials Directive until January 31, 2025. By that date, all ongoing trials will become subject to the provisions of the CTR. Compliance with the CTR requirements by us and our third-party service providers, such as CROs, may impact our developments plans.

It is currently unclear to what extent the United Kingdom, or UK, will seek to align its regulations with the EU. The UK regulatory framework in relation to clinical trials is derived from existing EU legislation (as implemented into UK law, through secondary legislation). On January 17, 2022, the UK Medicines and Healthcare Regulatory Agency, or MHRA, launched an eight-week consultation on reframing the UK legislation for clinical trials. The consultation closes on March 14, 2022 and aims to streamline clinical trials approvals, enable innovation, enhance clinical trials transparency, enable greater risk proportionality, and promote patient and public involvement in clinical trials. The outcome of the consultation will be closely watched and will determine whether the UK chooses to align with the regulation or diverge from it to maintain regulatory flexibility. A decision by the UK not to closely align its regulations with the new approach that will be adopted in the EU may have an effect on the cost of conducting clinical trials in the UK as opposed to other countries and/or make it harder to seek a marketing authorization in the EU for our product candidates on the basis of clinical trials conducted in the UK.

If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies governing clinical trials, our development plans may also be impacted.

Our product candidates may be associated with serious adverse events, undesirable side effects or have other properties that could halt their clinical development, prevent their regulatory approval, limit their commercial potential or result in significant negative consequences.

Adverse events or other undesirable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other comparable foreign regulatory authorities. During the conduct of clinical trials, patients report changes in their health, including illnesses, injuries, and discomforts, to their study doctor. Often, it is not possible to determine whether or not the product candidate being studied caused these conditions. It is possible that as we test our product candidates in larger, longer and more extensive clinical trials, or as use of these product candidates becomes more widespread if they receive regulatory approval, illnesses, injuries, discomforts and other adverse events that were observed in previous trials, as well as conditions that did not occur or went undetected in previous trials, will be reported by patients. Many times, side effects are only detectable after investigational products are tested in large-scale clinical trials or, in some cases, after they are made available to patients on a commercial scale following approval. For example, it is possible that exposure to exebacase could result in adverse clinical events such as localized inflammation in the region surrounding blood vessels, or having a hypersensitivity reaction, such as serum sickness or anaphylaxis.

If any serious adverse events occur, clinical trials or commercial distribution of any product candidates or products we develop could be suspended or terminated, and our business could be seriously harmed. Treatment-related side effects could also affect patient recruitment and the ability of enrolled patients to complete the trial or result in potential liability claims. Regulatory authorities could order us to cease further development of, deny approval of, or require us to cease selling any product candidates or products for any or all targeted indications. If we are required to delay, suspend or terminate any clinical trial or commercialization efforts, the commercial prospects of such product candidates or products may be harmed, and our ability to generate product revenues from them or other product candidates that we develop may be delayed or eliminated. Additionally, if one or more of our product candidates receives marketing approval and we or others later identify undesirable side effects or adverse events caused by such products, a number of potentially significant negative consequences could result, including but not limited to:

- regulatory authorities may suspend, limit or withdraw approvals of such product, or seek an injunction against its manufacture or distribution;
- regulatory authorities may require additional warnings on the label, including “boxed” warnings, or issue safety alerts, Dear Healthcare Provider letters, press releases or other communications containing warnings or other safety information about the product;
- we may be required to change the way the product is administered or conduct additional clinical trials or post-approval studies;

- we may be required to create a REMS or similar risk management system, which could include a medication guide outlining the risks of such side effects for distribution to patients;
- we may be subject to fines, injunctions or the imposition of criminal penalties;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of the particular product candidate, if approved, and could seriously harm our business.

We depend on enrollment of patients in our clinical trials for our product candidates. If we experience delays or difficulties enrolling in our clinical trials, our research and development efforts and business, financial condition, and results of operations could be materially adversely affected.

Successful and timely completion of clinical trials will require that we enroll a sufficient number of patient candidates. These trials and other trials we conduct may be subject to delays for a variety of reasons, including as a result of patient enrollment taking longer than anticipated, patient withdrawal or adverse events. These types of developments could cause us to delay the trial or halt further development.

Our clinical trials will compete with other clinical trials that are in the same therapeutic areas as our product candidates, and this competition reduces the number and types of patients available to us, as some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Because the number of qualified clinical investigators and clinical trial sites is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitors use, which will reduce the number of patients who are available for our clinical trials at such clinical trial sites. In addition, there may be limited patient pools from which to draw for clinical studies. In addition to the rarity of some diseases, the eligibility criteria of our clinical studies will further limit the pool of available study participants as we will require that patients have specific characteristics that we can measure or to assure their disease is either severe enough or not too advanced to include them in a study. Patient enrollment depends on many factors, including:

- the size and nature of the patient population;
- the severity of the disease under investigation;
- eligibility criteria for the trial;
- the proximity of patients to clinical sites;
- the design of the clinical protocol;
- the ability to obtain and maintain patient consents;
- the ability to recruit clinical trial investigators with the appropriate competencies and experience;
- the risk that patients enrolled in clinical trials will drop out of the trials before the administration of our product candidates or trial completion;
- the availability of competing clinical trials;
- the availability of new drugs approved for the indication the clinical trial is investigating; and
- clinicians' and patients' perceptions as to the potential advantages of the drug being studied in relation to other available therapies.

These factors may make it difficult for us to enroll enough patients to complete our clinical trials in a timely and cost-effective manner. In addition, our Phase 3 DISRUPT clinical trial has experienced some delays in patient enrollment as a result of the COVID-19 pandemic, as some clinical sites in high impact areas have

delayed new patient enrollment as dictated by local conditions. We expect that such delays could adversely affect the expected timelines for our product development and approval process and may adversely affect our business, financial condition and results of operations. Delays in the completion of any clinical trial of our product candidates will increase our costs, slow down our product candidate development and approval process and delay or potentially jeopardize our ability to commence product sales and generate revenue. In addition, some of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of our product candidates.

We are significantly dependent on our license agreements with Rockefeller that relate to exebacase.

Under our various license agreements with Rockefeller, we are obligated to use our diligent efforts to develop and commercialize licensed products, including exebacase. Rockefeller may terminate the agreement in the event of our breach of the terms of the license agreements. In the event of such termination, Rockefeller has the right to retain its license and other rights under the agreement, subject to continuing royalties and other obligations. Our breach of the agreement, including non-payment of any milestone payment, and Rockefeller's subsequent termination of the agreement, could result in the loss of our rights to develop and commercialize exebacase, which would seriously harm our ability to generate revenues or achieve profitability.

We rely on CROs to conduct our preclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be delayed in obtaining, or may ultimately not be able to obtain, regulatory approval for commercialization of exebacase or any other product candidates.

We have relied and will continue to rely on CROs for the execution of our preclinical and clinical studies and to recruit patients and monitor and manage data for our clinical programs for exebacase or any other product candidate. We control only certain aspects of our CROs' activities, but we are responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol and legal, regulatory and scientific standards. Our reliance on the CROs does not relieve us of these regulatory responsibilities. We and our CROs are required to comply with the FDA's regulations and GCPs requirements, which are regulations and guidelines enforced by the FDA and comparable regulatory authorities meant to protect the rights and health of clinical trial subjects. The FDA and comparable regulatory authorities enforce their regulations and GCPs through periodic inspections of trial sponsors, principal investigators and clinical trial sites. If we or our CROs fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable, and the FDA (or similar foreign authorities) may require us to perform additional clinical trials before approving our product candidates. We cannot assure you that, upon inspection, the FDA (or similar foreign authorities) will determine that any of our clinical trials comply with GCPs. In addition, to evaluate the safety and effectiveness of exebacase or any other product candidate to a statistically significant degree, our clinical trials will require an adequately large number of test subjects. Any clinical trial that a CRO conducts abroad on our behalf is subject to similar regulation. Accordingly, if our CROs fail to comply with these regulations or recruit a sufficient number of patients, we may have to repeat clinical trials, which would delay the regulatory approval process.

In addition, our CROs are not our employees and we cannot control whether or not they devote sufficient time and resources to ourmon-clinical, preclinical or clinical programs. Our CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical studies or other drug development activities, which could impede their ability to devote appropriate time to our clinical programs. If our CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements, or for other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize exebacase or any other product candidate that we seek to develop. As a result, our financial results and the commercial prospects for exebacase or any other product candidate that we seek to develop would be harmed, our costs could increase and our ability to generate revenues could be delayed or ended.

If any of our relationships with these CROs change or terminate, we may not be able to enter into arrangements with alternative CROs or clinical study management organizations, or be able to do so on commercially reasonable terms. Switching or adding additional CROs or other clinical study management organizations involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new CRO or clinical study management organization commences work. As a result, delays could occur, which could compromise our ability to meet our desired development timelines.

Any Breakthrough Therapy designation that we may receive from the FDA for our product candidates may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.

We have received Breakthrough Therapy designation for exebacase for the treatment of for the treatment of MRSA bacteremia, including right-sided endocarditis, when used in addition to SOC anti-staphylococcal antibiotics in adult patients, and we may seek Breakthrough Therapy designation for our other product candidates. A Breakthrough Therapy is defined as a drug or biologic that is intended to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug or biologic may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed in early clinical development. For drugs or biologics that have been designated as Breakthrough Therapies, interaction and communication between the FDA and the sponsor can help to identify the most efficient path for clinical development. Drugs or biologics designated as Breakthrough Therapies by the FDA are also eligible for rolling review of the associated marketing application, meaning that the agency may review portions of the marketing application before the sponsor submits the complete application, as well as priority review, if the relevant criteria are met.

Designation as a Breakthrough Therapy is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for designation as a Breakthrough Therapy, the FDA may disagree and instead determine not to make such designation. The receipt of a Breakthrough Therapy Designation for a product candidate, including for exebacase, may not result in a faster development process, review or approval compared to conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, not all products designated as Breakthrough Therapies ultimately will be shown to have the substantial improvement over available therapies suggested by the preliminary clinical evidence at the time of designation. As a result, if the Breakthrough Therapy Designation for exebacase we have received or any future designation we receive is no longer supported by subsequent data, the FDA may rescind the designation.

We rely on contract manufacturing organizations ("CMOs") to manufacture clinical and commercial supplies of our product candidates. In addition to the risks associated with the manufacture of our product candidates, which could include cost overruns, new impurities, difficulties in process or formulation development, scaling up or reproducing manufacturing processes and lack of timely availability of raw materials, if these third parties do not successfully carry out their contractual duties or meet expected deadlines, we may be delayed in obtaining, or may ultimately not be able to obtain, regulatory approval for commercialization of exebacase or any other product candidates.

We do not currently have nor do we plan to build the infrastructure or capability internally to manufacture exebacase or any other product candidates. We rely, and expect to continue to rely, on third-party manufacturers for the production of our product candidates for preclinical studies and clinical trials under the guidance of members of our organization. For example, we employ the services of Fujifilm UK to supply the active pharmaceutical ingredient for exebacase. We have not yet validated the manufacturing processes or contractually secured our commercial supplies. We do not currently have long-term supply agreements. Furthermore, the raw materials for our product candidates are sourced, in some cases, from a single-source supplier. If we were to experience an unexpected loss of supply of any of our product candidates or any of our future product candidates for any reason, whether as a result of manufacturing, supply or storage issues or otherwise, we could experience delays, disruptions, suspensions or terminations of, or be required to restart or repeat, any pending or ongoing

clinical trials. For example, on January 21, 2021, the President of the United States signed an executive order entitled "Executive Order on a Sustainable Public Health Supply Chain" (the "Executive Order") which "directs immediate actions to secure supplies necessary for responding to the COVID-19 pandemic, so that supplies are available, and remain available to the Federal Government and State, local, Tribal and territorial authorities, as well as to America's health care workers, health systems, and patients. The DPA, which empowers the President to issue the Executive Order, allows him to direct private companies to prioritize orders from the federal government. The Executive Order directed the President's administration to identify shortfalls in the supply of materials needed for the pandemic response, and to use the DPA to address them, if necessary. The extent to which the COVID-19 pandemic and the invocation of the DPA impacts our ability to procure sufficient supplies for the development or manufacture of our products and product candidates will depend on the severity and duration of the spread of the virus, and any actions undertaken to contain COVID-19 or treat its effects.

We expect to continue to rely on third-party manufacturers for the commercial supply of any of our product candidates for which we obtain marketing approval. We may be unable to maintain or establish required agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- the failure of the third-party to successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA (or similar regulatory authorities);
- the failure of the third-party to manufacture our product candidates according to our schedule, or at all, including if our third-party contractors give greater priority to the supply of other products over our product candidates;
- the reduction or termination of production or deliveries by suppliers, or the raising of prices or renegotiation of terms;
- the termination or nonrenewal of arrangements or agreements by our third-party contractors at a time that is costly or inconvenient for us;
- the breach by the third-party contractors of our agreements with them or if the third-party otherwise does not satisfactorily perform according to the terms of the agreements between us and them;
- the failure of third-party contractors to comply with applicable regulatory requirements;
- the failure of the third party to manufacture our product candidates according to our specifications;
- the mislabeling of clinical supplies, potentially resulting in the wrong dose amounts being supplied or study drug or placebo not being properly identified;
- clinical supplies not being delivered to clinical sites on time, leading to clinical trial interruptions, or of drug supplies not being distributed to commercial vendors in a timely manner, resulting in lost sales; and
- the misappropriation of our proprietary information, including our trade secrets andknow-how.

In the fourth quarter of 2020, we were notified by Fujifilm UK that they experienced equipment failures that would impact their manufacturing timelines. As a result, we successfully transferred manufacturing to Fujifilm USA and expect to complete the process validation and initial commercial manufacturing of drug substance with Fujifilm USA in support of a potential BLA submission for exebacase. We may still experience delays to the manufacturing timeline.

If Fujifilm UK, Fujifilm USA, or any alternate supplier of an active pharmaceutical ingredient, or any supplier of finished drug product for our product candidates, experiences any significant difficulties in its respective manufacturing processes, does not comply with the terms of its agreement with us or does not devote

sufficient time, energy and care to providing our manufacturing needs, we may experience delays. Moreover, as a result of theCOVID-19 pandemic, third-party manufacturers may be affected, which could disrupt their activities and, as a result, we could face difficulty sourcing key components necessary to produce supply of our product candidates. As a result, we could experience significant interruptions in the supply of our product candidates, which could impair our ability to supply our product candidates at the levels required for our clinical trials or commercialization and prevent or delay its successful development or commercialization. For example, a lot of the exebacase investigational drug product did not meet manufacturing release specifications, resulting in the delay of our Phase 2 study.

We do not have complete control over all aspects of the manufacturing process of, and are dependent on, our contract manufacturing partners, in particular Fujifilm UK and Fujifilm USA, for compliance with cGMP or similar regulations for manufacturing both active drug substances and finished drug products. Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or foreign regulatory authorities, they will not be able to secure and/or maintain marketing approval for their manufacturing facilities. In addition, we do not have control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain marketing approval for or market our product candidates, if approved. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or drugs, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our product candidates or drugs and harm our business and results of operations.

Developments by competitors, many of which have greater financial and other resources than we do, may render our products or technologies obsolete or non-competitive.

The pharmaceutical and biotechnology industries are intensely competitive. We compete directly and indirectly with other pharmaceutical companies, biotechnology companies and academic and research organizations in developing therapies to treat diseases. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. Many of our competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations and well-established sales forces. We compete with companies that have products on the market or in development for the same indications as our product candidates. We may also compete with organizations that are developing similar technology platforms. Competitors may develop more effective, more affordable or more convenient products or may achieve earlier patent protection or commercialization of their products. These competing products may render our product candidates obsolete or limit our ability to generate revenue from our product candidates. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in our competitors. Competition may increase further as a result of advances in the commercial applicability of technologies and greater availability of capital for investment in these industries. Our competitors may succeed in developing, acquiring or licensing, on an exclusive basis, drug products that are more effective or less costly than exebacase and our other product candidates.

The level of commercial success of exebacase or any other product candidates that we develop will depend upon attaining significant market acceptance of these products among physicians and payors.

Even if exebacase or any other product candidates that we develop is approved by the appropriate regulatory authorities for marketing and sale, physicians may not prescribe the approved product. Market acceptance of

exebacase or any other product candidate that we develop by physicians, patients and payors will depend on a number of factors, many of which are beyond our control, including:

- the indications for which the product is approved;
- acceptance by physicians and payors of each product as a safe and effective treatment;
- the availability, efficacy and cost of competitive drugs;
- the effectiveness of our or any third-party partner's sales force and marketing efforts;
- the extent to which the product is approved for inclusion on formularies of hospitals and managed care organizations;
- whether the product is designated under physician treatment guidelines as a first-line therapy or as a second- or third-line therapy for particular infections;
- the availability of adequate reimbursement by third parties, such as insurance companies and other health care payors, and/or by government health care programs, including Medicare and Medicaid;
- limitations or warnings contained in a product's FDA-approved labeling (or similarly approved labeling by foreign authorities); and
- prevalence and severity of adverse side effects.

Even if the medical community accepts that our product candidates are safe and efficacious for their approved indications, physicians may not immediately be receptive to the use or may be slow to adopt our product candidates as accepted treatments for their approved indications. While we believe our product candidates may demonstrate significant advantages in clinical studies, we cannot assure you that labeling approved by the FDA (or similar foreign authorities) will permit us to promote these advantages. In addition, our efforts to educate the medical community and third-party payors on the benefits of any product candidates that we develop may require significant resources and may never be successful.

Coverage and reimbursement may not be available for exebacase or any other product candidates that we develop, which could make it difficult for us to sell our products profitably.

Market acceptance and sales of exebacase or any other product candidate that we develop will depend on coverage and reimbursement policies and may be affected by health care reform measures. Government authorities and third-party payors, such as private health insurers and health maintenance organizations, decide which drugs they will pay for and establish reimbursement levels. We cannot be sure that reimbursement will be available for exebacase or any other product candidate that we develop. Also, we cannot be sure that the amount of reimbursement available, if any, will not reduce the demand for, or the price of, our products. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize exebacase or any other product candidate that we develop.

In both the United States and some foreign jurisdictions, there have been a number of legislative and regulatory proposals to change the health care system in ways that could affect our ability to sell our products profitably. In March 2010, the ACA became law in the United States. The goal of the ACA is to reduce the cost of health care and substantially change the way health care is financed by both governmental and private insurers. The ACA, among other things, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, established annual fees on manufacturers of certain branded prescription drugs, required manufacturers to participate in a discount program for certain outpatient drugs under Medicare Part D and promoted programs that increase the federal government's comparative effectiveness research, which will impact existing government healthcare programs and will result in the development of new programs. An expansion in the government's role in the United States healthcare industry may further lower rates of reimbursement for pharmaceutical products.

Since its enactment, there have been judicial, executive and Congressional challenges to certain aspects of the ACA. On June 17, 2021, the U.S. Supreme Court dismissed the most recent judicial challenge to the ACA brought by several states without specifically ruling on the constitutionality of the ACA. Prior to the Supreme Court's decision, President Biden issued an executive order to initiate a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace, which began on February 15, 2021 and remained open through August 15, 2021. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. It is unclear how other healthcare reform measures of the Biden administration will impact our business or financial condition.

Other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. For example, the Budget Control Act of 2011, among other things, resulted in aggregate reductions of Medicare payments to providers of 2% per fiscal year, which went into effect in April 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through March 31, 2022, unless additional Congressional action is taken. Further, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, or the ATRA, which, among other things, further reduced Medicare payments to several providers. Recently there has also been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted legislation designed to, among other things, reform government program reimbursement methodologies. For example, the Cures Act changes the reimbursement methodology for infusion drugs and biologics furnished through durable medical equipment in an attempt to remedy over- and underpayment of certain drugs. More recently, on March 11, 2021, President Biden signed into law the American Rescue Plan Act of 2021, which eliminates the statutory cap on the Medicaid drug rebate, currently set at 100% of a drug's average manufacturer price, beginning January 1, 2024.

While we cannot predict the impact these new laws will have in general or on our business specifically, they may result in downward pressure on pharmaceutical reimbursement, which could negatively affect market acceptance of exebacase or any future products.

We expect to experience pricing pressures in connection with the sale of exebacase or any other product candidate that we develop, due to the trend toward managed health care, the increasing influence of health maintenance organizations and additional legislative proposals. If we fail to successfully secure and maintain coverage and reimbursement for our products or are significantly delayed in doing so, we will have difficulty achieving market acceptance of our products and our business will be harmed.

We currently have no marketing and sales organization and have no experience in marketing drug products. If we are unable to establish our own marketing and sales capabilities, or enter into agreements with third parties, to market and sell our products after they are approved, we may not be able to generate revenues.

We do not have the capabilities to market, sell and distribute any of our drug products. In order to commercialize any products, we must develop these capabilities on our own or make arrangements with third parties for the marketing, sales and distribution of our products. The establishment and development of our own sales force would be expensive and time consuming and could delay any product launch, and we cannot be certain that we would be able to successfully develop this capability. As a result, we may seek one or more third parties to handle some or all of the sales, marketing or distribution for exebacase or any other product candidate in the United States or elsewhere. However, we may not be able to enter into arrangements with third parties to sell exebacase or any other product candidate on favorable terms or at all. In the event we are unable to develop our own marketing and sales force or collaborate with a third-party marketing and sales organization, we would not be able to commercialize exebacase or any other product candidate that we develop, which would negatively impact our ability to generate product revenues. Further, whether we commercialize products on our own or rely

on a third party to do so, our ability to generate revenue will be dependent on the effectiveness of the sales force. In addition, to the extent we rely on third parties to commercialize our approved products, we may likely receive less revenues or profits than if we commercialized these products ourselves.

We may form or seek strategic alliances in the future, and we may not realize the benefits of such alliances.

We may form or seek strategic alliances, create joint ventures or collaborations or enter into licensing arrangements with third parties that we believe will complement or augment our development and commercialization efforts with respect to exebacase or any future product candidate that we may develop. Any of these relationships may require us to incur non-recurring and other charges, increase our near-and long-term expenditures, issue securities that dilute our existing stockholders or disrupt our management and business. In addition, we face significant competition in seeking appropriate strategic alliances and the negotiation process is time-consuming and complex. Moreover, we may not be successful in our efforts to establish a strategic collaboration or other alternative arrangements for exebacase and any future product candidate because it may be deemed to be at too early of a stage of development for collaborative effort and third parties may not view exebacase or any future product candidate as having the requisite potential to demonstrate safety and efficacy. Any delays in entering into new strategic collaboration agreements could delay the development and commercialization of exebacase or any other product candidate that we develop, which would harm our business prospects, financial condition and results of operations.

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

From time to time, we may publicly disclose interim, topline or preliminary data from our clinical trials, which is based on a preliminary analysis of then-available data, and the results and related findings and conclusions are subject to change following a more comprehensive review of the data related to the particular study or trial. We also make assumptions, estimations, calculations and conclusions as part of our analyses of data, and we may not have received or had the opportunity to fully and carefully evaluate all data. As a result, the topline or preliminary results that we report may differ from future results of the same studies, or different conclusions or considerations may qualify such results, once additional data have been received and fully evaluated. Topline or preliminary data also remain subject to audit and verification procedures that may result in the final data being materially different from the top-line or preliminary data we previously published. As a result, topline and preliminary data should be viewed with caution until the final data are available.

From time to time, we may also disclose interim data from our preclinical studies and clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Adverse differences between interim data and final data could significantly harm our business prospects. Further, disclosure of interim data by us or by our competitors could result in volatility in the price of our common stock.

Further, others, including regulatory agencies, may not accept or agree with our assumptions, estimates, calculations, conclusions or analyses or may interpret or weigh the importance of data differently, which could impact the value of the particular program, the approvability or commercialization of the particular product candidate or product and our company in general. In addition, the information we choose to publicly disclose regarding a particular study or clinical trial is based on what is typically extensive information, and you or others may not agree with what we determine is material or otherwise appropriate information to include in our disclosure.

If the interim topline or preliminary data that we report differ from actual results, or if others, including regulatory authorities, disagree with the conclusions reached, our ability to obtain approval for, and commercialize, our product candidates may be harmed, which could harm our business, operating results, prospects or financial condition.

Risks Related to Regulatory Approval of Our Product Candidates and Other Legal Compliance Matters

If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, we will not be able to commercialize, or will be delayed in commercializing, exebacase and any future product candidate, and our ability to generate revenue will be materially impaired.

Exebacase and any other product candidate that we develop and the activities associated with their development and commercialization, including their design, testing, manufacture, recordkeeping, labeling, storage, approval, advertising, promotion, sale, distribution, importation and exportation are subject to comprehensive regulation by the FDA and other regulatory agencies in the United States and by comparable authorities in other countries. Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate. We have not received approval to market any product from regulatory authorities in any jurisdiction. Securing regulatory approval requires the submission of extensive preclinical and clinical data and supporting information to the various regulatory authorities for each therapeutic indication to establish the product candidate's safety and efficacy. Securing regulatory approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Exebacase and any other product candidate that we develop may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use.

The process of obtaining marketing approvals, both in the United States and abroad, is expensive, may take many years, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted product application, may cause delays in the approval or rejection of an application. The FDA and comparable authorities in other countries have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional preclinical, clinical or other studies. If we experience delays in obtaining approvals or if we fail to obtain approval of our product candidates that we develop, our ability to generate revenues will be materially impaired.

Even if our product candidates receive regulatory approval, they will be subject to significant post- marketing regulatory requirements and oversight.

Even if we obtain regulatory approval in (or outside) the United States, the FDA (or similar foreign authorities) may still impose significant restrictions on the indicated uses or marketing of the approved product, or impose ongoing requirements for potentially costly post-approval studies or post-market surveillance. The holder of an approved BLA is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. The holder of an approved BLA must also submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws. Similar risks exist in foreign jurisdictions.

In addition, drug product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMPs, or similar requirements outside the United States, and adherence to commitments made in the BLA. If we or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions relative to that product or the manufacturing facility, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

If the FDA or a comparable foreign regulatory authority approves any of our product candidates, the manufacturing processes, labeling, packaging, distribution, adverse event reporting, storage, advertising, promotion and recordkeeping for the product will be subject to extensive and ongoing regulatory requirements. These requirements include submissions of safety and other post-marketing information and reports, registration requirements and continued compliance with cGMPs or similar requirements outside the United States and GCPs for any clinical trials that we conduct post-approval.

If we or our partners fail to comply with applicable regulatory requirements following approval of any of our future product candidates, a regulatory agency may:

- issue a warning or untitled letter asserting that we are in violation of the law;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend or withdraw regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve a pending BLA or supplements to a BLA, or similar applications in foreign jurisdictions, submitted by us;
- seize product; or
- refuse to allow us to enter into supply contracts, including government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our future products and generate revenues.

The FDA's and other regulatory authorities' policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates.

In addition, we cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. We also cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may be subject to enforcement action and we may not achieve or sustain profitability.

The FDA and other regulatory agencies actively enforce the laws and regulations prohibiting the promotion ofoff-label uses.

If any of our product candidates are approved and we are found to have improperly promotedoff-label uses of those products, we may become subject to significant liability. The FDA and other regulatory agencies strictly regulate the promotional claims that may be made about prescription products, such as our product candidates, if approved. In particular, a product may not be promoted for uses that are not approved by the FDA or such other regulatory agencies as reflected in the product's approved labeling. If we receive marketing approval for a product candidate, physicians may nevertheless prescribe it to their patients in a manner that is inconsistent with the approved label. If we are found to have promoted such off-label uses, we may become subject to significant liability. The U.S. federal government has levied large civil and criminal fines against companies for alleged improper promotion of off-label use and has enjoined several companies from engaging inoff-label promotion. The FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. If we cannot successfully manage the promotion of our product candidates, if approved, we could become subject to significant liability, which would materially adversely affect our business and financial condition.

We have no experience as a company in bringing a drug to regulatory approval.

As a company, we have never obtained regulatory approval for, or commercialized, a drug or biologic. It is possible that the FDA may refuse to accept any or all of our planned BLAs for substantive review or may conclude after review of our data that our application is insufficient to obtain regulatory approval of exebacase or any other product candidate. If the FDA does not accept or approve any or all of our planned BLAs, it may require that we conduct additional preclinical, clinical or manufacturing validation studies, which may be costly, and submit that data before it will reconsider our applications. Depending on the extent of these or any other FDA required studies, approval of any BLA or application that we submit may be significantly delayed, possibly for several years, or may require us to expend more resources than we have available. Any delay in obtaining, or an inability to obtain, regulatory approvals would prevent us from meeting our timelines for commercializing exebacase or any other product candidate, generating revenues and achieving and sustaining profitability.

Disruptions at the FDA and other government agencies caused by funding shortages or global health concerns could hinder their ability to hire, retain or deploy key leadership and other personnel, or otherwise prevent new or modified products from being developed, approved or commercialized in a timely manner or at all, which could negatively impact our business.

The ability of the FDA and foreign regulatory authorities to review and or approve new products can be affected by a variety of factors, including government budget and funding levels, statutory, regulatory, and policy changes, the FDA's or foreign regulatory authorities' ability to hire and retain key personnel and accept the payment of user fees, and other events that may otherwise affect the FDA's or foreign regulatory authorities' ability to perform routine functions. Average review times at the FDA and foreign regulatory authorities have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies, such as the EMA following its relocation to Amsterdam and resulting staff changes, may also slow the time necessary for new drugs and biologics or modifications to cleared or approved drugs/biologics to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities.

Separately, in response to the COVID-19 pandemic, in March 2020, the FDA announced its intention to postpone most inspections of foreign manufacturing facilities, and on March 18, 2020, the FDA temporarily postponed routine surveillance inspections of domestic manufacturing facilities. Subsequently, in July 2020, the FDA resumed certain on-site inspections of domestic manufacturing facilities subject to a risk-based prioritization system. The FDA utilized this risk-based assessment system to assist in determining when and where it was safest to conduct prioritized domestic inspections. Additionally, on April 15, 2021, the FDA issued a guidance document in which the FDA described its plans to conduct voluntary remote interactive evaluations of certain drug manufacturing facilities and clinical research sites, among other facilities. According to the guidance, the FDA may request such remote interactive evaluations where the FDA determines that remote evaluation would be appropriate based on mission needs and travel limitations. In May 2021, the FDA outlined a detailed plan to move toward a more consistent state of inspectional operations, and in July 2021, the FDA resumed standard inspectional operations of domestic facilities and was continuing to maintain this level of operation as of September 2021. More recently, the FDA has continued to monitor and implement changes to its inspectional activities to ensure the safety of its employees and those of the firms it regulates as it adapts to the evolving COVID-19 pandemic. Regulatory authorities outside the United States have adopted similar restrictions or other policy measures in response to the COVID-19 pandemic. If a prolonged government shutdown occurs, or if global health concerns continue to prevent the FDA or other regulatory authorities from conducting their

regular inspections, reviews, or other regulatory activities, it could significantly impact the ability of the FDA or other regulatory authorities to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

If foreign approval for exebacase or any other product candidate is obtained, there are inherent risks in conducting business in international markets.

Commercialization of our product candidates in international markets is an element of our long-term strategy. If approved for commercialization in a foreign country, we intend to enter into agreements with third parties to market exebacase or any other product candidate whenever it may be approved and wherever we have the right to market it. Consequently, we expect that we will be subject to additional risks related to entering into international business relationships, including:

- potentially reduced protection for intellectual property rights;
- the potential for so-called parallel importing, which is what happens when a local seller, faced with high or higher local prices, opts to import goods from a foreign market (with low or lower prices) rather than buying them locally;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with laws for employees working and traveling abroad;
- foreign taxes, including withholding of payroll taxes;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenues;
- workforce uncertainty in countries where labor unrest is more common than in the United States;
- production shortages resulting from any events affecting active pharmaceutical ingredient and/or finished drug product supply or manufacturing capabilities abroad;
- business interruptions resulting from geo-political actions, including war and terrorism, epidemics, including the COVID-19 pandemic, or natural disasters including earthquakes, typhoons, floods and fires; and
- failure to comply with the rules and regulations of the Office of Foreign Asset Control, the Foreign Corrupt Practices Act and other applicable anti-bribery rules and regulations in other jurisdictions.

These and other risks may materially adversely affect our ability to attain or sustain revenue from international markets and therefore materially adversely affect our business.

Product liability lawsuits against us could divert our resources, cause us to incur substantial liabilities and limit commercialization of any products that we may develop.

We face an inherent risk of product liability exposure related to the testing of exebacase and any other product candidate that we develop in human clinical trials and we will face higher degrees of this risk if we commercially sell any products that we develop. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- distraction of our management or other internal resources from pursuing our business strategies;
- decreased demand for any product candidates or products that we may develop;

- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend the related litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue; and
- the inability to commercialize any products that we may develop.

We maintain product liability insurance coverage in relation to our clinical trials. Such coverage may not be adequate to cover all liabilities that we may incur. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on our business.

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

Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Our product candidates may face competition sooner than anticipated.

The ACA includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA, which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product.

We believe that any of our product candidates approved as a biological product under a BLA should qualify for the12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to

congressional action or otherwise, or that the FDA will not consider our product candidates to be reference products for competing products, potentially creating the opportunity for generic competition sooner than anticipated. In the EU, these exclusivity periods are even shorter. Upon receiving marketing authorization, new chemical or biological entities generally receive eight years of data exclusivity and an additional two years of market exclusivity. If granted, data exclusivity prevents regulatory authorities in the EU from referencing the innovator's data to assess a generic/biosimilar application. During the additional two-year period of market exclusivity, a generic/biosimilar marketing authorization can be submitted, and the innovator's data may be referenced, but no generic/biosimilar product can be marketed until the expiration of the market exclusivity.

Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing.

We may be subject, directly or indirectly, to foreign, federal and state healthcare laws, including applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings.

Healthcare providers, physicians and third-party payors play a primary role in the recommendation and prescription of any product candidates for which we obtain marketing approval. Our business operations and current and future arrangements with third-party payors, healthcare providers and customers may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we research, develop, market, sell and distribute our products for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations include the following:

- the federal healthcare Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under federal and state healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of the federal Anti-Kickback Statute or specific intent to violate it to have committed a violation;
- the federal False Claims Act imposes criminal and civil penalties, including through civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. 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;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program;
- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it to have committed a violation;
- the federal transparency requirements under the ACA requires 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 certain exceptions) to report to the Department of Health and Human Services information related to physician payments and other transfers of value and

ownership and investment interests held by physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), certain non-physician practitioners (physician assistants, nurse practitioners, clinical nurse specialists, certified nurse anesthetists, anesthesiologist assistants and certified nurse midwives), and their immediate family members and payments or other transfers of value made to such physician owners;

- analogous state laws and regulations, such as state anti-kickback and false claims laws, and transparency laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, and some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures and pricing information; and
- similar healthcare laws and regulations in the EU and other jurisdictions, including reporting requirements detailing interactions with and payments to healthcare providers.

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 or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, exclusion from government funded healthcare programs, such as Medicare and Medicaid, additional reporting obligations and oversight if we become subject to a corporate integrity agreement or other agreement to resolve allegations of non-compliance with these laws, imprisonment and the curtailment or restructuring of our operations. Further, defending against any such actions, even if successful, can be costly, time-consuming and may require significant personnel resources. 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 laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

The unfavorable consequences of any plaintiff attorney investigation or the adverse outcome of litigation or arbitration proceedings commenced by or against us could materially harm our business.

Unfavorable consequences from the most recent and prior investigations by plaintiff attorneys could damage our reputation and disrupt our business. The adverse outcome of any litigation or arbitration proceedings commenced by or against us could have a material adverse effect on our business and impede the achievement of our development and commercialization objectives.

In the ordinary course of our operations, claims involving our actions, actions of third parties or agreements to which we are a party may be brought by and against us. The claims and charges can involve actual damages, as well as contractually agreed upon liquidated sums. These claims, if not resolved through negotiation, are often subject to lengthy and expensive litigation or arbitration proceedings.

The United Kingdom's withdrawal from the European Union may adversely impact our business.

The UK left the EU on January 31, 2020, following which existing EU legislation continued to apply in the UK during a transition period under the terms of the EU-UK Withdrawal Agreement. The transition period, which ended on December 31, 2020, maintained access to the EU single market and to global trade deals negotiated by the EU on behalf of its members. The transition period provided time for the UK and EU to negotiate a framework for partnership for the future, which was then crystallized in the Trade and Cooperation Agreement, or Trade and Cooperation Agreement, which became effective on the January 1, 2021.

The long-term effects of Brexit on our business in the UK, the EU and worldwide will depend on the effects of the implementation and application of the Trade and Cooperation Agreement and any other relevant agreements between the UK and the EU. EU laws which have been transposed into UK law through secondary legislation continue to be applicable as "retained EU law". However, new legislation will not be applicable. The UK government has passed a new Medicines and Medical Devices Act 2021, which introduces delegated powers in favor of the Secretary of State or an 'appropriate authority' to amend or supplement existing regulations in the area of medical devices. This allows new rules to be introduced in the future by way of secondary legislation, which aims to allow flexibility in addressing regulatory gaps. There is a possibility that over time, national laws will be amended and that consequently the regulatory framework in Great Britain will diverge from that of the EU. As of January 1, 2021, the Medicines and Healthcare products Regulatory Agency, or MHRA, is the UK's standalone medicines and medical devices regulator. As a result of the Northern Ireland protocol, different rules will apply in Northern Ireland than in England, Wales, and Scotland, together, Great Britain; broadly, Northern Ireland will continue to follow the EU regulatory regime, but its national competent authority will remain the MHRA.

Further, the UK's withdrawal from the EU has resulted in the relocation of the EMA from the UK to the Netherlands. This relocation has caused, and may continue to cause, disruption in the administrative and medical scientific links between the EMA and the UK MHRA, including delays in granting clinical trial authorization or marketing authorization, disruption of importation and export of active substance and other components of new drug formulations, and disruption of the supply chain for clinical trial product and final authorized formulations. The cumulative effects of the disruption to the regulatory framework may add considerably to the development lead time to marketing authorization and commercialization of products in the EU and/or the UK.

Risks Related to Employee Matters and Managing Growth

Our future success depends on our ability to attract and retain qualified personnel, and changes in management may negatively affect our business.

We are dependent on the principal members of our management and scientific teams. Our success and the execution of our growth strategy depend largely on the continued service of these employees. Although we have formal employment agreements with our executive officers, these agreements do not prevent them from terminating their employment with us at any time. The loss of the services of any of these persons could be disruptive to our operations, impede our ability to raise additional funding or delay the achievement of our development and commercialization objectives. Additionally, we cannot be certain that changes in management will not lead to additional management departures or changes, affect our ability to hire or retain key personnel, or otherwise negatively affect our business. We do not maintain "key person" insurance for any of our executives or other employees.

Recruiting and retaining qualified scientific and clinical personnel is critical to our success. We may not be able to attract and retain these personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also compete for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us.

For our Company to successfully develop and commercialize our product candidates, we may need to expand our development, regulatory and sales, marketing and distribution capabilities, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

In order to successfully develop and commercialize our product candidate, we may need to increase the number of our employees and expand the scope of our operations, particularly in the areas of drug discovery,

drug development, regulatory affairs and commercialization. To manage our anticipated future growth, we would need to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the various levels of experience of our management team in managing a company with significant growth, we may not be able to effectively manage a significant expansion of our operations or recruit and train additional qualified personnel. The physical expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

Risks Related to Our Intellectual Property

If we or our licensors are unable to obtain and maintain patent protection for our owned or licensed technology and products, or if the scope of the patent protection is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully commercialize our technology and products may be adversely affected.

Our success depends in large part on our and our licensors' ability to obtain and maintain patent protection in the United States and other countries with respect to our proprietary technology and products or technology or products that may have been licensed to us. Similar to our licensors, we seek to protect our proprietary position by filing patent applications in the United States and abroad related to our novel technologies and product candidates that are important to our business. This process is expensive and time-consuming, and we or our licensors may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that we or our licensors will fail to identify patentable aspects of either our or their research and development output before it is too late to obtain patent protection. Moreover, if we license technology or product candidates from third parties in the future, these license agreements may not permit us to control the preparation, filing and prosecution of patent applications, or to maintain the patents, covering this intellectual property. These agreements could also give our licensors the right to enforce the licensed patents without our involvement, or to decide not to enforce the patents without our consent. Therefore, in these circumstances, we could not be certain that these patents and applications would be prosecuted and enforced in a manner consistent with the best interests of our business.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain and has in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights and any patent rights we may license from a third party are highly uncertain. Our or our licensors' pending and future patent applications may not result in issued patents that protect our technology or products, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our or our licensors' patents or narrow the scope of such patent protection.

The laws of foreign countries may not protect our rights to the same extent as the laws of the United States. For example, European patent law restricts the patentability of methods of treatment of the human body more than United States law does. Assuming the other requirements for patentability are met, historically, in the United States, the first to make the claimed invention was entitled to the patent, while outside the United States, the first to file a patent application is entitled to the patent. The United States currently uses a first-inventor-to-file system in which, assuming the other requirements for patentability are met, the first inventor to file a patent application will be entitled to the patent. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not at all. Therefore, we cannot be certain that we were the first to make the inventions claimed in our patents or pending patent applications, or that we were the first to file for patent protection of such inventions. Moreover, we may be subject to a third party preissuance

submission of prior art to the U.S. Patent and Trademark Office, or become involved in opposition, derivation, reexamination, litigation, inter partes review or interference proceedings, in the United States or elsewhere, challenging our patent rights or the patent rights of others. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or products and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize products without infringing third-party patent rights. In addition, if the breadth or strength of protection provided by our patents and patent applications is threatened, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

Even if our or our licensors' patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. Our competitors may be able to circumvent our owned or licensed patents by developing similar or alternative technologies or products in a non-infringing manner.

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 the United States and abroad. 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 prevent others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized and such patents may not be able to claim the benefits of any patent term extension laws or regulations. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

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

Many of our employees were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we use customary non-disclosure agreements and try to ensure that our employees do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or these employees have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such employee's former employer. Litigation may be necessary to defend against these claims.

In addition, while we typically require our employees and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own, or such agreements may be inadequately drafted at times thereby not ensuring assignment to us of all potential intellectual property rights. If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to management.

We have not yet registered our trademarks in all of our potential markets, and failure to secure those registrations could adversely affect our business.

Our future trademark applications may not be allowed for registration, and our registered trademarks may not be maintained or enforced. During trademark registration proceedings, we may receive rejections from the U.S. Patent and Trademark Office or other applicable foreign intellectual property offices. Although we are given an opportunity to respond to those rejections, we may be unable to overcome such rejections, or have to expend additional resources to secure registrations, such as commencing cancellation proceedings against third-party

trademark registrations to remove them as obstacles to our trademark applications. In addition, in the U.S. Patent and Trademark Office and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we do not secure registrations for our trademarks, we may encounter more difficulty in enforcing them against third parties than we otherwise would.

In addition, we have not yet proposed a proprietary name for our product candidates in any jurisdiction. Any proprietary name we propose to use with our product candidates in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed proprietary product names, we may be required to expend significant additional resources in an effort to identify a suitable proprietary product name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

Risks Related to Our Securities

The price of our common stock may be volatile and you could lose all or part of your investment.

There has been significant volatility in the market price and trading volume of equity and derivative securities, which is unrelated to the financial performance of the companies issuing the securities, including due to the effects of the COVID-19 pandemic. In addition, equity markets have experienced significant price and volume fluctuations that have affected the market prices for the securities of biotechnology and also newly public companies for a number of reasons, including reasons that may be unrelated to the business or operating performance of the companies. These broad market fluctuations may negatively affect the market price of our common stock.

The trading price of our securities has been and is likely to continue to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control, including limited trading volume. In addition to the factors discussed in this “Risk Factors” section and elsewhere in this Annual Report, these factors include:

- our ability to implement our preclinical, clinical and other development or operational plans;
- adverse regulatory decisions;
- strategic actions by us or our competitors, such as acquisitions or restructurings;
- new laws or regulations, or new interpretations of existing laws or regulations, applicable to our business;
- actual or anticipated fluctuations in our financial condition or annual or quarterly results of operations;
- our cash position;
- public reaction to our press releases, other public announcements and filings with the SEC;
- changes in investor and financial analyst perceptions of the risks and condition of our business;
- changes in, or our failure to meet, performance expectations of investors or financial analysts (including, without limitation, with respect to the status of development of our product candidates);
- changes in market valuations of biotechnology companies;
- changes in key personnel;
- increased competition;

- sales of common stock by us or members of our management team;
- trading volume of our common stock;
- issuances of debt or equity securities;
- the granting or exercise of employee stock options or other equity awards;
- changes in accounting standards, policies, guidance, interpretations or principles;
- ineffectiveness of our internal controls;
- actions by institutional or other large stockholders;
- significant lawsuits, including patent or stockholder litigation;
- general political, market and economic conditions, including as a result of health pandemics; and
- other events or factors, many of which are beyond our control.

In addition, the stock market in general, and the Nasdaq Capital Market and biotechnology companies in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance. In the past, securities class action litigation has often been instituted against companies following periods of volatility in the market price of a company's securities. This type of litigation, if instituted, could result in substantial costs and a diversion of management's attention and resources, which would harm our business, operating results or financial condition.

Future sales of our common stock or warrants may cause the market price of our securities to decline.

Sales of substantial amounts of shares of our common stock or warrants in the public market, or the perception that these sales may occur, could adversely affect the price of our securities and impair our ability to raise capital through the sale of additional equity securities. As of March 17, 2022, we have approximately 39.3 million shares of common stock outstanding, of which approximately 37.4 million shares of our outstanding common stock are freely tradable, or may become freely tradable, without restriction, in the public market unless held by our "affiliates," as defined under Rule 144 of the Securities Act of 1933, as amended (the "Securities Act"). Additionally, we have warrants to purchase approximately 10.9 million shares of our common stock outstanding as of March 17, 2022. Approximately 10.4 million shares of common stock underlying warrants will be freely tradable upon exercise unless held by our affiliates.

We have registered 4,031,200 shares of our common stock as of March 17, 2022 that we may issue under our employee benefit plans. These shares can be freely sold in the public market upon issuance, unless pursuant to their terms these stock awards have transfer restrictions attached to them. Additionally, pursuant to the 2014 Omnibus Incentive Plan (the "2014 Plan"), our management is authorized to grant stock options and other equity linked award to our employees, directors and consultants. The 2014 Plan provides that the number of shares available for future grant under our 2014 Plan will automatically increase on January 1st each year, from January 1, 2015 through January 1, 2024, by an amount equal to four percent of all shares of our capital stock outstanding as of December 31st of the preceding calendar year, subject to the ability of our board of directors to take action to reduce the size of such increase in any given year. Unless our board of directors elects not to increase the number of shares underlying our 2014 Plan each year, our stockholders may experience additional dilution, which could cause our stock price to decline.

Any failure to maintain effective internal control over financial reporting could have a significant adverse effect on our business and the price of our common stock.

Our management is required to report annually on the effectiveness of our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act, or Section 404. The rules governing the standards

that must be met for our management to assess our internal control over financial reporting are complex and require significant documentation, testing and possible remediation. Because we are no longer an emerging growth company, our independent registered public accounting firm will be required to formally attest to the effectiveness of our internal control over financial reporting pursuant to Section 404 if we, in the future, no longer qualify under the SEC exemption for low-revenue "smaller reporting companies", as defined in Rule 12b-2 of the Exchange Act. As such, our independent registered public accounting firm may in the future issue a report that is adverse in the event it is not satisfied with the level at which our controls are documented, designed or operating.

In the future, we may identify material weaknesses or significant deficiencies in our internal control over financial reporting, and we may not be able to remediate them in time to meet the deadline imposed by the Sarbanes-Oxley Act for compliance with the requirements of Section 404. In addition, we may encounter problems or delays in completing the implementation of any requested improvements and receiving a favorable attestation report from our independent registered public accounting firm, if such a report is required. We will be unable to issue securities in the public markets through the use of a shelf registration statement if we are not in compliance with Section 404. Furthermore, failure to achieve and maintain an effective internal control environment could materially adversely affect our business, reduce the market's confidence in our common stock, adversely affect the price of our common stock and limit our ability to report our financial results accurately and timely.

We have no present intention to pay cash dividends and, even if we change that policy, we may be restricted from paying cash dividends on our common stock.

We do not intend to pay cash dividends for the foreseeable future. We currently expect to retain all future earnings, if any, for use in the development, operation and expansion of our business. Any determination to pay cash dividends in the future will depend upon, among other things, our results of operations, plans for expansion, tax considerations, available net profits and reserves, limitations under law, financial condition, capital requirements and other factors that our board of directors considers to be relevant.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

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

- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;
- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a stockholder rights plan, or so-called "poison pill," that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and

- require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or repeal certain provisions of our charter or bylaws.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner.

Risks Related to Cybersecurity, Data Protection and Privacy

Security breaches and other disruptions could compromise our information and expose us to liability, which would cause our business and reputation to suffer.

In the ordinary course of our business, we store sensitive data, including intellectual property, proprietary business information and personally identifiable information, in our data centers and on our networks. The secure processing, maintenance and transmission of this information is critical to our operations and business strategy. Our information technology systems and those of our third-party service providers, strategic partners and other contractors or consultants are vulnerable to attack and damage or interruption from computer viruses and malware (e.g. ransomware), malicious code, natural disasters, terrorism, war, telecommunication and electrical failures, hacking, cyberattacks, phishing attacks and other social engineering schemes, employee theft or misuse, human error (e.g., social engineering, phishing), fraud, denial or degradation of service attacks, sophisticated nation-state and nation-state-supported actors or unauthorized access or use by persons inside our organization, or persons with access to systems inside our organization. Attacks upon information technology systems are increasing in their frequency, levels of persistence, sophistication and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of motives and expertise. As a result of the COVID-19 pandemic and the current conflict between Russia and Ukraine, we may also face increased cybersecurity risks due to our reliance on internet technology and the number of our employees who are working remotely, which may create additional opportunities for cybercriminals to exploit vulnerabilities. Furthermore, because the techniques used to obtain unauthorized access to, or to sabotage, systems change frequently and often are not recognized until launched against a target, we may be unable to anticipate these techniques or implement adequate preventative measures. We may also experience security breaches that may remain undetected for an extended period. Despite our security measures, our information technology and infrastructure may be vulnerable to attacks by hackers or breached due to employee error, malfeasance, or other disruptions. Even if identified, we may be unable to adequately investigate or remediate incidents or breaches due to attackers increasingly using tools and techniques that are designed to circumvent controls, to avoid detection, and to remove or obfuscate forensic evidence.

We and certain of our service providers are from time to time subject to cyberattacks and security incidents. While we do not believe that we have experienced any significant system failure, accident or security breach to date, any such breach could compromise our networks and the information stored there could be accessed, publicly disclosed, lost or stolen. Any such access, disclosure or other loss of information could result in significant costs to address and remediate the incident, lead to legal claims or proceedings, disrupt our operations, and damage our reputation.

We maintain cyber risk insurance, but this insurance may not be sufficient to cover all of our losses from any future breaches of our systems.

Our collection, control, processing, sharing, disclosure and otherwise use of personal data could give rise to liabilities as a result of governmental regulation, conflicting legal requirements, and evolving laws concerning data privacy in the EU and EEA.

The global data protection landscape is rapidly evolving, and we are or may become subject to numerous state, federal and foreign laws, requirements and regulations governing the collection, use, disclosure, retention, and security of personal data, such as information that we may collect in connection with clinical trials in the U.S. and abroad. Implementation standards and enforcement practices are likely to remain uncertain for the foreseeable future, and we cannot yet determine the impact future laws, regulations, standards, or perception of their requirements may have on our business. This evolution may create uncertainty in our business, affect our ability to operate in certain jurisdictions or to collect, store, transfer use and share personal information, necessitate the acceptance of more onerous obligations in our contracts, result in liability or impose additional costs on us. The cost of compliance with these laws, regulations and standards is high and is likely to increase in the future. Any failure or perceived failure by us to comply with federal, state or foreign laws or regulation, our internal policies and procedures or our contracts governing our processing of personal information could result in negative publicity, government investigations and enforcement actions, claims by third parties and damage to our reputation, any of which could have a material adverse effect on our operations, financial performance and business.

As our operations and business grow, we may become subject to or affected by new or additional data protection laws and regulations and face increased scrutiny or attention from regulatory authorities. In the U.S., HIPAA imposes, among other things, certain standards relating to the privacy, security, transmission and breach reporting of individually identifiable health information. Certain states have also adopted comparable privacy and security laws and regulations, some of which may be more stringent than HIPAA. Such laws and regulations will be subject to interpretation by various courts and other governmental authorities, thus creating potentially complex compliance issues for us and our future customers and strategic partners. In addition, the CCPA went into effect on January 1, 2020. The CCPA creates individual privacy rights for California consumers and increases the privacy and security obligations of entities handling certain personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. The CCPA may increase our compliance costs and potential liability, and many similar laws have been proposed at the federal level and in other states. Further, the CPRA recently passed in California. The CPRA will impose additional data protection obligations on covered businesses, including additional consumer rights processes, limitations on data uses, new audit requirements for higher risk data, and opt outs for certain uses of sensitive data. It will also create a new California data protection agency authorized to issue substantive regulations and could result in increased privacy and information security enforcement. The majority of the provisions will go into effect on January 1, 2023, and additional compliance investment and potential business process changes may be required. Similar laws have passed in Virginia and Colorado and have been proposed in other states and at the federal level, reflecting a trend toward more stringent privacy legislation in the United States. The enactment of such laws could have potentially conflicting requirements that would make compliance challenging. In the event that we are subject to or affected by HIPAA, the CCPA, the CPRA or other domestic privacy and data protection laws, any liability from failure to comply with the requirements of these laws could adversely affect our financial condition.

Our activities outside the United States impose additional compliance requirements and generate additional risks of enforcement for noncompliance. For example, the GDPR repealed the Data Protection Directive (95/46/EC) and is directly applicable in all E.E.A. countries (which consists of the 27 EU member states plus Norway, Liechtenstein and Iceland) since its effective date of May 25, 2018. The GDPR applies to companies established in the EEA, as well as companies that are not established in the EEA and which collect and use personal data in relation to offering goods or services to, or monitoring the behavior of, individuals located in the EEA, including, for example, through the conduct of clinical trials (whether the trials are conducted directly by the company itself or through a clinical vendor or collaborators). The GDPR permits EEA countries derogations for certain matters and, accordingly, we are also subject to national laws relating to the processing of certain data

such as genetic data, biometric data and health data. It imposes a strict data protection compliance regime including: providing detailed disclosures about how personal data is collected and processed (in a concise, intelligible and easily accessible form); demonstrating that valid consent or another an appropriate legal basis is in place or otherwise exists to justify data processing activities; appointing data protection officers in certain circumstances; granting new rights for data subjects in regard to their personal data (including the right to be "forgotten" and the right to data portability), as well as enhancing current rights (e.g., data subject access requests); introducing the obligation to notify data protection regulators or supervisory authorities (and in certain cases, affected individuals) of significant data breaches; imposing limitations on retention of personal data; maintaining a record of data processing; defining for the first time pseudonymized (i.e., key-coded) data; and complying with principal of accountability and complying with the obligation to demonstrate compliance through policies, procedures, training and audit.

We are also subject to EU rules with respect to cross-border transfers of personal data out of the E.E.A. These rules are under scrutiny from time to time. For example, in July 2020, the Court of Justice of the European Union (the "CJEU") limited how organizations could lawfully transfer personal data from the EU/EEA to the United States by invalidating the EU-U.S. Privacy Shield for purposes of international transfers and imposing further restrictions on the use of standard contractual clauses ("SCCs"). Following the decision of the CJEU, the EU-U.S. Privacy Shield can no longer be used as a legal basis for transferring personal data from the European Union to the United States and the CJEU made clear that reliance on standard contractual clauses (SCCs) may not necessarily be a sufficient alternative. The European Commission issued revised SCCs on June 4, 2021 to account for the decision of the CJEU and recommendations made by the European Data Protection Board. The revised SCCs must be used for relevant new data transfers from September 27, 2021; existing standard contractual clauses arrangements must be migrated to the revised clauses by December 27, 2022. The new SCCs apply only to the transfer of personal data outside of the EEA and not the UK; the UK's Information Commissioner's Office launched a public consultation on its draft revised data transfers mechanisms in August 2021 and laid its proposal before Parliament, with the UK SCCs expected to come into force in March 2022, with a two-year grace period. There is some uncertainty around whether the revised clauses can be used for all types of data transfers, particularly whether they can be relied on for data transfers to non-EEA entities subject to the GDPR. As supervisory authorities issue further guidance on personal data export mechanisms, including circumstances where the standard contractual clauses cannot be used, and/or start taking enforcement action, we could suffer additional costs, complaints and/or regulatory investigations or fines, and/or if we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we provide our services, the geographical location or segregation of our relevant systems and operations, and could adversely affect our financial results. If we are otherwise unable to transfer personal data between and among countries and regions in which we operate, it could affect the manner in which we conduct our clinical trials and could adversely affect our business and financial results.

Further, we have had to comply with the GDPR and the GDPR as incorporated into United Kingdom national law, the latter regime having the ability to separately fine up to the greater of £17.5 million or 4% of global turnover. The European Commission has adopted an adequacy decision in favor of the UK, enabling data transfers from EU member states to the UK without additional safeguards. However, the UK adequacy decision will automatically expire in June 2025 unless the European Commission re-assesses and renews/ extends that decision and remains under review by the Commission during this period. The relationship between the UK and the EU in relation to certain aspects of data protection law remains unclear, and it is unclear how UK data protection laws and regulations will develop in the medium to longer term, and how data transfers to and from the UK will be regulated in the long term. These changes may lead to additional costs and increase our overall risk exposure.

We depend on a number of third parties in relation to the operation of our business (including clinical research organizations), a number of which process personal data on our behalf. There is no assurance that our own privacy and security-related safeguards and/or any contractual measures that we enter into with these providers will protect us from the risks associated with the third-party processing, storage and transmission of

such information. Any violation of data or security laws by our third-party processors could have a material adverse effect on our business and result in the fines and penalties outlined below.

Fines for certain breaches of the GDPR are significant for companies: up to the greater of 4% of total annual worldwide turnover of the preceding financial year, or €20 million. In addition to the foregoing, a breach of the GDPR could result in regulatory investigations, reputational damage, orders to cease/ change our processing of our data, enforcement notices, assessment notices (for a compulsory audit), as well potential civil claims including class action type litigation where individuals suffer harm. Our actual or alleged failure to comply with the GDPR could result in enforcement actions and significant penalties against us (as outlined above), which could result in negative publicity, increase our operating, business and/or legal costs, subject us to claims or other remedies and have a material adverse effect on our clinical trials, business, financial condition, and operations.

We are also subject to evolving EU privacy laws on cookies, ande-marketing. The EU is in the process of replacing thee-Privacy Directive with a new set of rules taking the form of a regulation, which will be directly implemented to all EEA countries. The draft E-Privacy Regulation imposes strict opt-in marketing rules with limited exceptions for business-to-business communications, alters rules on third-party cookies, web beacons and similar technology and significantly increases fining powers to the same levels as the GDPR (i.e. the greater of 20 million Euros or 4% of total global annual revenue for certain breaches). While the e-Privacy Regulation was originally intended to be adopted on May 25, 2018 (alongside the GDPR), it is still going through the European legislative process and commentators now expect it to be adopted during 2021, after which a two-year transition period will follow before it is in force. We are likely to be required to expend further capital and other resources to ensure compliance with these changing laws and regulations.

Although we work to comply with applicable laws, regulations and standards, our contractual obligations and other legal obligations, these requirements are evolving and may be modified, interpreted and applied in an inconsistent manner from one jurisdiction to another, and may conflict with one another or other legal obligations with which we must comply. Any failure or perceived failure by us or our employees, representatives, contractors, consultants, collaborators, or other third parties to comply with such requirements or adequately address privacy and security concerns, even if unfounded, could result in additional cost and liability to us, damage our reputation, and adversely affect our business and results of operations.

General Risk Factors

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

Competitors may infringe our or our licensors' patents, trademarks, copyrights or other intellectual property. To stop infringement or unauthorized use, we or our licensors may be required to file infringement claims, which can be expensive and time consuming. Any claims we or our licensors assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that some or all of our patents or other intellectual property rights are not valid or that we or our licensors infringe their patents or other intellectual property rights. In addition, in a patent infringement proceeding, a court may decide that a patent of ours or our licensors is invalid or unenforceable, in whole or in part, construe the patent's claims narrowly, or may refuse to stop the other party from using the technology at issue on the grounds that such patents do not cover the technology in question and therefore cannot be infringed. Similarly, if we assert trademark infringement claims, a court may determine that the marks we have asserted are invalid, unenforceable, or not infringed, or that the party against whom we have asserted trademark infringement claims has superior rights to the marks in question. In this case, we could ultimately be forced to cease use of such marks. In any infringement litigation, any award of monetary damages may be unlikely or very difficult to obtain, and any such award we may receive may not be commercially valuable. Furthermore, because of the substantial amount of discovery required in connection with

intellectual property litigation, there is a risk that we could incur substantial litigation costs or that some of our confidential information could be compromised by disclosure during this type of litigation.

Third parties may initiate legal proceedings alleging that we or our licensors are infringing their intellectual property rights, the outcome of which would be uncertain and could have a material adverse effect on the success of our business.

Our commercial success depends upon our ability to develop, manufacture, market, or sell our or our licensors' product candidates and use our proprietary technologies without infringing the intellectual property and other proprietary rights of third parties. There is considerable intellectual property litigation in the biotechnology and pharmaceutical industries, and we may become party to, or threatened with, future adversarial proceedings or litigation regarding intellectual property rights with respect to our products and technology, including reexamination or interference proceedings before the U.S. Patent and Trademark Office. Third parties may assert infringement claims against us based on existing or future intellectual property rights.

If we or our licensors are found to infringe a third party's intellectual property rights, we or our licensors could be enjoined from further using certain products and technology or may be required to obtain a license from such third party to continue developing and marketing such products and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. We could be forced, including by court order, to cease commercializing the infringing technology or product. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees if we are found to have willfully infringed a patent or other intellectual property rights of a third party. A finding of infringement could prevent us from commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business.

Intellectual property litigation could cause us to spend substantial resources and could distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses, and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development, sales, marketing or distribution activities. We may not have sufficient financial or other resources to adequately conduct or defend such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

In addition to seeking patents for some of our technology and products, we also rely on trade secrets, including unpatentedknow-how, technology and other proprietary information, to maintain our competitive position. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, contract manufacturers, consultants, advisors and other third parties. However, we cannot guarantee that we have executed these agreements with each party that may have or have had access to our trade secrets, nor can we guarantee that such agreements will always be adequately drafted so as to be enforceable. If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, because of potential differences in laws in different jurisdictions, some courts inside and outside the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed.

We may issue additional shares of common stock, warrants or other securities to finance our growth.

We may finance the development of our product pipeline or generate additional working capital through additional equity financing. Therefore, subject to the rules of the Nasdaq, we may issue additional shares of our common stock, warrants and other equity securities of equal or senior rank, with or without stockholder approval, in a number of circumstances from time to time. The issuance by us of shares of our common stock, warrants or other equity securities of equal or senior rank will have the following effects:

- the proportionate ownership interest in us held by our existing stockholders will decrease;
- the relative voting strength of each previously outstanding share of common stock may be diminished; and
- the market price of our common stock may decline.

In addition, if we issue shares of our common stock and/or warrants in a future offering (or, in the case of our common stock, the exercise of outstanding warrants to purchase our common stock), it could be dilutive to our security holders.

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

The SEC has adopted regulations which generally define a "penny stock" to be an equity security that has a market price of less than $5.00 per share or an exercise price of less than $5.00 per share, subject to specific exemptions, including an exemption for any securities listed on a national securities exchange. The rules impose additional sales practice requirements on broker-dealers for transactions involving "penny stock", with some exceptions. If shares of our common stock were delisted from the Nasdaq Capital Market and determined to be "penny stock", broker-dealers may find it more difficult to trade such securities and investors may find it more difficult to acquire or dispose of such securities on the secondary market.

There can be no assurance that we will ever provide liquidity to our investors through a sale of our company.

While acquisitions of pharmaceutical companies like ours are not uncommon, potential investors are cautioned that no assurances can be given that any form of merger, combination, or sale of our company will take place, or that any merger, combination, or sale, even if consummated, would provide liquidity or a profit for our investors. You should not invest in our company with the expectation that we will be able to sell the business in order to provide liquidity or a profit for our investors.

We incur significant costs as a result of operating as a public company and our management is required to devote substantial time to complying with public company regulations.

As a public company, we incur significant legal, accounting and other expenses, including costs associated with our public company reporting requirements under the Securities Exchange Act of 1934, as amended (the "Exchange Act"). We must also follow the rules, regulations and requirements subsequently adopted by the SEC and the Nasdaq and any failure by us to comply with such rules and requirements could negatively affect investor

confidence in us and cause the market price of our common stock to decline. Our executive officers and other personnel also need to devote substantial time and financial resources to comply with these rules, regulations and requirements.

The rules and regulations applicable to public companies have substantially increased our legal and financial compliance costs and made some activities more time-consuming and costly. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition and results of operations. The increased costs decrease our net income or increase our net loss, and may require us to reduce costs in other areas of our business. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to incur substantial costs to maintain the same or similar coverage. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers.

Reports published by analysts, including projections in those reports that exceed our actual results, could adversely affect the price and trading volume of our common stock.

The projections of securities research analysts may vary widely and may not accurately predict the results we actually achieve. The price of our common stock may decline if our actual results do not match the projections of these securities research analysts. Similarly, if one or more of the analysts who write reports on us downgrades our stock or publishes inaccurate or unfavorable research about our business, the price of our common stock could decline. If one or more of these analysts ceases coverage of us or fails to publish reports on us regularly, the price or trading volume of our common stock could decline.

If securities or industry analysts do not publish research or reports about our business, the prices of our securities and trading volume could decline.

The trading market for our securities depends, in part, on the research and reports that securities or industry analysts publish about us or our business. We do not have any control over these analysts. If no securities or industry analysts commence coverage of our company, the trading prices for our securities may be negatively impacted.

We have broad discretion in the use of the net proceeds from our public offerings and private placement and may not use them effectively.

Our management has broad discretion in the application of the net proceeds from our public offerings and private placement and could spend the proceeds in ways that do not enhance the value of our common stock. Because of the number and variability of factors that will determine our use of the net proceeds from our completed offerings, their ultimate use may vary substantially from their currently intended use. The failure by our management to apply these funds effectively could delay the development of our product candidates or have a material adverse effect on our business. Pending their use, we may invest the net proceeds from the offerings in a manner that does not produce income or that loses value. If we do not apply or invest the net proceeds from the offerings in ways that enhance stockholder value, we may fail to achieve expected financial results, which could cause the price of our securities to decline.

Item 1B. Unresolved Staff Comments

None

Item 2. Properties

Our corporate headquarters and laboratory is located in Yonkers, New York. This 15,000 sq. ft. mixed use office, laboratory space consists of open laboratory and suites for molecular biology, microbiology, tissue culture, microscopy, a vivarium, and a robotics suite. This facility is leased through December 31, 2027.

Item 3. Legal Proceedings

None

Item 4. Mine Safety Disclosures

None

PART II

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

Market Information

Our common stock is publicly traded on the Nasdaq Capital Market under the symbol "CFRX".

Holders

On March 17, 2022, the last reported sale price for our common stock on the Nasdaq Capital Market was $3.48 per share. As of March 17, 2022, there were approximately 1,600 holders of record of our common stock. This number does not include beneficial owners whose shares are held by nominees in street name.

Dividends

We have not declared or paid any cash dividends on our capital stock since our inception. We intend to retain future earnings, if any, to finance the operation and expansion of our business and do not anticipate paying any cash dividends to holders of common stock in the foreseeable future.

Unregistered Sales of Equity Securities

None

Purchases of Equity Securities by the Issuer or Affiliated Purchaser

We did not repurchase any of our equity securities during the quarter ended December 31, 2021.

Item 6. Reserved

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

You should read the following discussion and analysis of our financial condition and results of operations together with our financial statements and the related notes and other financial information included elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. You should review the "Risk factors" section of this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are a late clinical-stage biotechnology company focused on the discovery and development of direct lytic agents ("DLAs"), including lysins and amurin peptides, as new medical modalities for the treatment of life-threatening, antibiotic-resistant infections. We believe DLAs are fundamentally different than antibiotics and offer a potential paradigm shift in the treatment of antibiotic-resistant infections. According to one of the most recent and comprehensive reports on the global burden of bacterial antimicrobial resistance ("AMR"), there were an estimated 4.95 million deaths associated with bacterial AMR in 2019, including 1.27 million deaths directly attributable to bacterial AMR. The six leading pathogens for deaths associated with resistance (*Escherichia coli ("E. coli")*, *Staphylococcus aureus ("S. aureus")*, *Klebsiella pneumoniae ("K. pneumoniae")*, *Streptococcus*

pneumoniae, *Acinetobacter baumannii ("A. baumannii")*, and *Pseudomonas aeruginosa* ("*P. aeruginosa*")) were responsible for 929,000 deaths. Only one pathogen–drug combination, methicillin-resistant *S. aureus* ("MRSA"), caused more than 100,000 deaths in 2019.

Lysins are recombinantly-produced enzymes, that when applied to bacteria cleave a key component of the target bacteria's peptidoglycan cell wall, resulting in rapid bacterial cell death. In addition to the speed of action and potent cidality, we believe lysins are differentiated by their other hallmark features, which include the demonstrated ability to eradicate biofilms and synergistically boost the efficacy of conventional antibiotics in animal models. Amurin peptides are a new class of DLAs, discovered in our laboratories, which disrupt the outer membrane of gram-negative bacteria, resulting in rapid bacterial cell death, offering a distinct mechanism of action from lysins. Amurins have a potent, broad spectrum of *in vitro* activity against a wide range of gram-negative pathogens, including deadly, drug-resistant *P. aeruginosa*, *K. pneumoniae, E. coli, A. baumannii* and *Enterobacter cloacae* bacteria species as well as difficult to treat pathogens such as *Stenotrophomonas, Achromobacter* and some *Burkholderia* species. The highly differentiated properties of DLAs underscore their potential use in addition to antibiotics with the goal of improving clinical outcomes compared to antibiotics alone. The development of DLAs involves a novel clinical and regulatory strategy, using superiority design clinical trials with the goal of delivering significantly improved clinical outcomes for patients with serious, antibiotic-resistant bacterial infections, including biofilm-associated infections. We believe this approach affords potential clinical benefits to patients as well as the potential ability to mitigate against further development of antibiotic resistance.

We have not generated any revenues and, to date, have funded our operations primarily through our initial public offering ("IPO"), our follow-on public offerings, private placements of securities, and grant funding received. On March 22, 2021, we completed an underwritten public offering of 11,500,000 shares of our common stock, including shares sold pursuant to the fully exercised overallotment option granted to the underwriters in connection with the offering, at a public offering price of $5.00 per share of common stock, resulting in estimated net proceeds of approximately $53.8 million after underwriting discounts and commissions and offering expenses payable by us.

On May 27, 2020, we completed an underwritten public offering of 11,797,752 shares of our common stock and warrants to purchase an additional 8,848,314 shares of our common stock at an exercise price of $4.90 per share. The public offering price was $4.45 for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock, resulting in net proceeds of approximately $48.9 million after underwriting discounts and commissions and offering expenses payable by us. We also completed a concurrent private placement to Pfizer Inc. ("Pfizer") of 674,156 shares of common stock and an accompanying warrant to purchase an additional 505,617 shares of our common stock at an exercise price of $4.90 per share. The offering price for the warrant was $4.45 for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock, resulting in net proceeds of approximately $3.0 million. This was the second investment by Pfizer, for a total of $6.0 million invested into the Company.

On March 10, 2021, we executed a cost-share contract (the "BARDA Contract") with the Biomedical Advanced Research and Development Authority ("BARDA") and any exercise of BARDA's options to extend such contract, part of the Office of the Assistant Secretary for Preparedness and Response at the U.S. Department of Health and Human Services. Under the terms of the BARDA Contract, the Company will receive $9.8 million in initial funding and up to an additional $77.0 million. The initial funding will be used to support our ongoing pivotal Phase 3 DISRUPT superiority trial of exebacase. Under the terms of the agreement, and if supported by Phase 3 DISRUPT study data, BARDA may provide the Company with additional funding upon achievement of key milestones to continue the advancement of exebacase through FDA product approval and completion of post-approval commitments. The BARDA Contract contains terms and conditions that are customary for contracts with BARDA of this nature, including provisions giving the government the right to terminate the contract at any time for its convenience. As a government contractor, we are subject to complex and wide-ranging federal and

agency-specific regulations and contractual requirements. The costs of compliance with these requirements may be significant. Failure to comply with government contracting requirements could result in termination of our contract or the imposition of penalties.

We have never been profitable and our net operating losses were $47.3 million, $34.2 million, and $27.9 million for the years ended December 31, 2021, 2020 and 2019, respectively. As of December 31, 2021, we had an accumulated deficit of $260.7 million and we had approximately $54.3 million in cash, cash equivalents and marketable securities. We expect to incur significant expenses and increasing operating losses for the foreseeable future. We expect our expenses to increase in connection with our ongoing activities, particularly as we advance our product candidates through preclinical activities and clinical trials to seek regulatory approval and, if approved, commercialize such product candidates. Accordingly, we will need additional financing to support our continuing operations and to continue as a going concern. We expect to seek to fund our operations through public or private equity, debt financings, equity-linked financings, collaborations, strategic alliances, licensing arrangements, research grants or other sources. Adequate additional financing may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. Without additional funding, the Company believes it will not have sufficient funds to meet its obligations within the next twelve months from the date of issuance of these consolidated financial statements. These factors raise substantial doubt about the Company's ability to continue as a going concern. Substantial doubt about our ability to continue as a going concern may materially and adversely affect the price per share of our common stock, and it may be more difficult for us to obtain financing. If potential collaborators decline to do business with us or potential investors decline to participate in any future financings due to such concerns, our ability to increase our cash position may be limited. We will need to generate significant revenues to achieve profitability, and we may never do so.

Financial Operations Overview

Revenue

We have not generated any revenues to date. In the future, we may generate revenues from product sales. In addition, to the extent we enter into licensing or collaboration arrangements, we may have additional sources of revenue. We expect that any revenue we generate will fluctuate from quarter to quarter as a result of the amount and timing of payments that we may recognize upon the sale of our products, to the extent that any products are successfully commercialized, and the amount and timing of fees, reimbursements, milestone and other payments received under any future licensing or collaboration arrangements. If we fail to complete the development of our product candidates in a timely manner or obtain regulatory approval for them, our ability to generate future revenue, and our results of operations and financial position, would be materially adversely affected.

Research and development expenses

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

- employee-related expenses, including salaries, performance bonuses, benefits, travel andnon-cash stock-based compensation expense;
- external research and development expenses incurred under arrangements with third parties such as contract research organizations, or CROs, contract manufacturers, consultants and academic institutions; and
- facilities and laboratory and other supplies.

We expense research and development costs to operations as incurred. We account fornon-refundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received, rather than when the payment is made.

The following summarizes our most advanced current research and development programs.

Exebacase

Our lead DLA product candidate, exebacase, was granted Breakthrough Therapy designation for the treatment of MRSA bloodstream infections (bacteremia), including right-sided endocarditis, when used in addition to standard-of-care ("SOC") anti-staphylococcal antibiotics in adult patients, by the U.S. Food and Drug Administration ("FDA") in February 2020 and is currently being studied in an ongoing Phase 3 superiority design study. In addition to bacteremia, *S. aureus* is also a common cause of pneumonia and osteomyelitis as well as biofilm-associated infections of heart valves (endocarditis), prosthetic joints, indwelling devices and catheters. These infections result in significant morbidity and mortality despite currently available antibiotic therapies.

In December 2019, we initiated the Phase 3 DISRUPT (Direct Lysis of*S. aureus* Resistant Pathogen Trial) superiority design study of exebacase. The DISRUPT study is a randomized, double-blind, placebo-controlled Phase 3 clinical trial conducted in the U.S. alone to assess the efficacy and safety of exebacase in approximately 350 adult and adolescent patients with complicated *S. aureus* bacteremia, including right-sided endocarditis. Patients entering the study will be randomized 2:1 to either exebacase or placebo, with all patients receiving SOC antistaphylococcal antibiotics. The primary efficacy endpoint of the study is clinical response at Day 14 in patients with MRSA bacteremia, including right-sided endocarditis. Secondary endpoints include clinical response at Day 14 in the All *S. aureus* patient group (MRSA and methicillin-sensitive*S. aureus* ("MSSA")), 30-day all-cause mortality in MRSA patients, and clinical response at later timepoints. We will also evaluate the impact of treatment with exebacase on health resource utilization, including hospital length of stay, ICU length of stay and 30-day readmission rates. We plan to conduct an interim futility analysis after approximately 60% of the MRSA population (the primary endpoint study population) completes the Day 14 primary endpoint study visit. We obtained concurrence with the FDA on the Phase 3 study protocol at an End-of-Phase 2 meeting with the FDA in September 2019, including the key design features of the study population, the endpoints and the size of the safety database that would be needed to support a Biologics License Application ("BLA") for approval of exebacase, under the FDA's "streamlined development" paradigm for agents to treat bacterial infections associated with high unmet medical need.

We completed a Phase 2 superiority design study of exebacase that evaluated its safety, tolerability, efficacy and pharmacokinetics ("PK") when used in addition to SOC antibiotics compared to SOC antibiotics alone for the treatment of *S. aureus* bacteremia, including endocarditis in adult patients. The results from this study showed clinically meaningful improvement in clinical responder rates among patients treated with exebacase in addition to SOC antibiotics compared to SOC antibiotics alone. In the primary efficacy analysis population of 116 patients with documented *S. aureus* bacteremia, including endocarditis, who received a single intravenous ("IV") infusion of blinded study drug, the clinical responder rate at Day 14 was 70.4% for patients treated with exebacase and 60.0% for patients dosed with SOC antibiotics alone (p=0.314).

In a pre-specified analysis of MRSA-infected patients, the clinical responder rate at Day 14 in patients treated with exebacase was nearly 43-percentage points higher than in patients treated with SOC antibiotics alone (74.1% for patients treated with exebacase compared to 31.3% for patients treated with SOC antibiotics alone (p=0.010)). In addition to the higher rate of clinical response, MRSA-infected patients treated with exebacase showed a 21-percentage point reduction in 30-day all-cause mortality (p=0.056), a four day lower mean length of hospital stay and meaningful reductions in hospital readmission rates. Additional pre-specified analyses showed a clinical responder rate at Day 14 in the subset of patients with bacteremia including right-sided endocarditis of 80.0% for patients treated with exebacase compared to 59.5% for patients treated with SOC antibiotics alone, an increase of 20.5% (p=0.028). In the subset of patients with bacteremia alone, the clinical responder rate at Day 14 was 81.8% for patients treated with exebacase compared to 61.5% for patients treated with SOC antibiotics alone, an increase of 20.3% (p=0.035).

Exebacase was well-tolerated and treatment emergent adverse events, including serious treatment-emergent serious adverse events ("SAEs") were balanced between the treatment groups. There were no SAEs that we

determined to be related to exebacase, there were no reports of hypersensitivity related to exebacase and no patients discontinued treatment with study drug in either treatment group.

We also performed a post-hoc Phase 3 simulation analysis using the Phase 2 data to evaluate the clinical outcomes for the Phase 2 patient population that would meet the Phase 3 inclusion criteria. In this simulated Phase 3 analysis population of 84 U.S. patients with documented *S. aureus* bacteremia, including right-sided endocarditis, who received a single IV infusion of blinded study drug, the clinical responder rate at Day 14 was 83.7% for patients treated with exebacase and 54.3% for patients dosed with SOC antibiotics alone, an improvement in the responder rate of over 29-percentage points. The clinical responder rate at Day 14 in the subset of patients with MRSA bacteremia including right-sided endocarditis was 82.6% for patients treated with exebacase compared to 33.3% for patients treated with SOC antibiotics alone, an improvement in the responder rate of over 49-percentage points. In the subset of patients with MSSA bacteremia including right-sided endocarditis, the clinical responder rate at Day 14 was 84.6% for patients treated with exebacase compared to 66.7% for patients treated with SOC antibiotics alone, an increase of nearly 18-percentage points.

We believe these data established proof of concept for exebacase and for DLAs as therapeutic agents. In particular, the data for MRSA-infected patients treated with exebacase, which, in the Phase 2 superiority study, demonstrated superior outcomes in clinical response at Day 14 and in 30-day all-cause mortality as well as health economics benefits, provided the basis for the FDA to grant Breakthrough Therapy designation to exebacase for the treatment of MRSA bloodstream infections (bacteremia), including right-sided endocarditis, when used in addition to SOC anti-staphylococcal antibiotics in adult patients. Breakthrough Therapy designation is a program designed by the FDA to expedite the development and review of medicines for serious or life-threatening diseases where preliminary clinical evidence suggests that the investigational therapy may demonstrate substantial improvement on at least one clinically significant endpoint over available therapies. The Breakthrough Therapy designation provides additional benefits, such as expedited interactions with the FDA and the potential for priority review, in addition to the Fast Track designation granted to exebacase in August 2015.

On March 10, 2021, we entered into a cost-share contract (the "BARDA Contract") with BARDA, a division of the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response. Under the BARDA Contract, we will receive funding of up to an estimated $86.8 million to advance the development of exebacase. The base period for the BARDA Contract includes government funding of up to $9.8 million to reimburse expenses for approximately one year to support the conduct of the ongoing Phase 3 clinical trial and futility analysis. Following successful completion of the base period, the BARDA Contract provides for approximately $77.0 million of additional BARDA funding for five option stages in support of the completion of the Phase 3 clinical trial of exebacase, further clinical and non-clinical studies, manufacturing, supply chain, clinical, regulatory and administrative activities. The contract period-of-performance (base period plus option exercises) is up to approximately six years. The BARDA Contract contains terms and conditions that are customary for contracts with BARDA of this nature, including provisions giving the government the right to terminate the contract at any time for its convenience.

Other programs

Our next product candidate, CF-370, is designed to target a range of gram-negative bacteria including *P. aeruginosa* and has demonstrated potent *in vivo* activity against extensively drug-resistant ("XDR") strains. *P. aeruginosa* is a major cause of morbidity and mortality in patients with hospital-acquired or ventilator-associated pneumonia and a major medical challenge for cystic fibrosis patients with chronic lung infections. CF-370 has also shown promising activity against *E. coli*, *K. pneumoniae* and *A. baumannii* in *in vitro* studies.

In July 2020, we were granted an award of up to $18.9 million in funding from CARB-X, including initial funding of $4.9 million, in support of the advancement of CF-370 through IND-enabling activities. Any additional funding beyond the $4.9 million is at the discretion of CARB-X and based on factors such as available funding, achievement of project milestones and mutual agreement on future milestones. We expect CF-370 to be our next DLA to enter clinical studies.

In addition, we have entered into two funding agreements with the Cystic Fibrosis Foundation to investigate the potential utility of DLAs against resistant gram-negative pathogens which afflict Cystic Fibrosis ("CF") patients. The first agreement provided funding for the assessment of the *in vitro* activity of CF-370 and amurin peptides against bacterial specimens obtained from CF patients at different stages of disease. The second agreement will provide funding for assessing the *in vitro* and *in vivo* activity of exebacase against *S. aureus* isolates obtained from CF patients. If we obtain supportive data, we plan to evaluate potential future clinical development of DLA product candidates for the treatment of exacerbations in CF lung disease.

We have developed a novel, engineered variant of exebacase, known as CF-296, which we believe provides an additional opportunity to advance a potential targeted therapy for deep-seated, invasive biofilm-associated *S. aureus* infections. We are conducting further *in vitro* and *in vivo* characterization of CF-296 to evaluate the full profile of this compound. We have been awarded up to $7.2 million of funding from the Military Infectious Diseases Research Program, United States Army Medical Research and Development Command ("USAMRDC") over the course of three years to advance CF-296 through Investigational New Drug application ("IND")-enabling studies.

Beyond our lysin programs, we continue our research to advance potential product candidates from our amurin peptide platform. We are evaluating our most promising amurins in preclinical animal studies with the goals of determining our next product candidate and moving this program towards clinical studies as soon as possible.

To date, a large portion of our research and development work has related to the establishment of our platform technologies, the advancement of our research projects to discovery of clinical candidates, manufacturing and preclinical testing of our clinical candidates and clinical testing of exebacase. We currently expect to focus the majority of our resources on the exebacase program. As our pipeline progresses, we are able to further leverage our employee and infrastructure resources across multiple development programs well as research projects. We recorded approximately $35.5 million, $22.6 million, and $18.1 million of research and development expenses for the years ended December 31, 2021, 2020 and 2019, respectively. A breakdown of our research and development expenses by category is shown below. We do not currently utilize a formal time or laboratory project expense allocation system to allocate employee-related expenses, laboratory costs or depreciation to any particular project. Accordingly, we do not allocate these expenses to individual projects or product candidates. However, we do allocate some portions of our research and development expenses in the product development, external research and licensing and professional fees categories to exebacase as shown below.

The following table summarizes our research and development expenses by category for the years ended December 31, 2021, 2020 and 2019:

	Year Ended December 31,		
	2021	2020	2019
Product development	$ 29,813	$15,502	$10,401
Personnel related	8,404	4,703	3,402
Professional fees	3,618	3,605	2,912
External research and licensing costs	1,651	952	2,487
Laboratory costs	1,638	1,418	2,021
Stock-based compensation	933	655	469
Expenses reimbursed through grant agreements and government contracts	(10,549)	(4,221)	(3,635)
Total research and development expense	$ 35,508	$22,614	$18,057

The following table summarizes our research and development expenses by program for the years ended December 31, 2021, 2020 and 2019:

	Year Ended December 31,		
	2021	2020	2019
Exebacase	$ 25,460	$15,094	$11,370
CF-370	4,077	1,325	—
Other research and development	7,184	5,058	6,451
Personnel related and stock-based compensation	9,336	5,358	3,871
Expenses reimbursed through grant agreements and government contracts	(10,549)	(4,221)	(3,635)
Total research and development expense	$ 35,508	$22,614	$18,057

We anticipate that our research and development expenses will increase substantially in connection with the commencement of additional clinical trials for our product candidates. However, the successful development of
future product candidates is highly uncertain. This is due to the numerous risks and uncertainties associated with developing drugs, including the uncertainty of:

- the scope, rate of progress and expense of our research and development activities;
- clinical trial results;
- the terms and timing of regulatory approvals;
- our ability to market, commercialize and achieve market acceptance for our product candidates in the future; and
- the expense, filing, prosecuting, defending and enforcing of patent claims and other intellectual property rights.

A change in the outcome of any of these variables with respect to the development of exebacase or any other product candidate that we may develop could mean a significant change in the costs and timing associated with the development of exebacase or any such product candidate. For example, if the FDA or other regulatory authority were to require us to conduct clinical trials beyond those which we currently anticipate will be required for the completion of clinical development of exebacase or if we experience significant delays in enrollment in any clinical trials of exebacase, we could be required to expend significant additional financial resources and time on the completion of the clinical development of exebacase.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related costs for personnel, includingnon-cash stock-based compensation expense, in our executive, finance, legal, human resource and business development functions. Other general and administrative expenses include facility costs, insurance expenses and professional fees for legal, consulting and accounting services.

We anticipate that our general and administrative expenses will increase in future periods to support increases in our research and development activities and as a result of increased headcount, expanded infrastructure, increased legal, compliance, accounting and investor and public relations expenses associated with being a public company and increased insurance premiums, among other factors.

Interest Income

Interest income consists of interest earned on our cash and cash equivalents andavailable-for-sale securities.

Critical Accounting Policies and Significant Judgments and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our financial statements, which we have prepared in accordance with U.S. generally accepted accounting principles. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities and expenses and the disclosure of contingent assets and liabilities in our financial statements. On an ongoing basis, we evaluate our estimates and judgments. We base our estimates on our historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in the notes to our financial statements included elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are the most critical to aid you in fully understanding and evaluating our financial condition and results of operations.

Fair Value of Warrant Liability

In accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") Topic 820,*Fair Value Measurements and Disclosures* ("ASC 820"), we classify and account for our warrant liability as a level 3 financial instrument. The valuation of a level 3 financial instrument requires inputs that reflect our own assumptions that are both significant to the fair value measurement and unobservable. We calculate the fair value estimate of our warrant liability on a recurring basis at each measurement date, based on relevant market information.

We use the Black-Scholes option pricing model to estimate the fair value of our warrant liability using various assumptions that require management to apply judgment and make estimates, including:

- the expected term of the warrant, which we estimate to be the remaining contractual life;
- the expected volatility of the underlying common stock, which we estimate based on the historical volatility of our own common shares;
- the risk-free interest rate, which we based on the yield curve of U.S. Treasury securities with periods commensurate with the expected term; and
- the expected dividend yield, which we estimate to be zero based on the fact that we have never paid cash dividends and have no present intention to pay cash dividends.

These estimates may be subjective in nature and involve uncertainties and matters of judgment and therefore cannot be determined with precision. If factors change and different assumptions are used, our warrant liability could be materially different in the future.

Accrued research and development expenses

As part of the process of preparing our financial statements, we are required to estimate our accrued expenses. This process 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 yet been invoiced or otherwise notified of the actual cost. The majority of our service providers invoice us monthly in arrears for services performed or when contractual milestones are met. We make estimates of our accrued expenses as of each balance sheet date in our financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of our estimates with the service providers and make adjustments if necessary. The significant estimates in our accrued research and development expenses are related to fees paid to CMOs and CROs in connection with research and development activities for which we have not yet been invoiced.

We base our expenses related to CMOs and CROs on our estimates of the services received and efforts expended pursuant to quotes and contracts for the conduct of manufacturing or research and development on our behalf. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the research and development expense. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from our estimate, we adjust the accrual or prepayment expense accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and could result in us reporting amounts that are too high or too low in any particular period. Differences between our estimates and amounts actually incurred to date, and any resulting adjustments, have not been material.

Stock-based compensation

We account for stock-based compensation in accordance with FASB ASC Topic 718,*Compensation-Stock Compensation*, which we refer to as ASC 718. ASC 718 requires the measurement and recognition of compensation expense for all stock-based payment awards made to employees, directors, and non-employees, including employee stock options. Compensation expense based on the grant date fair value is generally amortized over the requisite service period of the award on a straight-line basis.

The fair value of options is calculated using the Black-Scholes option pricing model. The Black-Scholes option pricing model uses various assumptions that require management to apply judgment and make estimates, including:

- the expected term of the stock option award, which fornon-employees we use the remaining contractual term, but for employees we calculate using the simplified method, as prescribed by the Securities and Exchange Commission Staff Accounting Bulletin No. 107, *Share-Based Payment,* as we have insufficient historical information regarding our stock options to provide a basis for an estimate;
- the expected volatility of the underlying common stock, which we estimate based on the historical volatility of our own common shares;
- the risk-free interest rate, which we based on the yield curve of U.S. Treasury securities with periods commensurate with the expected term of the options being valued;
- the expected dividend yield, which we estimate to be zero based on the fact that we have never paid cash dividends and have no present intention to pay cash dividends; and
- the fair value of our common stock on the date of grant.

If factors change and different assumptions are used, our stock-based compensation expense could be materially different in the future.

Recent Accounting Pronouncements

See Note 2—Summary of Significant Accounting Policies, of the Notes to Financial Statements, for a discussion of the impact of new accounting standards on our Financial Statements.

Results of Operations

For a discussion of our results of operations for the year ended December 31, 2020, including ayear-to-year comparison between 2020 and 2019, refer to Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our Annual Report on Form 10-K for the year ended December 31, 2020.

Comparison of years ended December 31, 2021 and 2020

The following table summarizes our results of operations for the years ended December 31, 2021 and 2020 (in thousands):

	Year Ended December 31,			
	2021	2020	Dollar Change	% Change
Operating expenses:				
Research and development	$ 35,508	$ 22,614	$ 12,894	57%
General and administrative	$ 11,757	$ 11,625	$ 132	1%
Other income	$ 26,983	$ 6,084	$ 20,899	344%

Research and Development Expenses

Research and development expense was $35.5 million for the year ended December 31, 2021, compared with $22.6 million for the year ended December 31, 2020, an increase of $12.9 million. This increase was primarily attributable to a $5.6 million increase in expenditures for the Phase 3 DISRUPT study of exebacase as we increased patient enrollment and expanded the number of clinical sites. We also increased expenditures by $4.9 million on non-clinical studies of exebacase that will support a potential BLA submission andCF-370 that will support a potential IND submission and by $4.5 million on manufacturing costs related to the process transfer, validation and manufacturing of exebacase that will also support a potential BLA submission, in addition to process development and manufacturing for CF-370. Finally, we increased expenditures to expand our internal research and development team and our external consultants by $4.0 million. These increases were partially offset by a $6.3 million increase in our expenses that are reimbursable under our grants compared to the prior year period.

General and Administrative Expenses

General and administrative expense was $11.8 million for the year ended December 31, 2021, compared with $11.6 million for the year ended December 31, 2020, an increase of $0.1 million. This increase was primarily attributable to increases in internal compensation costs and external professional fees of $0.6 million and insurance costs of $0.4 million. These increases were partially offset by a $0.9 million reduction in our external legal costs.

Other income

Other income was $27.0 million for the year ended December 31, 2021 compared with $6.1 million for the year ended December 31, 2020, an increase of $20.9 million. This increase was primarily attributable to the increase in the non-cash gain related to the change in fair value of our warrant liability of $18.8 million. In addition, the prior year period has a charge to other expense of $2.2 million for issuance expenses allocated to warrants, for which there was no such expense in 2021.

Liquidity and Capital Resources

Sources of Liquidity

We have financed our operations to date primarily through proceeds from sales of common stock, common stock and warrants, convertible preferred stock and convertible debt and, to a lesser extent, funding received from government contracts and granting organizations. To date, we have not generated any revenue from the sale of products. We have incurred losses and generated negative cash flows from operations since inception.

Since the date of our IPO, we have funded our operations through the sale of registered securities for gross proceeds of $257.8 million, $9.6 million from the exercise of the Class B Warrants issued in our IPO, $26.0 million from the sale of securities in private placements and the receipt of $16.7 million of funding from grant agreements and government contracts.

On August 14, 2020, we filed a shelf registration statement on FormS-3 (the "Form S-3") with the SEC. The Form S-3 was declared effective by the SEC on August 31, 2020. The Form S-3 allows us to offer and sell from time-to-time up to $150.0 million of common stock, preferred stock, debt securities, warrants or units comprised of any combination of these securities. On March 22, 2021, we completed an underwritten public offering of 11,500,000 shares of our common stock, including shares sold pursuant to the fully exercised overallotment option granted to the underwriters in connection with the offering, at a public offering price of $5.00 per share of common stock, resulting in estimated net proceeds of approximately $53.8 million after underwriting discounts and commissions and offering expenses payable by us. The terms of any future offerings under the shelf registration statement will be established at the time of such offering and will be described in a prospectus supplement filed with the SEC prior to the completion of any such offering.

As of December 31, 2021, we had approximately $54.3 million in cash, cash equivalents and marketable securities which we do not believe will be sufficient to meet our obligations within the next twelve months from the date of issuance of our audited consolidated financial statements that are included elsewhere in this Annual Report on Form 10-K. Combined with our accumulated deficit and our forecasted cash expenditures, these factors raise substantial doubt about our ability to continue as a going concern.

As such, under the requirements of Accounting Standard Codification ("ASC")205-40, we may not consider the potential for future capital raises in our assessment of our ability to meet our obligations for the next twelve months. We plan to continue to fund our operations through public or private debt and equity financings, but there can be no assurances that such financing will continue to be available to us on acceptable terms, or at all, and the terms of any public or private offerings of stock could be significantly dilutive to existing stockholders. If we are unable to obtain funding, we would be forced to delay, reduce or eliminate our research and development programs, which could adversely affect our business prospects, or we may be unable to continue operations. In accordance with the requirements of ASC 205-40, we have concluded that substantial doubt exists about our ability to continue as a going concern for twelve months from the date of issuance of our audited consolidated financial statements that are included elsewhere in this Annual Report on Form 10-K.

In the past, we have obtained grants to supplement our financings withnon-dilutive funding, including grants from CARB-X, USAMRDC and our cost-sharing contract with BARDA. We may continue to pursue further non-dilutive funding opportunities. In addition, there can be no assurances that either BARDA, CARB-X or USAMRDC will provide the maximum potential funding to the Company.

Cash flows

The following table shows a summary of our cash flows for the years ended December 31, 2021 and 2020:

	Year Ended December 31,	
	2021	2020
Net cash (used in) provided by:		
Operating activities	$ (41,125)	$ (33,187)
Investing activities	$ (11,613)	$ (27,404)
Financing activities	$ 53,907	$ 51,892

Net cash used in operating activities

Net cash used in operating activities resulted primarily from our net losses adjusted fomon-cash charges and changes in the components of working capital. Net cash used in operating activities increased $7.9 million

for the year ended December 31, 2021 as compared to the comparable period in 2020. This increase was primarily attributable to increased expenditures for the Phase 3 DISRUPT trial of exebacase in order to enroll more patients and expand the number of active investigator sites, process transfer, validation and manufacturing of exebacase, process development and manufacturing of CF-370, and an increased number of personnel and related compensation costs.

Net cash used in investing activities

Net cash used in investing activities for the year ended December 31, 2021 was attributable to the proceeds received from the maturities of marketable securities less the purchases of marketable securities subsequent to the equity offering completed on March 22, 2021. Net cash used in investing activities for the year ended December 31, 2020 was attributable to the proceeds received from the maturities of marketable securities less the purchases of marketable securities subsequent to the equity offerings completed on May 27, 2020.

Net cash provided by financing activities

Net cash provided by financing activities for the year ended December 31, 2021 resulted primarily from the completion of our equity offering on March 22, 2021, resulting in proceeds of $53.8 million, net of offering costs. Net cash provided by financing activities for the year ended December 31, 2020 resulted primarily from the completion of our equity offerings on May 27, 2020, resulting in proceeds of $51.9 million, net of offering costs.

Funding requirements

All of our product candidates are in clinical or preclinical development. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. We anticipate that our expenses will increase substantially if and as we:

- continue our ongoing clinical trials, and initiate the planned clinical trials of our product candidates;
- continue our ongoing preclinical studies, and initiate additional preclinical studies, of our product candidates;
- continue the research and development of our other product candidates and our platform technology;
- add operational, financial and management information systems and personnel, including personnel to support our product development and future commercialization efforts;
- seek marketing approvals for our product candidates that successfully complete clinical trials;
- establish, either on our own or with strategic partners, a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval;
- seek to identify additional product candidates;
- acquire or in-license other products and technologies;
- maintain, leverage and expand our intellectual property portfolio; and

For a description of our contractual obligations, see Note 8, “Commitments and Contingencies” to the notes to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Without additional funding, we believe we will not have sufficient funds to meet our obligations within the next twelve months from the date of issuance of our audited consolidated financial statements that are included elsewhere in this Annual Report on Form 10-K. If we are unable to obtain funding, we would be forced to delay, reduce or eliminate our research and development programs, which could adversely affect our business

prospects, or we may be unable to continue operations. In accordance with the requirements of ASC205-40, we have concluded that substantial doubt exists about our ability to continue as a going concern. Because of the numerous risks and uncertainties associated with the development and commercialization of our product candidates, and the extent to which we may enter into collaborations with third parties for development and commercialization of our product candidates, we are unable to estimate the amounts of increased capital outlays and operating expenses associated with completing the development of our current product candidates. We plan to continue to fund our operations through public or private debt and equity financings, but there can be no assurances that such financing will be available to us on satisfactory terms, or at all. We plan to continue to supplement our financings with non-dilutive funding, including grants from CARB-X and USAMRDC and our cost-sharing contract with BARDA, but there can be no assurances that either BARDA, CARB-X or USAMRDC will provide the maximum potential funding to the Company.

Our future capital requirements will depend on many factors, including:

- the progress and results of the clinical trials of our lead product candidates;
- the scope, progress, results and costs of compound discovery, preclinical development, laboratory testing and clinical trials for our other product candidates;
- the extent to which we acquire or in-license other products and technologies;
- the timing and amount of actual reimbursements under the BARDA Contract;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of future commercialization activities, including product sales, marketing, manufacturing and distribution, for any of our product candidates for which we receive marketing approval;
- revenue, if any, received from commercial sales of our product candidates, should any of our product candidates receive marketing approval;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending intellectual property-related claims; and
- our ability to establish any future collaboration arrangements on favorable terms, if at all.

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

We incur significant costs as a public company, including, but not limited to, increased personnel costs, increased directors fees, increased directors and officers insurance premiums, audit and legal fees, investor relations and external communications fees, expenses for compliance with the Sarbanes-Oxley Act and rules implemented by the SEC and Nasdaq and various other costs and expenses.

Effects of Inflation

We do not believe that inflation or changing prices had a significant impact on our results of operations for any periods presented herein. We continue to monitor the impact of inflationary pressures on purchases and new contractual commitments.

Item 8. Financial Statements and Supplementary Data

The financial statements required to be filed pursuant to this Item 8 are appended to this report. An index of those financial statements is found in Item 15 of Part IV 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

Limitations on Effectiveness of Controls and Procedures

In designing and evaluating our disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply judgment in evaluating the benefits of possible controls and procedures relative to their costs.

Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15(b) and Rule 15d-15(b) of the Exchange Act, our management, including our principal executive officer and our principal financial officer, conducted an evaluation as of the end of the period covered by this Annual Report on Form 10-K of the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) of the Exchange Act). Based on that evaluation, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2021.

Management's Annual Report on Internal Control Over Financial Reporting

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

Our management conducted an assessment of the effectiveness of our internal control over financial reporting based on the criteria set forth in "Internal Control-Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that, as of December 31, 2021, our internal control over financial reporting was effective.

This annual report does not include an attestation report of our registered public accounting firm on internal control over financial reporting because we qualify as a "smaller reporting company", as defined in Rule 12b-2 of the Exchange Act.

Changes in Internal Control Over Financial Reporting

In connection with management's evaluation of our internal control over financial reporting as of December 31, 2021, our principal executive officer and principal financial officer concluded that there were no changes to our internal control over financial reporting during the quarter ended December 31, 2021 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None

Item 9C. Disclosure Regarding Foreign Jurisdictions That Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Director Biographical Information

Biographical information concerning each of our directors is set forth below:

Name	Age	Position
Roger J. Pomerantz, M.D., F.A.C.P	65	President, Chief Executive Officer, Director, Chairman of the Board
Steven C. Gilman, Ph.D	69	Director, Vice Chairman of the Board
Sol J. Barer, Ph.D	74	Director, Lead Independent Director
Lishan Aklog, M.D	56	Director
Jane F. Barlow, M.D	61	Director
David N. Low, Jr	63	Director
Michael J. Otto, Ph.D	73	Director
Cary W. Sucoff, J.D	70	Director

Roger J. Pomerantz, M.D., F.A.C.P. Dr. Pomerantz has served as Chairman of our board of directors and our Chief Executive Officer since April 2019. Prior to that, he had served as Vice Chairman of our board of directors since May 2014. From November 2013 to December 2019, Dr. Pomerantz served as Chairman of the board of directors of Seres Therapeutics, Inc., a biotechnology company, and as its President and Chief Executive Officer from June 2014 to January 2019. From 2011 to 2013, he was formerly Worldwide Head of Licensing & Acquisitions, Senior Vice President at Merck & Co., Inc. where he oversaw all licensing and acquisitions at Merck Research Laboratories. Previously, he served as Senior Vice President and Global Franchise Head of Infectious Diseases at Merck. Prior to joining Merck, Dr. Pomerantz was Global Head of Infectious Diseases for Johnson & Johnson Pharmaceuticals. He joined Johnson & Johnson in 2005 as President of Tibotec Pharmaceuticals, Inc.

Dr. Pomerantz serves as Chairman of the board of directors of the public companies Collplant Biotechnologies, Inc. since 2021, Indaptus Therapeutics since 2021 and Viracta Therapeutics since 2020. He also serves as Chairman of the board of directors of the private company Silicon Therapeutics Inc. since 2019, and a member of the board of the private companies X-VAX Technology, Inc. since 2019 and VerImmune since 2020. Previously, Dr. Pomerantz served on the board of directors of public companies Rubius Therapeutics from 2014 to 2019 and Evelo Therapeutics from 2015 to 2016. Dr. Pomerantz received his B.A. in Biochemistry at the Johns Hopkins University and his M.D. at the Johns Hopkins School of Medicine. He received post-graduate training at the Massachusetts General Hospital, Harvard Medical School and M.I.T. Dr. Pomerantz is Board Certified in both Internal Medicine and Infectious Diseases. He was Professor of Medicine, Biochemistry and Molecular Pharmacology, Chief of Infectious Diseases, and the Founding Director and Chair of the Institute for Human Virology and Biodefense at the Thomas Jefferson University and Medical School. He has developed nine drugs approved world-wide in important diseases, including HIV, HCV, and tuberculosis. We believe that Dr. Pomerantz's significant scientific, executive and board leadership experience in drug development and in the pharmaceutical industry qualifies him to serve as a member of our board of directors.

Steven C. Gilman, Ph.D. Dr. Gilman has served as Vice Chairman of our board of directors since April 2019. Prior to that, he had served as our Chairman since May 2015, Interim Chief Executive Officer from March 2016 to July 2016 and Chief Executive Officer since July 2016. Until 2015, he served as the Executive Vice President, Research & Development and Chief Scientific Officer at Cubist Pharmaceuticals, a biopharmaceutical company, until its acquisition by Merck & Co. Prior to joining Cubist in 2008, he served as Chairman of the Board of Directors and Chief Executive Officer of ActivBiotics, a privately held biopharmaceutical company. Previously, he worked at Millennium Pharmaceuticals, Inc., where he held a number of senior leadership roles including Vice President and General Manager of the Inflammation franchise responsible for all aspects of the

Inflammation business from early gene discovery to product commercialization. Prior to Millennium, he was Group Director at Pfizer Global Research and Development, where he was responsible for drug discovery of novel antibacterial agents as well as several other therapeutic areas. Dr. Gilman has also held scientific, business, and academic appointments at Wyeth, Cytogen Corporation, Temple Medical School, and Connecticut College. He currently serves on the board of directors of publicly traded companies Akebia Therapeutics, SCYNEXIS Inc., and Vericel Corporation, and previously served on the board of directors of Momenta Pharmaceuticals, Inc. Dr. Gilman also serves as a director of the non-profit organization Lakes Environmental Association of Bridgeton, Maine and is a Trustee at the Atrium School in Watertown, MA. He received his Ph.D. and M.S. degrees in microbiology from Pennsylvania State University, his post-doctoral training at Scripps Clinic and Research Foundation, and received a B.A. in microbiology from Miami University of Ohio. He has authored over 60 publications and is an inventor on 7 patents. We believe that Dr. Gilman's significant scientific, executive and board leadership experience in the pharmaceutical and biotechnology industries qualifies him to serve as a member of our board of directors.

Sol J. Barer, Ph.D. Dr. Barer has served as a member of our board of directors since April 2011. Dr. Barer served as our Chairman of the board of directors from February 2012 to May 2015. He was appointed Lead Independent Director in May 2015. Dr. Barer spent most of his professional career with the Celgene Corporation, a pharmaceutical company. He was Chairman from January 2011 until June 2011, Executive Chairman from June 2010 until January 2011, and Chairman and Chief Executive Officer from May 2006 until June 2010. Before assuming the CEO position, he was appointed Chief Operating Officer in 1994 and President in 1993. Dr. Barer was the founder of the biotechnology group at the Celanese Research Company which was subsequently spun out to form Celgene. Dr. Barer serves as Chairman of the board of directors of the public companies Teva Pharmaceutical Industries and Neximmune and the private company Centrexion and as a board member of the private companies 3DBio Therapeutics and Zephyr AI. He is the Founding Chair of the Hackensack Meridian Health Center for Discovery and Innovation, and Founder of Mendham Investment Group. He is a venture advisor to the Israel Biotech Fund as well as an advisor to biopharma companies. In 2011, Dr. Barer was Chairman of the University of Medicine and Dentistry of New Jersey Governor's Advisory Committee which resulted in sweeping changes in the structure of New Jersey's medical schools and public research universities. He previously served as a Commissioner of the NJ Commission on Science and Technology. He was a member of the Board of Trustees of Rutgers University and served two terms as Chair of the Board of Trustees of BioNJ, the New Jersey biotechnology organization. Dr. Barer received a Ph.D. in Organic Chemistry in 1974 from Rutgers University where he was an NDEA Graduate Fellow and a B.S. in 1968 from Brooklyn College (City University of New York) where he was an NSF Undergraduate Fellow and Regents Scholar. He received an LL.D. (Honorary) from the Rabbinical College of America in 2018. We believe that Dr. Barer's significant scientific, executive and board leadership experience in the pharmaceutical and biotechnology industries qualifies him to serve as a member of our board of directors.

Lishan Aklog, M.D. Dr. Aklog has served as a member of our board of directors since June 2020. He isCo-Founder, Chairman and Chief Executive Officer of PAVmed Inc. since 2014, a publicly traded commercial-stage diversified medical technology company, and Chairman and Chief Executive Officer of its subsidiary, Lucid Diagnostics, a publicly traded commercial-stage cancer prevention diagnostics company since its IPO in October, 2021 and as Executive Chairman since its inception in 2018. He also serves as a co-founding Partner of both Pavilion Holdings Group LLC ("PHG"), a medical device holding company, since its inception in 2007, and Pavilion Medical Innovations LLC, a venture-backed medical device incubator, since its inception in 2009. Prior to entering the medical device industry full-time in 2012, Dr. Aklog was an academic cardiac surgeon serving, from 2006 to 2012, as Associate Professor of Surgery, Chief of Cardiovascular Surgery and Chair of The Cardiovascular Center at St. Joseph's Hospital and Medical Center's Heart and Lung Institute in Phoenix, Arizona; from 2002 to 2006, as Assistant Professor of Cardiothoracic Surgery, Associate Chief of Cardiac Surgery and Director of Minimally Invasive Cardiac Surgery at Mount Sinai Medical Center in New York; and as Assistant Professor of Surgery at Harvard Medical School, Director of the Cardiac Surgery Research Laboratory, and an attending cardiac surgeon at Brigham and Women's Hospital in Boston, from 1999 to 2002. Dr. Aklog received his clinical training in general and cardiothoracic surgery at Brigham and Women's Hospital

and Boston Children's Hospital, during which he spent two years as the Medtronic Research Fellow at Harvard Medical School's Cardiac Surgery Research Laboratory. He was then awarded the American Association of Thoracic Surgery Traveling Fellowship pursuant to which he received advanced training in heart valve surgery under renowned cardiac surgeons Sir Magdi Yacoub at Harefield Hospital in London and Professor Alain Carpentier at L'Hopital Broussais in Paris. Dr. Aklog has served as Chairman of the Boston ECG Project Charitable Foundation since 2018, and as a director on the International Board of Directors since 2019, the New York Executive Committee of Human Rights Watch since 2015 and the Advanced Medical Technology Association since 2021. He previously served on the board of directors of Viveon Health Acquisition Corp. from 2020 to 2021, as Chairman and Chief Technology Officer of Vortex Medical Inc., from its inception in 2008 until its acquisition in October 2012 by Angiodynamics, as a board member of the International Society for Minimally Invasive Cardiothoracic Surgery from 2006 to 2009 and as President of the 21st Century Cardiothoracic Surgery Society in 2011. He is a member of numerous professional societies and has been elected to the American Association of Thoracic Surgery. Dr. Aklog has served as a consultant and on the advisory boards of many major medical device companies as well as innovative startups. Dr. Aklog is an inventor on 35 issued patents and over 45 patent applications, including the core patents of Vortex Medical's AngioVac® system and the patents for a majority of PAVmed Inc.'s products. He has also a co-author of 38 peer-reviewed articles and 10 book chapters and has served on the Editorial Board of the Journal of Cardiothoracic Surgery since 2006. Dr. Aklog received his A.B., magna cum laude, in Physics from Harvard University, where he was elected to Phi Beta Kappa. He received his M.D., cum laude, from Harvard Medical School. We believe that Dr. Aklog's significant scientific, medical, executive and board leadership experience qualifies him to serve as a member of our board of directors.

Jane F. Barlow, M.D. Dr. Barlow has served as a member of our board of directors since February 2021. She is currently the Chief Executive Officer of Jane Barlow & Associates, LLC, a consulting firm focused on value-based health care services, since January 2017 and Executive Vice President and Chief Clinical Officer at Real Endpoints, a data, analytics, and advisory firm, since January 2017. She is a senior advisor to MIT's Center for Biomedical Innovation and serves on the Biotech Advisory Board of Pictet Asset Management. Prior to her current roles, she was Associate Chief Medical Officer at CVS Health and Chief Medical Officer of CVS Health's Government Services arm where she successfully implemented industry-leading clinical strategies supporting drug purchasing, distribution, and utilization management. Formerly, she served as Vice President of Clinical Innovation at Medco Health Solutions, leading the adoption of cutting-edge therapeutic programs through all aspects of pharmacy. Dr. Barlow previously served on the public company boards of Momenta Pharmaceuticals, Inc. (prior to and during its sale to Johnson and Johnson), Therapeutics MD Inc., and SilverScript Insurance Company. Dr. Barlow received her medical degree from Creighton University School of Medicine and subsequently completed her residency in occupational and environmental medicine at The Johns Hopkins University, where she also earned her M.P.H. She is a distinguished graduate of the United States Air Force School of Aerospace Medicine and served as Chief of Flight Medicine at the Beale and Maxwell Air Force Bases. Additionally, she holds an M.B.A. from the University of Alabama. She is board-certified in occupational medicine and a fellow of the American College of Occupational and Environmental Medicine and the American College of Preventive Medicine. She is a diplomat of the American College of Physician Executives and a member of the American Medical Association. We believe that Dr. Barlow's extensive experience in steering pharmaceutical development by strategically weighing the value and economic costs that drug candidates bring to the healthcare ecosystem at large qualifies her to serve as a member of our board of directors.

David N. Low, Jr. Mr. Low has served as a member of our board of directors since April 2014. Mr. Low has worked as an investment banker since 1987, with broad investment and advisory experience in the life sciences, biotechnology and medical technology sectors. Since June 2017, Mr. Low has served as a partner at MTS Health Partners, a healthcare investment banking boutique. From 2002 to April 2017, Mr. Low was a member of Lazard's Life Sciences Group as a Managing Director and Senior Advisor. Mr. Low has advised on major M&A transactions in the life sciences, biotechnology and medical technology sectors, and has worked with private and public companies to raise capital, including emerging growth companies. Prior to joining Lazard, Mr. Low was a Managing Director at JP Morgan Chase & Co. and a Senior Vice President at Lehman Brothers. Mr. Low serves on the board of directors of the Philharmonia Baroque Orchestra as President since 2020 and as a board member

since 2012, and as a Trustee of the Ellen Battell Stoeckel Trust since 2021. Mr. Low holds an A.B. from Harvard College, where he graduated cum laude, an M.A. from the Johns Hopkins University School of Advanced International Studies and an M.B.A. from Yale University. We believe that Mr. Low's significant investment and financial advisory experience qualifies him to serve as a member of our board of directors.

Michael J. Otto, Ph.D. Dr. Otto has served as a member of our board of directors since April 2014. Dr. Otto served as Chief Scientific Officer of Pharmasset, a pharmaceutical company, from October 1999 until February 2012, when the company was acquired by Gilead Sciences. He led the research team responsible for the discovery of sofosbuvir for the treatment of HCV infections. In previous capacities, he has served as Associate Director of Anti-Infectives Clinical Research at Rhône-Poulenc Rorer, Vice President for Research and Development at Avid Therapeutics, Inc., Research Manager at DuPont Pharmaceuticals and DuPont Merck Pharmaceuticals and as Group Leader in the Virology Dept. at Sterling Drug in Rensselaer, NY. Prior to joining Sterling Drug, Dr. Otto was Research Assistant Professor at Yale University School of Medicine, Dept. of Pharmacology. Dr. Otto also served as the US editor for Antiviral Chemistry & Chemotherapy from 1989 until 2012. Dr. Otto holds a B.S. degree from Loyola University of Chicago and a Ph.D. degree in medical microbiology from The Medical College of Wisconsin. He is the author or coauthor of over 100 research papers and book chapters and named inventor on several patents and patent applications. We believe that Dr. Otto's substantial scientific and executive leadership experience in the pharmaceutical industry qualifies him to serve as a member of our board of directors.

Cary W. Sucoff, J.D. Mr. Sucoff has served on our board of directors since May 2010. Mr. Sucoff has more than 40 years of legal and securities industry experience. Since 2011, Mr. Sucoff has owned and operated Equity Source Partners LLC, an advisory and consulting firm. He has participated in the financing of more than 100 public and private biotech companies. Mr. Sucoff has served on the board of directors of the public company IMAC Holdings, Inc. since 2020 and the private companies First Wave Technologies, Inc. since 2016, Galimedix Therapeutics since 2018 and Jupiter Unmanned since 2021. In addition, Mr. Sucoff currently serves as a consultant to Sapience Therapeutics, LB Pharmaceuticals, Kinetic Power Systems and Green Hygienics Holdings Inc. He previously served as a director of Legacy Education Alliance, Inc. (LEAI) from 2015 to 2021. Mr. Sucoff, a former New York City prosecutor, is the past President of New England Law/Boston and has been a member of the Board of Trustees for over 25 years. He has been Chairman of the Endowment Committee for over ten years. Mr. Sucoff received a B.A. from SUNY Binghamton in 1974 and a J.D. from New England School of Law in 1977, where he was the Managing Editor of the Law Review and graduated magna cum laude. He has been a member of the Bar of the State of New York since 1978. We believe that Mr. Sucoff's broad financial and legal experience qualifies him to serve as a member of our board of directors.

Executive Officers of the Registrant

Biographical information concerning each of our executive officers is set forth below. Information concerning Roger J. Pomerantz, M.D., F.A.C.P., our Chief Executive Officer, may be found above in the section entitled "Director Biographical Information."

Natalie Bogdanos, J.D. Ms. Bogdanos, age 53, has served as our General Counsel and Corporate Secretary since August 2014, and served as a member of the Interim Office of the Chief Executive Officer from March 2017 to June 2017. Ms. Bogdanos has also served as our Data Protection Officer since July 2018. She has over 20 years of experience in the legal field, at least 15 of which were serving as the chief legal officer of publicly traded biotechnology companies. Prior to joining ContraFect in 2014, Ms. Bogdanos served as a full-time legal consultant for Ferring Pharmaceuticals, Inc. from January 2014 to August 2014. Prior to that, Ms. Bogdanos served as Associate General Counsel at Memorial Sloan-Kettering Cancer Center ("MSKCC"), a cancer treatment and research institution, where she held a joint appointment with the Office of the General Counsel and the Office of Technology Development ("OTD") from 2012 to 2013. At MSKCC, she provided legal counsel and guidance to various departments throughout the institution while having sole responsibility for the legal oversight of the OTD. Prior to MSKCC, she was General Counsel at Enzo Biochem, Inc. ("Enzo"), a publicly traded

international biotechnology and life science company, from 2003 to 2012. At Enzo, she was responsible for leading the legal department, ensuring SEC and regulatory compliance, overseeing litigation and managing Enzo's portfolio of 500+ patents and patent applications and negotiating complex business development agreements as well as other contracts. Previously, Ms. Bogdanos was an associate at Amster, Rothstein & Ebenstein from 1999 to 2003 where her practice focused on all intellectual property matters including related litigation. Ms. Bogdanos was a faculty member at the Practising Law Institute. Prior to attending law school, she was a research technician at the Public Health Research Institute where her work focused on *Staphylococcus aureus*. Ms. Bogdanos is an attorney and admitted to practice law in New York, the United States District Court, Southern and Eastern District of New York and the United States Court of Appeals for the Federal Circuit. She is also licensed to practice before the United States Patent and Trademark Office. Ms. Bogdanos received her J.D. from New York Law School and her Bachelor of Arts in Biology, with honors, from Queens College of the City University of New York.

Cara M. Cassino, M.D. Dr. Cassino, age 60, has served as our Chief Medical Officer since September 2015, also as Executive Vice President of Research and Development since August 2016, and served as a member of the Interim Office of the Chief Executive Officer from March 2017 to June 2017. Dr. Cassino has over 20 years of experience as a clinician and executive in healthcare, including over 15 years of experience in pharmaceutical product development with over 20 successful regulatory submissions in the United States and globally. Prior to joining ContraFect, Dr. Cassino served as an independent consultant to various pharmaceutical and biotechnology companies, including SCYNEXIS Inc., from December 2014 to September 2015. Prior to that, she served as Senior Vice President at Forest Laboratories, Inc., a biopharmaceutical company (acquired by Actavis plc, now Allergan plc), where she oversaw Global Clinical Development from 2013 to 2014. While at Forest, she was responsible for pre- and post- marketing clinical activities for a portfolio of 35 compounds, and also clinical due diligence for M&A activity, including the $2.9 billion acquisition of Aptalis Pharma and the $1.1 billion acquisition of Furiex Pharmaceuticals. From 2008 to 2013, Dr. Cassino held a number of senior positions at Pfizer, including Global Medical Team Leader of Pfizer's antibacterial franchise which included Zyvox (linezolid) and Medicines Development Group VP for Pulmonary Vascular Disease and Rare Diseases. Prior to joining Pfizer, Dr. Cassino also served as Executive Medical Director for the late-stage U.S. respiratory franchise at Boehringer-Ingelheim Pharmaceuticals, Inc. and was a member of the academic faculty of the Division of Pulmonary and Critical Care Medicine at New York University (NYU) School of Medicine for eight years prior to joining industry. Dr. Cassino received her B.A., summa cum laude, in Chemistry and Fine Arts from NYU where she was elected Phi Beta Kappa, followed by an M.D. from NYU School of Medicine. She completed her internship and residency in Internal Medicine at NYU/Bellevue Hospital and a fellowship in Pulmonary/Critical Care Medicine at NYU and Mount Sinai Medical Centers. Dr. Cassino is Board Certified in both internal medicine and pulmonary medicine.

Michael Messinger, CPA. Mr. Messinger, age 47, has served as our Chief Financial Officer since November 2018. He has more than 20 years of experience in finance, accounting and forecasting for clinical development. Prior to joining ContraFect in November 2012 as our Vice President, Finance, and later serving as our Senior Vice President, Finance beginning in August 2016, he served as Director of Finance at Lexicon Pharmaceuticals, Inc. ("Lexicon") for eight years and also held the position of Controller for three years. Prior to working at Lexicon, Mr. Messinger served as Controller of Coelacanth Corporation (which was acquired by Lexicon) for two years. While at Lexicon, Mr. Messinger was responsible for the financial management of Lexicon's partnership with Symphony Capital, LLC, in addition to coordinating fiscal and program management concerning Lexicon's development programs. Mr. Messinger received his B.B.A. degree in accounting from the University of Michigan. He started his career as an auditor at Ernst & Young LLP.

Our board of directors has adopted a Code of Ethics and Business Conduct applicable to all officers, directors and employees, which is available on our website at http://ir.contrafect.com/governance-docs. We intend to satisfy the disclosure requirement under Item 5.05 of Form 8-K regarding amendment to, or waiver from, a provision of our Code of Ethics and Business Conduct, as well as Nasdaq's requirement to disclose waivers with respect to directors and executive officers, by posting such information on our website at the address and location specified above.

The remaining information required by this Item 10 will be contained under the heading "Corporate Governance," "Delinquent Section 16(a) Reports" and "Executive Compensation – Compensation Committee Interlocks and Insider Participation," if applicable, in our definitive proxy statement to be filed with the SEC with respect to our 2022 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this Item 11 will be contained under the heading "Executive Compensation" in our definitive proxy statement to be filed with the SEC with respect to our 2022 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item 12 will be contained under the headings "Executive Compensation – Equity Compensation Plan Information" and "Security Ownership of Certain Beneficial Owners and Management" in our definitive proxy statement to be filed with the SEC with respect to our 2022 Annual Meeting of Stockholders and is incorporated herein by reference.

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

The information required by this Item 13 will be contained under the headings "Certain Relationships and Related Transactions" and "Corporate Governance – Director Independence" in our definitive proxy statement to be filed with the SEC with respect to our 2022 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services

The information required by this Item 14 will be contained under the heading "Ratification of Appointment of Independent Registered Public Accounting Firm" in our definitive proxy statement to be filed with the SEC with respect to our 2022 Annual Meeting of Stockholders and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this Annual Report on Form10-K:

(1) Index list to Consolidated Financial Statements

The following documents are included on pages F-1 through F-28 attached hereto and are filed as part of this Annual Report on Form10-K.

(2) Financial Statement Schedules

Schedules have been omitted since they are either not required or not applicable or the information is otherwise included herein.

(3) Exhibits

Exhibit Index

Exhibit No.	Description	Incorporated by Reference				Filed/ Furnished Herewith
		Form	File No.	Exhibit	Filing Date	
3.1	Amended and Restated Certificate of Incorporation of ContraFect Corporation, dated August 1, 2014, and Certificate of Amendment, dated May 9, 2016, Certificate of Amendment dated May 2, 2017, Certificate of Amendment dated February 3, 2020, and Certificate of Amendment dated February 24, 2022	10-K	001-36577	3.1	March 18, 2020	
3.2	Amended and Restated Bylaws of ContraFect Corporation	10-Q	001-36577	3.2	November 13, 2020	
4.1	Form of Common Stock Certificate	S-1/A	333-195378	4.1	July 3, 2014	
4.2	Form of Warrant Agreement by and between ContraFect Corporation and the American Stock Transfer & Trust Company, LLC, dated July 27, 2016	8-K	001-36577	4.1	July 27, 2016	
4.3	Form of Warrant Certificate	8-K	001-36577	4.2	July 27, 2016	

Exhibit No.	Description	Incorporated by Reference				Filed/ Furnished Herewith
		Form	File No.	Exhibit	Filing Date	
4.4	Form of Warrant Agreement by and between ContraFect Corporation and the American Stock Transfer & Trust Company, LLC, dated July 25, 2017	8-K	001-36577	4.1	July 25, 2017	
4.5	Form of Warrant Certificate	8-K	001-36577	4.2	July 25, 2017	
4.6	Description of ContraFect Corporation Securities	10-K	001-36577	4.12	March 18, 2020	
10.1	License Agreement, between The Rockefeller University and ContraFect Corporation, dated July 12, 2011	S-1	333-195378	10.1	April 18, 2014	
10.2	Lease Agreement, between Hudson View Building #3 LLC and ContraFect Corporation, dated December 1, 2010	S-1	333-195378	10.2	April 18, 2014	
10.3	Lease Agreement, between Hudson View Building #3 LLC and ContraFect Corporation, dated January 1, 2012	S-1	333-195378	10.3	April 18, 2014	
10.4#	Form of Indemnification Agreement	S-1/A	333-195378	10.4	July 1, 2014	
10.5#	ContraFect Corporation Amended and Restated 2008 Equity Incentive Plan	S-1	333-195378	10.11	April 18, 2014	
10.6#	ContraFect Corporation Form of Stock Option Agreement	S-1	333-195378	10.12	April 18, 2014	
10.7#	ContraFect Corporation 2008 Equity Incentive Plan	S-1	333-195378	10.13	April 18, 2014	
10.8#	ContraFect Corporation 2014 Omnibus Incentive Plan	S-1/A	333-195378	10.14	July 1, 2014	
10.9	License Agreement, between Trellis Bioscience LLC and ContraFect Corporation, dated January 29, 2014	S-1/A	333-195378	10.15	July 1, 2014	
10.10	Amendment to the Trellis License Agreement, dated June 15, 2014	S-1/A	333-195378	10.16	July 1, 2014	
10.11#	Offer Letter, dated June 26, 2014, between ContraFect Corporation and Natalie Bogdanos, as amended by Amendment No. 1, dated November 2, 2015	10-K	001-36577	10.27	March 15, 2017	
10.12#	Offer Letter, dated August 24, 2015, between ContraFect Corporation and Cara Cassino, M.D.	10-K	001-36577	10.28	March 15, 2017	
10.13#	Amendment No. 1 to Offer Letter, dated March 15, 2017, between ContraFect Corporation and Cara Cassino, M.D.	10-K	001-36577	10.29	March 15, 2017	

Exhibit No.	Description	Incorporated by Reference				Filed/ Furnished Herewith
		Form	File No.	Exhibit	Filing Date	
10.14#	Employment Agreement, dated as of April 2, 2019, by and between ContraFect Corporation and Roger J. Pomerantz	8-K	001-36577	10.1	April 2, 2019	
10.15	Stock Purchase Agreement, dated December 9, 2019, by and between ContraFect Corporation and Pfizer Inc.	8-K	001-36577	10.1	December 12, 2019	
10.16#	Employment Agreement, dated November 5, 2012, by and between ContraFect Corporation and Michael Messinger	10-K	001-36577	10.16	March 30, 2021	
10.17#	Non-Employee Director Compensation Program	10-K	001-36577	10.17	March 30, 2021	
10.18	Cost-Sharing Agreement by and between ContraFect Corporation and the Biomedical Advanced Research and Development Authority, dated March 15, 2021	8-K	001-36577	10.1	March 12, 2021	
23.1	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm					*
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) and Section 302 of the Sarbanes-Oxley Act of 2002					*
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) and Section 302 of the Sarbanes-Oxley Act of 2002					*
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					**
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					**
101.INS	Inline eXtensible Business Reporting Language (XBRL) Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document					*

Exhibit No.	Description	Incorporated by Reference				Filed/ Furnished Herewith
		Form	File No.	Exhibit	Filing Date	
101.SCH	Inline XBRL Taxonomy Extension Schema Document					*
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					*
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					*
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					*
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					*
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)					*

* Filed herewith.
** Furnished herewith.
# Indicates management contract or compensatory plan.

Item 16. Form 10-K Summary

None

CONTRAFECT CORPORATION

Index to Financial Statements

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of ContraFect Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of ContraFect Corporation (the Company) as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive loss, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2021, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

The Company's Ability to Continue as a Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has an accumulated deficit, has incurred recurring losses and used significant cashflows in operations, expects continuing future losses and has stated that substantial doubt exists about the Company's ability to continue as a going concern. Management's evaluation of the events and conditions and management's plans regarding these matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might 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.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging,

subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Accrued and Prepaid Research and Development Costs

Description of the Matter	As discussed in Note 2 of the Company's consolidated financial statements, costs for certain development activities, such as clinical trials, are recognized based on an evaluation of the progress to completion of specific tasks using data such as patient enrollment, clinical site activations or information provided to the Company by its vendors. Payments for these activities are based on the terms of the individual arrangements, which may differ from the pattern of costs incurred. The Company's estimates are highly dependent upon the timeliness and accuracy of the data provided by third parties regarding the status of their contracted activity. As of December 31, 2021, total accrued liabilities and prepaid expenses were $9.1 million and $4.4 million, respectively, including estimated amounts for research and clinical development service costs either incurred and unpaid or paid in advance as of that date. Auditing management's accrued and prepaid research and development costs is especially challenging and judgmental due to the estimation required by management to determine the cost incurred for the services rendered on or prior to the balance sheet date for enrolling, dosing and monitoring patients, activating trial sites and conducting manufacturing activities. The Company has contracts with multiple clinical research organizations ("CROs") that conduct and manage clinical studies on its behalf, as well as, contract manufacturing organizations ("CMOs") that perform manufacturing activities. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payments during the period.
How We Addressed the Matter in Our Audit	To test the estimated accrued and prepaid research and development costs, we performed audit procedures that included, among others, assessing the methodologies and testing the significant assumptions applied, such as the number of patient visits and trial sites and the amount of manufacturing activity. We also tested the underlying data used by management and assessed the historical accuracy of management's estimates. We performed inquiries of management regarding the status of significant trials and manufacturing activities to understand the impact of recent developments on the accounting for the studies and requested confirmation of costs incurred as of period end that were invoiced or remained unbilled from a sample of CROs and CMOs. Additionally, we compared significant cash payments to the contractual terms. To evaluate the completeness of the accrued research and development costs we also examined invoices received from vendors and cash disbursements made subsequent to December 31, 2021.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2013.

Hartford, Connecticut

March 24, 2022

CONTRAFECT CORPORATION
Consolidated Balance Sheets

(in thousands, except share data)

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 16,654	$ 15,485
Marketable securities	37,631	27,005
Prepaid expenses	4,439	3,084
Other current assets	4,140	1,081
Total current assets	62,864	46,655
Property and equipment, net	741	910
Operating lease right-of-use assets	2,544	2,811
Other assets	613	740
Total assets	$ 66,762	$ 51,116
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 2,389	$ 1,806
Accrued liabilities	9,128	3,610
Current portion of lease liabilities	657	644
Total current liabilities	12,174	6,060
Warrant liabilities	2,530	29,404
Long-term portion of lease liabilities	2,609	2,959
Other liabilities	73	73
Total liabilities	17,386	38,496
Commitments and contingencies (Note 8)	—	—
Stockholders' equity:		
Preferred stock, $0.0001 par value, 25,000,000 shares authorized and none issued or outstanding at December 31, 2021 and 2020	—	—
Common stock, $0.0001 par value, 125,000,000 shares authorized; 39,332,721 and 27,810,161 shares issued and outstanding at December 31, 2021 and 2020	4	3
Additional paid-in capital	310,008	252,908
Accumulated other comprehensive loss	(84)	(21)
Accumulated deficit	(260,552)	(240,270)
Total stockholders' equity	49,376	12,620
Total liabilities and stockholders' equity	$ 66,762	$ 51,116

See accompanying notes.

CONTRAFECT CORPORATION
Consolidated Statements of Operations

(in thousands, except share and per-share data)

	Year Ended December 31,		
	2021	2020	2019
Operating expenses:			
Research and development, including stock-based compensation of $933, $655 and $469, respectively	$ 35,508	$ 22,614	$ 18,057
General and administrative, including stock-based compensation of $2,261, $1,921 and $977, respectively	11,757	11,625	9,809
Total operating expenses	47,265	34,239	27,866
Loss from operations	(47,265)	(34,239)	(27,866)
Other income (expense):			
Interest income	109	192	359
Other expense	—	(2,165)	—
Change in fair value of warrant liabilities	26,874	8,056	14,713
Total other income	26,983	6,083	15,072
Net loss	$ (20,282)	$ (28,156)	$ (12,794)
Per share information:			
Net loss per share of common stock, basic and diluted	$ (0.55)	$ (1.24)	$ (1.54)
Basic and diluted weighted average shares outstanding	36,775,950	22,763,528	8,283,509

See accompanying notes.

CONTRAFECT CORPORATION
Consolidated Statements of Comprehensive Loss

(in thousands)

	Year Ended December 31,		
	2021	2020	2019
Net loss	$ (20,282)	$ (28,156)	$ (12,794)
Other comprehensive (loss) gain:			
Unrealized (loss) gain on available-for-sale securities	(63)	(21)	30
Comprehensive loss	$ (20,345)	$ (28,177)	$ (12,764)

See accompanying notes.

CONTRAFECT CORPORATION
Consolidated Statements of Stockholders' Equity
(in thousands, except share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Stockholders' Equity
	Shares	Amount				
Balance, December 31, 2018	7,940,931	$ 1	$ 204,891	$ (30)	$ (199,320)	$ 5,542
Issuance of securities in registered offerings	6,280,000	1	20,033	—	—	20,034
Issuance of securities in private placement	1,111,111	—	3,000	—	—	3,000
Financing cost of sale of securities	—	—	(1,713)	—	—	(1,713)
Stock-based compensation	—	—	1,447	—	—	1,447
Unrealized gain on marketable securities	—	—	—	30	—	30
Net loss	—	—	—	—	(12,794)	(12,794)
Balance, December 31, 2019	15,332,042	$ 2	$ 227,658	$ —	$ (212,114)	$ 15,546
Issuance of securities in registered offerings	11,797,752	1	21,107	—	—	21,108
Issuance of securities in private placement	674,156	—	3,000	—	—	3,000
Financing cost of sale of securities	—	—	(1,462)	—	—	(1,462)
Issuance of common stock for exercise of warrants	5,850	—	29	—	—	29
Issuance of common stock for exercise of options	361	—	—	—	—	—
Stock-based compensation	—	—	2,576	—	—	2,576
Unrealized loss on marketable securities	—	—	—	(21)	—	(21)
Net loss	—	—	—	—	(28,156)	(28,156)
Balance, December 31, 2020	27,810,161	$ 3	$ 252,908	$ (21)	$ (240,270)	$ 12,620
Issuance of securities in registered offering	11,500,000	1	57,499	—	—	57,500
Financing cost of sale of securities	—	—	(3,703)	—	—	(3,703)
Issuance of common stock for exercise of warrants	22,560	—	110	—	—	110
Stock-based compensation	—	—	3,194	—	—	3,194
Unrealized loss on marketable securities	—	—	—	(63)	—	(63)
Net loss	—	—	—	—	(20,282)	(20,282)
Balance, December 31, 2021	39,332,721	$ 4	$ 310,008	$ (84)	$ (260,552)	$ 49,376

See accompanying notes.

CONTRAFECT CORPORATION
Statements of Cash Flows

(in thousands)

	Year Ended December 31,		
	2021	2020	2019
Cash flows from operating activities			
Net loss	$ (20,282)	$ (28,156)	$ (12,794)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation	148	168	169
Stock-based compensation expense	3,194	2,576	1,447
Issuance costs allocated to warrants	—	2,175	—
Change in fair value of warrant liabilities	(26,874)	(8,056)	(14,713)
Net amortization of premium paid on marketable securities	924	378	171
Changes in operating assets and liabilities:			
(Increase) decrease in prepaid expenses and other current and non-current assets	(4,336)	1,738	(1,263)
Increase (decrease) in accounts payable, accrued liabilities and other liabilities	6,101	(4,010)	(445)
Net cash used in operating activities	(41,125)	(33,187)	(27,428)
Cash flows from investing activities			
Purchases of marketable securities	(48,698)	(47,555)	—
Proceeds from maturities of marketable securities	37,085	20,151	21,991
Purchases of property and equipment	—	—	(20)
Net cash (used in) provided by investing activities	(11,613)	(27,404)	21,971
Cash flows from financing activities			
Proceeds from issuance of equity securities	57,500	55,500	23,034
Payment of financing costs of securities sold	(3,703)	(3,637)	(1,713)
Proceeds from exercise of warrants	110	29	—
Net cash provided by financing activities	53,907	51,892	21,321
Net increase (decrease) in cash and cash equivalents	1,169	(8,699)	15,864
Cash and cash equivalents at beginning of period	15,485	24,184	8,320
Cash and cash equivalents at end of period	$ 16,654	$ 15,485	$ 24,184
Supplemental disclosures of cash flow information			
Prepaid expenses in accrued liabilities	$ —	$ —	$ 4,097
Right-of-use assets obtained in exchange for lease obligations	$ —	$ —	$ 4,149
Leasehold improvement obtained in exchange for lease incentive obligations	$ —	$ —	$ 189
Issuance of warrants to purchase common stock	$ —	$ 31,391	$ —

See accompanying notes.

ContraFect Corporation
Notes to Financial Statements
December 31, 2021

1. Organization and Description of Business

Organization and Business

ContraFect Corporation (the "Company") is a clinical-stage biotechnology company focused on the discovery and development of direct lytic agents ("DLAs"), including lysins and amurin peptides, as new medical modalities for the treatment of life-threatening, antibiotic-resistant infections. The Company intends to address antibiotic-resistant infections using product candidates from our lysin and amurin peptide platforms. DLAs are fundamentally different than antibiotics and offer a potential paradigm shift in the treatment of antibiotic-resistant infections. The Company's most advanced product candidate is exebacase, a lysin which targets *S. aureus*, including methicillin-resistant strains, which causes serious infections such as bacteremia, pneumonia and osteomyelitis. *S. aureus* is also a frequent source of biofilm-dependent infections of heart valves (endocarditis), prosthetic joints, indwelling devices and catheters. These infections result in significant morbidity and mortality despite current antibiotic therapy. Exebacase is being studied in a pivotal Phase 3 superiority study to evaluate its safety, tolerability, efficacy and pharmacokinetics when used in addition to background standard of care antibacterial therapy for the treatment of *S. aureus* bacteremia, including right-sided endocarditis in adult patients.

The Company has incurred recurring losses since inception as a research and development organization and has an accumulated deficit of $260.6 million as of December 31, 2021. For the year ended December 31, 2021, the Company used $41.1 million of cash in operations. The Company has relied on its ability to fund its operations through public and private debt and equity financings, and, to a lesser extent, grant funding. The Company expects operating losses and negative cash flows to continue at significant levels in the future as it continues its clinical trials. As of December 31, 2021, the Company had approximately $54.3 million in cash, cash equivalents and marketable securities, which, without additional funding, the Company believes will not be sufficient to meet its obligations within the next twelve months from the date of issuance of these consolidated financial statements. The Company plans to continue to fund its operations through public or private debt and equity financings, but there can be no assurances that such financing will continue to be available to the Company on satisfactory terms, or at all. As such, under the requirements of Accounting Standard Codification ("ASC") 205-40, management may not consider the potential for future capital raises in its assessment of the Company's ability to meet its obligations for the next twelve months, and substantial doubt exists about the Company's ability to continue as a going concern for twelve months from the date the financial statements were issued. If the Company is unable to obtain funding, the Company would be forced to delay, reduce or eliminate its research and development programs, which could adversely affect its business prospects, or the Company may be unable to continue operations or continue as a going concern.

The consolidated financial statements have been prepared assuming that the Company will continue as a going concern, which contemplates continuity of operations, the realization of assets and the satisfaction of liabilities and commitments in the normal course of business.

On August 14, 2020, the Company filed a shelf registration statement on Form S-3 (the "Form S-3") with the SEC. The Form S-3 was declared effective by the SEC on August 31, 2020. The Form S-3 allows the Company to offer and sell from time-to-time up to $150.0 million of common stock, preferred stock, debt securities, warrants or units comprised of any combination of these securities.

On March 22, 2021, the Company completed an underwritten public offering under the Form S-3 of 11,500,000 shares of its common stock, including shares sold pursuant to the fully exercised overallotment option granted to the underwriters in connection with the offering, at a public offering price of $5.00 per share, resulting in estimated net proceeds to the Company of approximately $53.8 million after underwriting discounts and commissions and offering expenses payable by the Company.

On March 10, 2021, the Company entered into a cost-share contract (the "BARDA Contract") with BARDA, a division of the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response. Under the BARDA Contract, the Company will receive funding of up to an estimated $86.8 million to advance the development of exebacase. The base period for the BARDA Contract includes government funding of up to $9.8 million to reimburse expenses for to support the conduct of the ongoing Phase 3 clinical trial and futility analysis. Following successful completion of the base period, the BARDA Contract provides for approximately $77.0 million of additional BARDA funding for five option stages in support of the completion of the Phase 3 clinical trial of exebacase, further clinical and non-clinical studies, manufacturing, supply chain, clinical, regulatory and administrative activities. The contract period-of-performance (base period plus option exercises) is up to approximately six years.

On May 27, 2020, the Company completed an underwritten public offering of 11,797,752 shares of its common stock and warrants to purchase an additional 8,848,314 shares of its common stock at an exercise price of $4.90 per share (the "2020 Offering"). The public offering price was $4.45 for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock, resulting in net proceeds to the Company of approximately $48.9 million after underwriting discounts and commissions and offering expenses payable by the Company. The Company completed a concurrent private placement to Pfizer Inc. ("Pfizer") of 674,156 shares of common stock and an accompanying warrant to purchase an additional 505,617 shares of its common stock at an exercise price of $4.90 per share (the "Pfizer Warrant"). The offering price for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock was at a price of $4.45 per share of common stock, resulting in net proceeds to the Company of approximately $3.0 million.

On December 18, 2019, the Company completed an underwritten public offering of 2,565,000 shares of its common stock at a public offering price of $3.90 per share, resulting in gross proceeds to the Company of approximately $10.0 million. On December 12, 2019, the Company completed an underwritten public offering of 3,715,000 shares of its common stock at a public offering price of $2.70 per share and a concurrent private placement of 1,111,111 shares of common stock to Pfizer Inc. at a price of $2.70 per share, resulting in gross proceeds to the Company of approximately $13.0 million. The combined net proceeds of both public offerings together with the private placement was $21.3 million after underwriting discounts and commissions and offering expenses payable by the Company.

The significant increases in common stock outstanding are expected to impact the year-over-year comparability of the Company's net loss per share calculations.

2. Summary of significant accounting policies

Basis of Presentation

The accompanying financial information has been prepared in accordance with U.S. generally accepted accounting principles ("U.S. GAAP").

Principles of Consolidation

The Company has a wholly-owned subsidiary, ContraFect International Limited, in Scotland that establishes legal status for interactions with the European Economic Area. This subsidiary is dormant or is otherwise non-operative. Any inter-company accounts have been eliminated in consolidation.

Segment and Geographic Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker, or decision-making group, in making decisions on how to allocate resources and assess performance. The Company's chief operating decision maker is the chief executive officer. The Company and the chief decision maker view the Company's operations and manage its business as one operating segment. The Company operates in only one geographic segment.

Significant Risks and Uncertainties

The Company's operations are subject to a number of factors that can affect its operating results and financial condition. Such factors include, but are not limited to: the results of clinical testing and trial activities of the Company's products, the Company's ability to obtain regulatory approval to market its products, and, if approved, the price of, and demand for, the Company's products, competition from products manufactured and sold or being developed by other companies, the Company's ability to negotiate favorable manufacturing and other agreements for its products and the Company's ability to raise capital.

The Company currently relies on a single manufacturer of exebacase drug substance and drug product, located in the United Kingdom, and there is no long-term supply agreement in place. A sustained disruption in the operations of this manufacturer or in the event the Company would need to change to a new supplier, could result in a significant delay in the ability of the Company to complete the activities needed to support a Biologics License Application for, and, if approved, commercialization of exebacase.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting period. The Company bases estimates and assumptions on historical experience when available and on various factors that it believes to be reasonable under the circumstances. On an ongoing basis, the Company evaluates its estimates and assumptions, including those related to research and development prepaid expenses and accruals, stock-based compensation, warrant valuation and realization of net deferred income tax assets. The Company's actual results may differ from these estimates under different assumptions or conditions. There have been no significant changes from the Company's original estimates in any periods presented.

Concentrations of Credit Risk

Financial instruments which potentially subject the Company to credit risk consist primarily of cash, cash equivalents and marketable securities. The Company holds these investments in highly rated financial institutions, and, by policy, limits the amounts of credit exposure to any one financial institution. These amounts at times may exceed federally insured limits. The Company has not experienced any credit losses in such accounts and does not believe it is exposed to any significant credit risk on these funds. The Company has no off-balance sheet concentrations of credit risk, such as foreign currency exchange contracts, option contracts or other hedging arrangements.

Cash and Cash Equivalents

The Company considers all highly liquid investments with maturities at the date of purchase ofthree months or less to be cash equivalents. Cash and cash equivalents include bank demand deposits, marketable securities with maturities of three months or less at purchase, and money market funds that invest primarily in certificates of deposit, commercial paper and U.S. government and U.S. government agency obligations. Cash equivalents are reported at fair value.

Marketable Securities

Marketable securities consists of investments in corporate debt securities. Management determines the appropriate classification of the securities at the time they are acquired and evaluates the appropriateness of such classifications at each balance sheet date. The Company classifies its marketable securities as available-for-sale pursuant to ASC 320, *Investments – Debt and Equity Securities.* The Company classifies marketable securities available to fund current operations as current assets on its consolidated balance sheets. Marketable securities are

classified as long-term assets on the consolidated balance sheets if (i) the Company has the intent and ability to hold the investments for a period of at least one year and (ii) the contractual maturity date of the investments is greater than one year. Marketable securities are recorded at fair value, with unrealized gains and losses included as a component of accumulated other comprehensive loss in stockholders' equity and a component of total comprehensive loss in the consolidated statements of comprehensive loss, until realized. The fair value of these securities is based on quoted prices for identical or similar assets. Realized gains and losses are included in interest income in the consolidated statement of operations on a specific-identification basis. There were no realized gains on sales of marketable securities for the year ended December 31, 2021. There were $9,609 of realized gains on sales of marketable securities for the year ended December 31, 2020. There were no marketable securities that had been in an unrealized loss position for more than 12 months as of December 31, 2021 or 2020.

The Company reviews marketable securities for other-than-temporary impairment whenever the fair value of a marketable security is less than the amortized cost and evidence indicates that a marketable security's carrying amount is not recoverable within a reasonable period of time. Other-than-temporary impairments of investments are recognized in the consolidated statements of operations if the Company has experienced a credit loss, has the intent to sell the marketable security, or if it is more likely than not that the Company will be required to sell the marketable security before recovery of the amortized cost basis. Evidence considered in this assessment includes reasons for the impairment, compliance with the Company's investment policy, the severity and the duration of the impairment and changes in value subsequent to the end of the period.

Fair Value of Financial Instruments

The Company's financial instruments consist of cash and cash equivalents, marketable securities, accounts payable, accrued liabilities and warrant liabilities. Fair value estimates of these instruments are made at a specific point in time, based on relevant market information. These estimates may be subjective in nature and involve uncertainties and matters of judgment and therefore cannot be determined with precision. The fair value of the Company's warrant liabilities is based upon unobservable inputs, as described further below.

The Company is required to disclose information on all assets and liabilities reported at fair value that enables an assessment of the inputs used in determining the reported fair values. FASB ASC Topic 820, *Fair Value Measurements and Disclosures* ("ASC 820"), establishes a hierarchy of inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the observable inputs be used when available. Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability, and are developed based on the best information available in the circumstances. The fair value hierarchy applies only to the valuation inputs used in determining the reported fair value of the investments and is not a measure of the investment credit quality. The three levels of the fair value hierarchy are described below:

Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date.

Level 2—Valuations based on quoted prices for similar assets or liabilities in markets that are not active or for which all significant inputs are observable, either directly or indirectly.

Level 3—Valuations that require inputs that reflect the Company's own assumptions that are both significant to the fair value measurement and unobservable.

To the extent that valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

The Company had no liabilities classified as Level 1 or Level 2. The carrying amounts reported in the accompanying financial statements for accounts payable and accrued expenses approximate their respective fair values due to their short-term maturities. The fair value of the warrant liabilities is discussed in Note 4, "Fair Value Measurements."

Property, Office Equipment, and Leasehold Improvements

Property and equipment are recorded at cost less accumulated depreciation. Depreciation of property and equipment is provided by the straight-line method over their estimated useful lives, ranging from three to five years.

Leasehold improvements are amortized on a straight-line basis over the useful lifeof the improvement or the initial lease term, whichever is shorter. Costs for normal repair and maintenance are charged to expense as incurred.

Impairment of Long-lived Assets

In accordance with ASC 360, *Property, Plant, and Equipment*, the Company's policy is to review long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. An impairment loss would be recognized when estimated undiscounted future cash flows expected to result from the use of the asset and its eventual disposition is less than its carrying amount. As of December 31, 2021 and 2020, no impairment of long-lived assets has occurred.

Research and Development Costs

Research and development costs are charged to expense as incurred and are typically made up of salaries and benefits, clinical trial activities, drug development and manufacturing costs, and third-party service fees, including for clinical research organizations and investigative sites. Costs for certain development activities, such as clinical trials, are recognized based on an evaluation of the progress to completion of specific tasks using data such as patient enrollment, clinical site activations, or information provided by vendors on their actual costs incurred. Payments for these activities are based on the terms of the individual arrangements, which may differ from the pattern of costs incurred, and are reflected in the financial statements as prepaid expenses or accrued liabilities.

Stock-based Compensation

The Company accounts for stock-based compensation in accordance with ASC 718,*Compensation—Stock Compensation,* which requires the measurement and recognition of compensation expense for all stock-based payment awards made to employees, directors, and non-employees, including employee stock options. Compensation expense based on the grant date fair value is generally amortized over the requisite service period of the award on a straight-line basis.

The fair value of options is calculated using the Black-Scholes option pricing model on the date of grant based on key assumptions such as stock price, risk free interest rates, expected volatility, expected term, and expected dividend yield. The Company's estimates of these assumptions are based on historical data and judgment regarding future trends and factors.

Income Taxes

The Company uses the asset and liability method to calculate deferred tax assets and liabilities. Deferred taxes are recognized based on the differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases using enacted tax rates expected to apply to taxable income in the

years in which those differences are expected to be recovered or settled. The Company records a valuation allowance against a deferred tax asset when it is more-likely-than-not that the deferred tax asset will not be realized.

The Company is subject to federal, state and local taxes and follows a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. The Company recognizes tax benefits or expenses of uncertain tax positions in the year such determination is made when the position is "more likely than not" to be sustained assuming examination by tax authorities. Management has reviewed the Company's tax positions for all open tax years (tax years ended December 31, 2010 through December 31, 2021) and concluded that no provision for unrecognized tax benefits or expense is required in these financial statements. There are no income tax audits in progress as of December 31, 2021.

Government Contracts and Grant Agreements

The Company recognizes a receivable, which is included in other current assets on its consolidated balance sheet, and the related reduction in its research and development expenses when the actual reimbursable costs have been incurred and there is reasonable assurance that the Company has complied with the conditions of the applicable government contract or grant agreement and the amounts will be received. The Company recognized a reduction to its research and development expense in the amount of approximately $10.5 million, $4.2 million and $3.6 million for the years ended December 31, 2021, 2020 and 2019 respectively. The receivable for government contracts and grant agreements as of December 31, 2021 and 2020 was approximately $4.1 million and $1.1 million, respectively, and is included in other current assets on the consolidated balance sheet. The Company has approximately $7.7 million of committed government contract and grant agreement funding remaining as of December 31, 2021.

Net Loss per Share Applicable to Common Stockholders

Basic net loss per share applicable to common stockholders is calculated by dividing net loss applicable to common stockholders by the weighted average shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share applicable to common stockholders is calculated by adjusting weighted average shares outstanding for the dilutive effect of common stock equivalents outstanding for the period, determined using the treasury-stock method. For purposes of the dilutive net loss per share applicable to common stockholders' calculation, stock options and warrants are considered to be common stock equivalents but are excluded from the calculation of diluted net loss per share applicable to common stockholders, as their effect would be anti-dilutive; therefore, basic and diluted net loss per share applicable to common stockholders were the same for all periods presented.

Comprehensive Loss

Comprehensive loss is defined as the change in equity of a business enterprise during a period from transactions, and other events and circumstances from non-owner sources, and currently consists of net loss and changes in unrealized gains and losses onavailable-for-sale securities.

Recently Adopted Accounting Pronouncements

Fair Value Measurements

On January 1, 2020, the Company adopted Accounting Standards Update No. 2018-13-*Fair Value Measurement (Topic 820)*. Topic 820 eliminates, adds and modifies certain disclosure requirements for fair value measurements. The adoption of the new guidance did not affect the Company's consolidated financial statements.

Income Taxes

On January 1, 2021, the Company adopted Accounting Standards Update No. 2019-12, *Income Taxes (Topic 740)*, which simplified the accounting for income taxes. The adoption of the new guidance did not affect the Company's consolidated financial statements.

Recently Issued Accounting Pronouncements Not Yet Adopted

In June 2016, the FASB issued a new Accounting Standards Update, *Financial Instruments-Credit Losses (ASU 2016-13).* ASU 2016-13 amends the guidance for measuring and recording credit losses on financial assets measured at amortized cost by replacing the "incurred loss" model with an "expected loss" model. Accordingly, these financial assets will be presented at the net amount expected to be collected. This new standard also requires that credit losses related to available-for-sale debt securities be recorded through an allowance for such losses rather than reducing the carrying amount under the current, other-than-temporary-impairment model. The new standard is effective for interim and annual periods beginning after December 15, 2022. The Company is currently evaluating the impact that this new standard will have on its consolidated financial statements and related disclosures.

In November 2021, the FASB issued a new Accounting Standards Update, *Disclosure by Business Entities about Government Assistance (ASU 2021-10)*. ASU 2021-10 improves the transparency of government assistance received by certain business entities by requiring the disclosure of (1) the types of government assistance received, (2) the accounting for such assistance, and (3) the effect of the assistance on the business entity's financial statements. The new standard is effective for fiscal years beginning after December 15, 2021, with early adoption permitted. The Company is currently evaluating the impact that this new standard will have on its consolidated financial statements and related disclosures.

3. Marketable Securities

Marketable securities at December 31, 2021 consisted of the following (in thousands):

Marketable Securities	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Current:				
Corporate debt	$ 37,715	$ —	$ (84)	$37,631

Marketable securities at December 31, 2020 consisted of the following (in thousands):

Marketable Securities	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
Current:				
Corporate debt	$ 27,026	$ 6	$ (27)	$27,005

Corporate debt includes obligations issued by investment-grade corporations. At December 31, 2021, the Company held only investments that have maturities of less than one year.

At December 31, 2021 and December 31, 2020, the Company held23 and 15 debt securities, respectively, that individually and in total were in an immaterial unrealized loss position for less than one year. The aggregate fair value of debt securities in an unrealized loss position at December 31, 2021 and December 31, 2020 was $37,631 and $18,116, respectively. The Company evaluated its securities for other-than-temporary impairment and considered the decline in market value for the securities to be primarily attributable to current economic and market conditions. It was not more likely than not that the Company would have been required to sell the securities prior to the recovery of the amortized cost basis. Based on this analysis, these marketable securities were not considered to be other-than-temporarily impaired as of December 31, 2021 and December 31, 2020.

4. Fair Value Measurements

The following fair value hierarchy table presents information about the Company's financial assets and liabilities measured at fair value on a recurring basis as of December 31, 2021 and December 31, 2020 (in thousands):

	Fair Value Measurement as of December 31, 2021		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Cash equivalents	$ 7,734	$ —	$ —
Marketable securities	37,631	—	—
Warrant liabilities	—	—	2,530
Total	$ 45,365	$ —	$ 2,530

	Fair Value Measurement as of December 31, 2020		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Cash equivalents	$ 12,921	$ —	$ —
Marketable securities	27,005	—	—
Warrant liabilities	—	—	29,404
Total	$ 39,926	$ —	$ 29,404

The Company issued warrants to the purchasers of its 2016 Offering (the "2016 Warrants"). The Company determined that these warrants should be classified as a liability and considered as a Level 3 financial instrument (see also Note 9, "Capital Structure"). The 2016 Warrants were re-measured at each subsequent reporting period and changes in fair value was recognized in the consolidated statement of operations. The 2016 Warrants expired in accordance with their terms on July 27, 2021. The following assumptions were used in a Black-Scholes option-pricing model to determine the fair value of the warrant liability:

	As of December 31, 2020
Expected volatility	59.7%
Remaining contractual term (in years)	0.58
Risk-free interest rate	0.09%
Expected dividend yield	—%

The Company issued warrants to the purchasers of its 2017 Offering (the "2017 Warrants"). The Company determined that these warrants should be classified as a liability and considered as a Level 3 financial instrument (see also Note 9, "Capital Structure"). The 2017 Warrants are re-measured at each subsequent reporting period and changes in fair value are recognized in the consolidated statement of operations. The following assumptions were used in a Black-Scholes option-pricing model to determine the fair value of the warrant liability:

	As of December 31, 2021	As of December 31, 2020
Expected volatility	56.5%	100.1%
Remaining contractual term (in years)	0.58	1.58
Risk-free interest rate	0.19%	0.12%
Expected dividend yield	—%	—%

The Company issued warrants to the purchasers of its 2020 Offering (the "2020 Warrants"). The Company determined that these warrants should be classified as a liability and considered as a Level 3 financial instrument (see also Note 9, "Capital Structure"). The 2020 Warrants are re-measured at each subsequent reporting period and changes in fair value are recognized in the consolidated statement of operations. The following assumptions were used in a Black-Scholes option-pricing model to determine the fair value of the warrant liability:

	As of December 31, 2021	As of December 31, 2020
Expected volatility	61.9%	111.9%
Remaining contractual term (in years)	1.42	2.42
Risk-free interest rate	0.56%	0.15%
Expected dividend yield	—%	—%

The following tables present a reconciliation of the Company's financial liabilities measured at fair value on a recurring basis using significant unobservable inputs (Level 3) for the years ended December 31, 2021, 2020 and 2019 (in thousands):

Warrant liabilities

	Year Ended December 31,		
	2021	2020	2019
Balance at beginning of period	$ 29,404	$ 6,069	$ 20,782
Issuance of 2020 Warrants	—	31,391	—
Change in fair value	(26,874)	(8,056)	(14,713)
Balance at end of period	$ 2,530	$29,404	$ 6,069

The key inputs into the Black-Scholes option pricing model are the per share value and the expected volatility of the Company's common stock. Significant changes in these inputs will directly increase or decrease the estimated fair value of the Company's warrant liability.

5. Property, Equipment, and Leasehold Improvements

Property, equipment, and leasehold improvements, at cost, consisted of the following for the years ended December 31, 2021 and 2020 (in thousands):

	December 31,	
	2021	2020
Computer equipment	$ 20	$ 20
Furniture	435	435
Lab equipment	1,864	1,864
Leasehold improvements	1,985	2,006
	4,304	4,325
Less: accumulated depreciation and amortization	(3,563)	(3,415)
	$ 741	$ 910

Depreciation expense was $148, $168 and $169 for the years ended December 31, 2021, 2020 and 2019, respectively.

6. Accrued Liabilities

Accrued liabilities consisted of the following for the years ended December 31, 2021 and 2020 (in thousands):

	December 31,	
	2021	2020
Accrued research and clinical development service fees	$5,641	$ 801
Accrued compensation costs	2,215	2,069
Accrued professional fees	819	457
Accrued facilities operation expenses	307	173
Other accrued expenses	146	110
	$9,128	$3,610

7. Net Loss Per Share of Common Stock

Diluted loss per share is the same as basic loss per share for all periods presented because the effects of potentially dilutive items were anti-dilutive given the Company's net loss. Basic loss per share is computed by dividing net loss available to common stockholders by the weighted-average number of common shares outstanding.

The following table sets forth the computation of basic and diluted loss per share for common stockholders (in thousands, except share and per share data):

	Year Ended December 31,		
	2021	2020	2019
Net loss applicable to common stockholders	$ (20,282)	$ (28,156)	$ (12,794)
Weighted average shares of common stock outstanding	36,775,950	22,763,528	8,283,509
Net loss per share of common stock—basic and diluted	$ (0.55)	$ (1.24)	$ (1.54)

The following potentially dilutive securities outstanding at December 31, 2021, 2020 and 2019 have been excluded from the computation of diluted weighted average shares outstanding, as they would have been antidilutive given the Company's net loss:

	December 31,		
	2021	2020	2019
Options to purchase common stock	2,899,694	1,853,841	1,216,338
Warrants to purchase common stock	10,926,594	12,350,293	3,033,910
	13,826,288	**14,204,134**	**4,250,248**

8. Commitments and Contingencies

Operating Leases

In December 2010, the Company entered into a non-cancellable operating lease for office space and laboratory facilities in Yonkers, New York expiring in December 2025. In December 2011, the Company entered into an amendment which extended the term of the lease through December 2027 (the "Third Floor Lease"). The lease provides for the option to renew for two additional five-year terms. The premises were occupied in June 2011. Monthly rent payments began the date the office and laboratory facilities were ready for occupancy.

In January 2012, the Company entered into a non-cancellable operating lease for additional office space and laboratory facilities in the same building in Yonkers, New York expiring in December 2027 (the "Fourth Floor Lease"). The Fourth Floor Lease provides for an option to renew for two additional five-year terms. Effective August 1, 2017, the Company relinquished 10,912 square feet of space under the Fourth Floor Lease and was relieved of its obligations related to such space.

The balance sheet classification of the Company's lease liabilities was as follows (in thousands):

	December 31,	
Description	2021	2020
Operating lease liabilities:		
Current portion of lease liabilities	$ 657	$ 644
Long-term portion of lease liabilities	$2,609	$2,959

Operating lease liabilities are based on the net present value of the remaining lease payments over the remaining lease term. The leases are renewable at the end of the lease term at the Company's option. For the purposes of determining the remaining lease term in contemplation of available extensions, the Company did not consider either renewal to be probable at this time. In determining the present value of lease payments, the Company estimated its incremental borrowing rate based on the information available at the adoption date of Topic 842. As of January 1, 2019, the remaining lease term was 9.0 years and the discount rate used to determine the operating lease liability was 9.93%.

As of December 31, 2021, the maturities of the Company's operating lease liabilities were as follows (in thousands):

	Amount
Year ending December 31:	
2022	$ 693
2023	707
2024	721
2025	736
2026	750
Thereafter	702
Total lease payments	4,309
Less: Present value adjustment	(1,043)
Operating lease liabilities	$ 3,266

Lease costs under the terms of the Company's leases for the years ended December 31, 2021 and 2020 are as follows (in thousands):

	Year Ended December 31,	
	2021	2020
Operating lease cost (1)	$616	$615
Variable lease costs (2)	148	126
Total lease cost	$764	$741

(1) Operating lease payments included in the measurement of the Company's lease liabilities are comprised of fixed payments according to the terms of the Company's leases.

(2) Variable lease payments consist of the Company's utility costs billed by and paid to its landlord. Variable lease payments are presented as operating expenses in the Company's Consolidated Statement of Operations in the same line item as expense arising from fixed lease payments and in net cash used in operating activities in the Company's Statement of Cash Flows.

Rockefeller University

License Agreements

The Company has entered into the following license agreements with The Rockefeller University:

- On July 12, 2011, the Company entered into a license agreement for the worldwide, exclusive right to a patent covering the composition of matter for the lysin PlySS2 for the treatment and prevention of diseases caused by gram-positive bacteria (the "CF-301 License"). The Company rebranded PlySS2 as CF-301 and subsequently, exebacase. The license gives the Company the right to exclusively develop, make, have made, use, import, lease, sell and offer for sale products that would otherwise infringe a claim of this patent application or patent.
- On June 1, 2011, the Company entered into a license agreement for the exclusive rights to The Rockefeller University's interest in a joint patent application covering the method of delivering antibodies through the cell wall of gram-positive bacteria to the periplasmic space. This intellectual property was developed as a result of the sponsored research agreement between the Company and The Rockefeller University and was jointly discovered and filed by the two parties.

- On September 23, 2010, the Company entered into a license agreement for the worldwide, exclusive right to develop, make, have made, use, import, lease, sell, and offer for sale products that would otherwise infringe a claim of the suite of patents and patent applications covering the composition of matter for eight individual lysin molecules for the treatment and prevention of diseases caused by gram-positive bacteria. The lysins in this suite have activity against Group B *Streptococci*, *Staphylococcus aureus, Streptococcus pneumonia, Bacillus anthracis, Enterococcus faecalis and Enterococcus faecium.*

In consideration for the licenses, the Company paid Rockefeller license initiation fees in cash and stock. The Company paid annual maintenance fees of $200,000 in each of 2021, 2020 and 2019, and are required to pay $200,000 each year thereafter until the licenses terminate. Depending on the success of its programs, the Company may also incur regulatory milestone payments up to a total of $5.0 million and royalties of up to 5% on net sales from products to Rockefeller. We are allowed to grant sublicenses to third parties without prior approval, subject to certain conditions and the payment of a certain percentage of all payments we receive from sublicensees. There were no milestone, royalty or sublicense payments made during the years ended December 31, 2021 or 2020. The Company made a milestone payment under the CF-301 License of $430,000 during the year ended December 31, 2019 for the completion of the Phase 2 trial. The Company has made total milestone payments under the CF-301 License of $810,000 as of December 31, 2021.

Each license agreement terminates upon the later of (i) the expiration or abandonment of the last licensed patent under the license agreement to expire or become abandoned, or (ii) 10 years after the first commercial sale of the first licensed product. The Rockefeller University may terminate any license agreement in the event of a breach of such agreement by the Company or if the Company challenges the validity or enforceability of the underlying patent rights. The Company may terminate any license agreement at any time on 60 days' notice.

Legal Contingencies

From time to time, the Company may be involved in disputes and legal proceedings in the ordinary course of its business. These proceedings may include allegations of infringement of intellectual property, employment or other matters. The Company records a liability in its financial statements for these matters when a loss is known or considered probable and the amount can be reasonably estimated. The Company reviews these estimates each accounting period as additional information is known and adjusts the loss provision when appropriate. If a matter is both probable to result in a liability and the amounts of loss can be reasonably estimated, the Company estimates and discloses the possible loss or range of loss to the extent necessary to make the financial statements not misleading. If the loss is not probable or cannot be reasonably estimated, a liability is not recorded in the Company's financial statements. The Company currently has no legal proceedings ongoing that management estimates could have a material effect on the Company's financial statements.

9. Capital Structure

Common Stock

As of December 31, 2021, the Company was authorized to issue 125,000,000 shares of common stock at $0.0001 par value per share.

Follow-on Offerings

On March 22, 2021, the Company completed an underwritten public offering of 11,500,000 shares of its common stock, including shares sold pursuant to the fully exercised overallotment option granted to the underwriters in connection with the offering, at a public offering price of $5.00 per share, resulting in net proceeds to the Company of approximately $53.8 million after underwriting discounts and commissions and offering expenses payable by the Company.

On May 27, 2020, the Company completed an underwritten public offering of 11,797,752 shares of its common stock and warrants to purchase an additional 8,848,314 shares of its common stock at an exercise price of $4.90 per share. The public offering price was $4.45 for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock, resulting in net proceeds to the Company of approximately $48.9 million after underwriting discounts and commissions and offering expenses payable by the Company. The Company completed a concurrent private placement to Pfizer of 674,156 shares of common stock and an accompanying warrant to purchase an additional 505,617 shares of its common stock at an exercise price of $4.90 per share at a price of $4.45 for one share of common stock and an accompanying warrant to purchase 0.75 shares of common stock, resulting in net proceeds to the Company of approximately $3.0 million. Warrants to purchase 22,560 and 5,850 shares of common stock were exercised during the years ended December 31, 2021 and 2020, respectively.

On December 18, 2019, the Company completed an underwritten public offering of 2,565,000 shares of its common stock resulting in gross proceeds to the Company of approximately $10.0 million. On December 12, 2019, the Company completed an underwritten public offering of 3,715,000 shares of its common stock and a concurrent private placement of 1,111,111 shares of common stock to Pfizer Inc. resulting in total gross proceeds to the Company of approximately $13.0 million. The combined net proceeds of both public offerings together with the private placement was $21.3 million after underwriting discounts and commissions and offering expenses payable by the Company.

The Company issued warrants in its 2020, 2017 and 2016 offerings of securities. These warrants contain a fundamental transaction provision that obligates the Company to cash settle the warrants under a limited set of conditions not entirely within the Company's control. Due to this conditional obligation, the Company determined that the 2020 Warrants, the 2017 Warrants and the 2016 Warrants should be classified as liabilities in the Company's consolidated balance sheet. At issuance, the Company determined the fair value of the 2020 Warrants, the 2017 Warrants and 2016 Warrants to be $31.4 million, $12.4 million and $18.6 million, respectively, and reclassified these balances from stockholders' equity to warrant liability. The fair value of these warrants is re-measured at each reporting period and changes in fair value are recognized in the consolidated statement of operations (see Note 4, "Fair Value Measurements"). Additionally, the Company allocated approximately $2.2 million, $0.9 million and $1.6 million of issuance costs to the 2020 Warrants, the 2017 Warrants and 2016 Warrants, respectively, based on the proportion of the proceeds allocated to the fair value of the warrants. The allocated issuance costs were expensed as other expense in the Company's consolidated statement of operations. On July 27, 2021, the 2016 Warrants expired in accordance with their terms and are no longer exercisable.

The Pfizer Warrant does not contain the same fundamental transaction provision that obligates the Company to cash settle the warrants under a limited set of conditions not entirely within the Company's control. Therefore, the Company determined that the Pfizer Warrant should be classified as equity in the Company's consolidated balance sheet.

Voting

The holders of shares of common stock are entitled to one vote for each share of common stock held at all meetings of stockholders and written actions in lieu of meetings.

Dividends

The holders of shares of common stock are entitled to receive dividends, if and when declared by the board of directors. As of December 31, 2021, no dividends have been declared or paid on the Company's common stock since inception.

Reserved for Future Issuance

The Company has reserved for future issuance the following number of shares of common stock As of December 31, 2021 and 2020:

	December 31,	
	2021	2020
Outstanding options to purchase common stock	2,899,694	1,853,841
Outstanding warrants to purchase common stock	10,926,594	12,350,293
For future issuance under the 2014 Omnibus Incentive Plan	77,631	41,079
For future issuance under the 2021 Employment Inducement Plan	1,000,000	—
	14,903,919	**14,245,213**

10. Stock Warrants

As of December 31, 2021 and 2020, the Company had warrants outstanding to purchase the underlying number of shares of common stock as shown in the table below.

	December 31,	
	2021	2020
2020 Warrants	8,819,904	8,842,464
2017 Warrants	1,599,645	1,599,645
2016 Warrants	—	1,400,000
Pfizer Warrant	505,617	505,617
Other warrants (1)	1,428	2,567
Warrants to purchase common stock	10,926,594	12,350,293
Weighted-average exercise price per share	$ 6.47	$ 9.14

(1) Other warrants are comprised of warrants issued prior to the Company's IPO, generally in exchange for services rendered to the Company.

The following table summarizes information regarding the Company's warrants outstanding and the corresponding exercise price at December 31, 2021:

Exercise Prices	Shares Underlying Outstanding Warrants	Expiration Date
≤ $10.00	9,325,521	May 27, 2023
> $10.00 ≤ $20.00	1,599,645	July 25, 2022
> $20.00	1,428	January 5, 2022
	10,926,594	

11. Stock Option and Incentive Plans

Amended and Restated 2008 Equity Incentive Plan

In July 2008, the Company adopted the 2008 Equity Incentive Plan (the "Plan"). On February 26, 2013, the board of directors approved an amended and restated plan (the "Amended Plan") under which the number of shares of common stock available for issuance was 157,143. For new awards, the period that vested awards

would remain exercisable upon termination of service was reduced fromten years to two years. The board of directors also increased the number of shares of common stock available under the Company's Amended Plan on February 24, 2014 and April 29, 2014 to 185,714 and 235,714, respectively. As of the closing of the Company's IPO, there were no further grants made under the Amended Plan.

2014 Omnibus Incentive Plan

In April 2014, the Company's board of directors adopted the 2014 Omnibus Incentive Plan (the "2014 Plan"). The 2014 Plan was approved by the Company's shareholders on July 3, 2014. The 2014 Plan allows for the granting of incentive and non-qualified stock options, restricted stock and stock unit awards, stock appreciation rights and other performance-based awards to the Company's employees, members of the board of directors and consultants of the Company. On July 28, 2014, the effective date of the 2014 Plan, the number of shares of common stock reserved pursuant to the 2014 Plan was 57,143. The 2014 Plan provides for an annual increase, to be added on the first day of each fiscal year, beginning with the fiscal year ending December 31, 2015 and ending on January 1, 2024, equal to the lesser of (i) 4% of the outstanding shares of common stock on December 31 immediately preceding such date or (ii) a lesser amount determined by the Company's board of directors. Consistent with the provision for an annual increase, an additional 2,695,373 shares of common stock have been reserved under the 2014 Plan as of December 31, 2021.

2021 Employment Inducement Omnibus Incentive Plan

In September 2021, the Company's board of directors adopted the 2021 Employment Inducement Omnibus Incentive Plan (the "2021 Plan"), under which the number of shares of common stock reserved for issuance was 1,000,000. The 2021 Plan allows for the granting of non-qualified stock options, restricted stock and stock unit awards, stock appreciation rights and other performance-based awards only to newly hired employees of the Company.

The Company recognizes compensation expense for stock-based compensation based on the fair value of the underlying instrument. The fair value of each stock option grant is estimated on the date of grant using the Black-Scholes option-pricing model. Stock option activity for the year ended December 31, 2021, is summarized as follows:

	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Options outstanding at December 31, 2020	1,853,841	$ 14.33		
Granted	1,227,500	$ 4.31		
Exercised	—	—		
Expired	(109,115)	$ 45.57		
Forfeited	(72,532)	$ 5.86		
Options outstanding at December 31, 2021	2,899,694	$ 9.12	7.85	$ —
Vested and exercisable at December 31, 2021	1,476,281	$ 12.65	6.86	$ —

The fair value of each option grant is estimated on the date of the grant using the Black-Scholes option-pricing model. The weighted average grant date fair value of options granted during the years ended December 31, 2021, 2020 and 2019 was $4.31, $9.67 and $4.30, respectively. Total compensation expense recognized amounted to $3.2 million, $2.6 million and $1.4 million for the years ended December 31, 2021, 2020 and 2019, respectively. As of December 31, 2021, the total remaining unrecognized compensation cost related to unvested stock options was approximately $5.7 million which will be recognized over a weighted average period of approximately 2.38 years.

The following weighted average assumptions were used to compute the fair value of stock option grants:

	Year Ended December 31,		
	2021	2020	2019
Risk free interest rate	0.83%	1.14%	2.35%
Expected dividend yield	—	—	—
Expected term (in years)	5.99	6.03	6.06
Expected volatility	94.5%	94.6%	89.7%

Expected volatility—The Company estimated the expected volatility based on the Company's historical volatility data.

Expected term—The Company based expected term on the midpoint of the vesting period and the contractual term of each respective option grant.

Risk-free interest rate—The Company estimated the risk-free interest rate in reference to yield on U.S. Treasury securities with a maturity date commensurate with the expected term of the associated award.

Expected dividend yield—The Company estimated the expected dividend yield based on consideration of its historical dividend experience and future dividend expectations. The Company has not historically declared or paid dividends to common stockholders. Moreover, it does not intend to pay dividends in the future, but instead expects to retain any earnings to invest in its continued growth.

12. 401k Savings Plan

In 2010, the Company established a defined-contribution savings plan under Section 401(k) of the Internal Revenue Code (the 401(k) Plan). The 401(k) Plan covers all employees who meet defined minimum age and service requirements and allows participants to defer a portion of their annual compensation on a pre-tax basis. During 2015, the Company established an employer matching program for participants in the 401(k) Plan. The Company incurred approximately $0.2 million, $0.1 million and $0.1 million of expense for matching contributions to the 401(k) Plan during the years ended December 31, 2021, 2020 and 2019, respectively.

13. Income Taxes

The Company has available approximately $275.5 million and $293.9 million of unused operating loss carryforwards for federal and state tax purposes, respectively, that may be applied against future taxable income. The NOL carryforwards will begin to expire in the year 2028 and research and development (R&D) credits will begin to expire in 2031 if not utilized prior to that date. The Company has evaluated the positive and negative evidence bearing upon the realizability of its net deferred tax assets. Based on the Company's history of operating losses since inception, the Company has concluded that it is more likely than not that the benefit of its deferred tax assets will not be realized. Accordingly, no provision for a deferred tax asset has been made for the tax benefits of the net operating loss carryforwards as the entire amount is offset by a valuation allowance. The valuation allowance increased by approximately $12.8 million and $10.7 million during the years 2021 and 2020, respectively, and was approximately $85.6 million and $72.8 million at December 31, 2021 and 2020, respectively.

The Internal Revenue Code of 1986, as amended (the "Code") provides for a limitation of the annual use of net operating losses and other tax attributes (such as research and development tax credit carryforwards) following certain ownership changes (as defined by the Code) that could limit the Company's ability to utilize these carryforwards. At this time, the Company has not completed a study to assess whether an ownership change under Section 382 of the Code has occurred, or whether there have been multiple ownership changes since the Company's formation, due to the costs and complexities associated with such a study. The Company may have experienced various ownership changes, as defined by the Code, as a result of past financing transactions.

Accordingly, the Company's ability to utilize the aforementioned carryforwards may be limited. Additionally, U.S. tax laws limit the time during which these carryforwards may be applied against future taxes. Therefore, the Company may not be able to take full advantage of these carryforwards for federal or state income tax purposes.

The Company's reserves related to taxes are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filings or positions is more likely than not to be realized following resolution of any potential contingencies present related to the tax benefit. For the three years ended December 31, 2021, the Company had no unrecognized tax benefits or related interest and penalties accrued. The Company has not, as yet, conducted a study of R&D credit carryforwards. This study may result in an adjustment to the Company's R&D credit carryforwards; however, until a study is completed and any adjustment is known, no amounts are being presented as an uncertain tax position. A full valuation allowance has been provided against the Company's R&D credits and, if an adjustment is required, this adjustment would be offset by an adjustment to the valuation allowance. Thus, there would be no impact to the consolidated balance sheet or statement of operations if an adjustment were required. The Company would recognize both accrued interest and penalties related to unrecognized benefits in income tax expense. The Company's uncertain tax positions are related to years that remain subject to examination by relevant tax authorities. Since the Company is in a loss carryforward position, the Company is generally subject to examination by the U.S. federal, state and local income tax authorities for all tax years in which a loss carryforward is available.

The principal components of the Company's deferred tax assets and liabilities are as follows (in thousands):

	December 31,	
	2021	2020
Deferred tax assets:		
Net operating loss carryovers	$ 77,431	$ 65,990
Stock-based compensation	2,457	2,265
R&D tax credits	5,031	3,833
Accrued compensation and severance	563	587
Lease liability	911	1,013
Intangible assets	88	99
Total deferred tax assets	$ 86,481	$ 73,787
Valuation allowance	(85,613)	(72,803)
Total deferred tax assets net of valuation allowance	$ 868	$ 984
Deferred tax liabilities:		
Right-of-use asset	(746)	(833)
Depreciation	(122)	(151)
Total deferred tax liabilities	$ (868)	$ (984)
Net deferred tax asset (liability)	$ —	$ —

A reconciliation of the statutory U.S. Federal rate to the company's effective tax rate is as follows:

	Year Ended December 31,		
	2021	2020	2019
Federal income tax benefit at statutory rate	(21.00)%	(21.00)%	(21.00)%
State income tax, net of federal benefit	(14.41)	(9.09)	(15.09)
Permanent items including change in fair value of warrants	(26.27)	(5.35)	(21.87)
Change in valuation allowance	63.08	37.88	62.56
R&D tax credits	(5.89)	(2.43)	(4.72)
Other	4.49	(0.01)	0.12
Effective income tax (benefit) expense rate	0%	0%	0%

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SIGNATURES

Pursuant to the requirements of 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.

CONTRAFECT CORPORATION

Date: March 24, 2022

By: /s/ Roger J. Pomerantz, M.D., F.A.C.P.
Roger J. Pomerantz, M.D., F.A.C.P.
President and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Roger J. Pomerantz, M.D., F.A.C.P. Roger J. Pomerantz, M.D., F.A.C.P.	President and Chief Executive Officer, Chairman of the Board *(Principal Executive Officer)*	March 24, 2022
/s/ Michael Messinger Michael Messinger	Chief Financial Officer *(Principal Financial Officer and Principal Accounting Officer)*	March 24, 2022
/s/ Sol J. Barer, Ph.D. Sol J. Barer, Ph.D.	Lead Independent Director	March 24, 2022
/s/ Steven C. Gilman, Ph.D. Steven C. Gilman, Ph.D.	Vice Chairman of the Board	March 24, 2022
/s/ Lishan Aklog, M.D. Lishan Aklog, M.D.	Director	March 24, 2022
/s/ Jane F. Barlow, M.D., M.P.H., M.B.A. Jane F. Barlow, M.D., M.P.H., M.B.A.	Director	March 24, 2022
/s/ David N. Low, Jr. David N. Low, Jr.	Director	March 24, 2022
/s/ Michael J. Otto, Ph.D. Michael J. Otto, Ph.D.	Director	March 24, 2022
/s/ Cary W. Sucoff Cary W. Sucoff	Director	March 24, 2022

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statements (Form S-3 Nos. 333-246359 and 333-261543) of ContraFect Corporation,

(2) Registration Statement (Form S-8 No. 333-199046) pertaining to the Amended and Restated 2008 Equity Incentive Plan and 2014 Omnibus Incentive Plan of ContraFect Corporation,

(3) Registration Statements (Form S-8 Nos. 333-217943, 333-224834, 333-231439, 333-246340, and 333-256569) pertaining to the 2014 Omnibus Incentive Plan of ContraFect Corporation, and

(4) Registration Statement (Form S-8 No. 333-261236) pertaining to the 2021 Employment Inducement Omnibus Incentive Plan of ContraFect Corporation;

of our report dated March 24, 2022, with respect to the consolidated financial statements of ContraFect Corporation included in this Annual Report (Form 10-K) for the year ended December 31, 2021.

/s/ Ernst & Young LLP

Hartford, Connecticut
March 24, 2022

Exhibit 31.1

CERTIFICATION

I, Roger J. Pomerantz, M.D., F.A.C.P., certify that:

1. I have reviewed this Annual Report on Form 10-K of ContraFect Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 24, 2022

/s/ Roger J. Pomerantz, M.D., F.A.C.P.
Roger J. Pomerantz, M.D., F.A.C.P.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Michael Messinger, certify that:

1. I have reviewed this Annual Report on Form 10-K of ContraFect Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 24, 2022

/s/ Michael Messinger
Michael Messinger
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with this Annual Report on Form 10-K of ContraFect Corporation (the "Company") for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Roger J. Pomerantz, M.D., F.A.C.P., President and Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that, to his knowledge on the date hereof:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 24, 2022

/s/ Roger J. Pomerantz, M.D., F.A.C.P.
Roger J. Pomerantz, M.D., F.A.C.P.
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with this Annual Report on Form 10-K of ContraFect Corporation (the "Company") for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Michael Messinger, Chief Financial Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that, to his knowledge on the date hereof:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 24, 2022

/s/ Michael Messinger
Michael Messinger
Chief Financial Officer
(Principal Financial Officer)