

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

FORM 10-K

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

For the fiscal year ended December 31, 2022

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

Commission File Number: 001-33004



ACER THERAPEUTICS INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

32-0426967
(IRS Employer
Identification No.)

One Gateway Center, Suite 356, 300 Washington Street, Newton,
MA
(Address of Principal Executive Offices)

02458
(Zip Code)

Registrant's Telephone Number, Including Area Code: (844) 902-6100

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

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common Stock, \$0.0001 par value per share	ACER	The Nasdaq Stock Market LLC

Securities registered pursuant to Section 12(g) of the Act: None

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

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.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 30, 2022, based upon the closing price as of such date was \$19,747,717.

As of March 24, 2023, 23,421,534 shares of the registrant's common stock, par value \$0.0001 per share, were outstanding.

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Unless otherwise indicated, references in this report to “Acer,” the “Company,” “we,” “us” and “our” refer to the business of Acer Therapeutics Inc. “ACER THERAPEUTICS,” “OLPRUVA,” “EDSIVO” and their related logos are trademarks or registered trademarks of Acer Therapeutics Inc. We do not intend our use or display of other

companies' trade names, trademarks or service marks to imply relationships with, or endorsements or sponsorship of us by, these other companies.

Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements which are made pursuant to the safe harbor provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Statements contained in this report, other than statements of historical fact, constitute “forward-looking statements.” The words “expects,” “believes,” “hopes,” “anticipates,” “estimates,” “may,” “could,” “intends,” “exploring,” “evaluating,” “progressing,” “proceeding,” and similar expressions are intended to identify forward-looking statements.

These forward-looking statements do not constitute guarantees of future performance. Investors are cautioned that statements which are not strictly historical statements, including, without limitation, statements regarding revenue, expenses and other financial metrics, including expectations and trends related thereto, current or future financial payments, costs, returns, royalties, performance and position, plans and objectives for future operations, plans and objectives for product development, plans and objectives for present and future clinical trials and results of such trials, plans and objectives for regulatory approval, litigation, intellectual property, information about our product OLPRUVA™ (sodium phenylbutyrate) for oral suspension, including statements about its development and future lifecycle opportunities, manufacturing plans and performance, management’s initiatives and strategies, our ability to meet Nasdaq’s continued listing standards, and the development of our product candidates and our expectations related thereto, including EDSIVO™ (celiprolol), ACER-801 (osanetant), and ACER-2820 (emetine), constitute forward-looking statements. Such forward-looking statements are subject to a number of risks and uncertainties that could affect our ability to successfully implement our business strategy and cause actual results to differ materially from those anticipated.

You should carefully consider all of the information in this report and, in particular, the following principal risks and all of the other specific factors further discussed in Item 1A of this report, “Risk Factors,” before deciding whether to invest in our company:

Summary Risk Factors

- We currently believe that our existing cash and cash equivalents at December 31, 2022, together with the subsequent proceeds from a second term loan which is part of the SWK Loans (defined below) which closed on January 31, 2023, the subsequent proceeds from our ATM facility (defined below) and the subsequent proceeds from a sale of securities (including pursuant to a registered direct offering of shares of our common stock and pre-funded warrants) which closed on March 24, 2023 (see Note 12 to our financial statements) (the “March 2023 Offering”), will be sufficient to fund our anticipated operating and capital requirements into the middle of the second quarter of 2023. We will require additional financing to commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as to complete development and seek to obtain marketing approval of our other product candidates and, if approved, to commercialize our other product candidates. A failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product development, other operations or commercialization efforts, or to suspend or restructure our business.
- Substantial doubt exists as to our ability to continue as a going concern. Unless we are able to raise additional capital within the second quarter of 2023 to continue to finance our operations, our long-term business plan may not be accomplished, and we may be forced to cease, restructure, reduce, or delay operations. Our efforts to raise additional funds could be affected by negative conditions in the capital markets, which in recent months have been especially challenging, and there are numerous companies in the pharmaceutical and biotech sectors seeking additional capital from many of the same sources, which may also limit the amount of capital, if any, available to us. The recent turmoil in the banking sector initiated by the failure of Silicon Valley Bank (“SVB”) has added to the volatility in that sector. While we have no direct relationship or business with SVB, this situation has added to the difficulties in raising capital on a timely basis and on favorable terms.
- The requirements (i) that we repay in cash the outstanding principal balance and accrued interest on our senior secured term loan facility (the “SWK Loans”), in a principal amount of \$13.9 million plus interest and fees (including a repayment premium of up to 50% of such principal amount) with the lenders party

thereto and SWK Funding LLC (“SWK”) as the agent, (ii) that the principal amount of the SWK Loans will amortize at a monthly rate of \$0.6 million starting April 15, 2023, until we have issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net proceeds from the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly, (iii) that we maintain for purposes of the SWK Loans unencumbered liquid assets of not less than the lesser of (a) the outstanding principal amount of the SWK Loans or (b) \$3.0 million, (iv) with respect to the secured convertible notes issued to MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. (“Marathon”) in an aggregate principal amount of \$6.0 million (the “Marathon Convertible Notes”), that we repurchase the Marathon Convertible Notes for \$12.0 million plus accrued interest if prior to April 15, 2023, with such repurchase price increasing by \$1.5 million (or a prorated amount) for each 90-day period (or portion) thereafter, and (v) that we abide by certain additional operating and financial covenants and restrictions on our operating and financial flexibility under the SWK Loans and the Marathon Convertible Notes, all of which could materially adversely affect our business plans, liquidity, financial condition, results of operations and viability, and prevent us from taking actions that we would otherwise consider to be in our best interests.

- Although we have obtained approval of the United States Food and Drug Administration the (“FDA”), for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and even if required regulatory approvals are obtained for OLPRUVA™ in other territories or for one or more of our other product candidates in the U.S. or other territories, commercial success of OLPRUVA™ and such other product candidates will depend on a variety of factors. These factors include, but are not limited to, market awareness and acceptance of OLPRUVA™ and, if applicable, our other product candidates, the availability of adequate capital and personnel for commercialization efforts, and the performance of third parties such as manufacturers and collaborators, including Relief Therapeutics Holding AG (“Relief”).
- The marketing approval processes of the FDA and comparable foreign authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain marketing approval for our product candidates in addition to OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, our business will be substantially harmed.
- We have a Collaboration and License Agreement with Relief for the development and commercialization of OLPRUVA™ (the “Collaboration Agreement”), pursuant to which we retain development and commercialization rights in the U.S., Canada, Brazil, Turkey, and Japan, and we split net profits from such territories 60%:40% in favor of Relief. In addition, Relief licenses rights for the rest of the world and we will receive a 15% royalty on net sales in Relief’s licensed territories. The Collaboration Agreement may impact our ability to generate revenues and achieve or sustain profitability. In addition, we are required to provide assistance to Relief in the performance of its contractual obligations under the Collaboration Agreement, which may distract us from achieving our objectives.
- We have identified a material weakness in our internal control over financial reporting that resulted in a restatement of our unaudited condensed interim financial statements for the three and six months ended June 30, 2022. This material weakness, if not remediated, could adversely affect our ability to report our results of operations and financial condition accurately and in a timely manner.
- Funding from our at-the-market (“ATM”) facility with JonesTrading Institutional Services LLC (“Jones Trading”) may be limited or may be insufficient to fund our operations or implement our strategy, especially in light of our suspension of the ATM facility in connection with the March 2023 Offering and a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023.
- We currently have no commercial product sales revenue and may never be profitable.
- Clinical drug development involves a lengthy and expensive process with an uncertain outcome, particularly for product candidates for rare diseases. Our ability to successfully design and complete clinical trials is uncertain.

- Our product candidates may cause undesirable adverse effects or have other properties that could delay or prevent their marketing approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if obtained.
- We face substantial competition, which may result in others discovering, developing or commercializing products for our targeted indications before, or more successfully, than we do.
- We rely on third-party suppliers and other third parties for manufacture of our product candidates and our dependence on these third parties may impair or delay the advancement of our research and development programs and the development of our product candidates.
- We plan to rely on third parties to conduct clinical trials for our product candidates. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, it may cause delays in commencing and completing clinical trials of our product candidates or we may be unable to obtain marketing approval for or commercialize our product candidates.
- Our proprietary rights may not adequately protect our technologies and product candidates.
- We are a party to license or similar agreements under which we license intellectual property, data, and/or receive commercialization rights. If we fail to comply with obligations in such agreements or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business; any termination of such agreements would adversely affect our business.
- On November 29, 2022, we were notified by the Listing Qualifications Department (the “Staff”) of the Nasdaq Stock Market LLC (“Nasdaq”) that, based upon our continued non-compliance with Nasdaq Listing Rule 5550(b)(2), which requires maintenance of a minimum market value of listed securities of \$35 million, our shares of common stock were subject to delisting. However, on December 23, 2022, we were notified by the Staff that we had regained compliance. If we are unable to regain and maintain compliance with the continued listing requirements of the Nasdaq Capital Market, our common stock could be delisted, which could affect our common stock’s market price and liquidity and reduce our ability to raise capital.
- Future sales of our common stock or the issuance of additional debt, convertible debt or other equity securities, with debt and convertible debt securities being senior to our common stock and with other equity securities potentially being senior to our common stock with respect to any future distributions, could cause dilution or otherwise adversely affect the priority and thus the value or price of our stock.

PART I




Item 1. Business.

Overview

We are a pharmaceutical company focused on the acquisition, development, and commercialization of therapies for serious rare and life-threatening diseases with significant unmet medical needs. We identify and develop treatments where science can be applied in new ways for use in diseases with high unmet need.

In the U.S., OLPRUVA™ (sodium phenylbutyrate) for oral suspension was recently approved for the treatment of urea cycle disorders (“UCDs”) involving deficiencies of carbamylphosphate synthetase (“CPS”), ornithine transcarbamylase (“OTC”), or argininosuccinic acid synthetase (“AS”).¹ We are also advancing a pipeline of investigational product candidates, including EDSIVO™ (celiprolol) for the treatment of vascular Ehlers-Danlos syndrome (“vEDS”) patients with a confirmed type III collagen (COL3A1) mutation, and ACER-801 (osanetant) for the treatment of vasomotor symptoms (“VMS”), post-traumatic stress disorder (“PTSD”), and prostate cancer, although the ACER-801 programs have all been paused due to top-line results announced in March 2023 from a Phase 2a proof of concept clinical trial to evaluate ACER-801 in VMS. We also intend to explore additional lifecycle opportunities for OLPRUVA™ (sodium phenylbutyrate) in various disorders where proof of concept data exists, subject to additional capital.

Our current product pipeline is summarized in the chart below:

Program	Indication	Phase 1	Phase 2	Phase 3	Approved	Expected Milestones	
 OLPRUVA™ (sodium phenylbutyrate) for oral suspension	Urea Cycle Disorders ¹						Approved in US; drug in channel anticipated July 2023⁵
 EDSIVO™ (celiprolol)	Vascular Ehlers-Danlos Syndrome (COL3A1+)						Q4 2023: Full trial enrollment²
 ACER-801 (osanetant)	Menopausal-related Vasomotor Symptoms						Q1 2023: Topline P2a VMS data announced; program paused
	Prostate Cancer						Q1 2023: POSH & PORT trials initiated³; program paused
	Acute Stress/PTSD						Program paused

1. OLPRUVA™ (sodium phenylbutyrate) for oral suspension approved in the U.S. for the treatment of certain patients living with UCDs involving deficiencies of CPS, OTC, or AS

\$ Subject to additional capital

2. University of Kansas investigator-sponsored trial
3. University of North Carolina investigator-sponsored trial

- OLPRUVA™ (sodium phenylbutyrate) for oral suspension
 - o Announced in October 2022 that the U.S. Patent and Trademark Office (“USPTO”) has issued a Notice of Allowance to Acer for U.S. patent application No. 16/624,834 for claims related to a kit comprising a combination therapeutic product composed of sodium phenylbutyrate or glycerol phenylbutyrate and sodium benzoate

- o Announced in December 2022 that the U.S. Food and Drug Administration (“FDA”) approved OLPRUVA™ (sodium phenylbutyrate) for oral suspension in the U.S. OLPRUVA™ is a prescription medicine used along with certain therapy, including changes in diet, for the long-term management of adults and children weighing 44 pounds (20 kg) or greater and with a body surface area (BSA) of 1.2 m² or greater, with UCDs, involving deficiencies of CPS, OTC or AS. OLPRUVA™ is not used to treat rapid increase of ammonia in the blood (acute hyperammonemia), which can be life-threatening and requires emergency medical treatment.¹ More information is available at www.OLPRUVA.com
- o In March 2023, we announced an update on our OLPRUVA™ U.S. commercial launch activities, including our intention to add commercial and medical affairs resources, the introduction of OLPRUVA™ Navigator by Acer Therapeutics patient support service, a price commitment, and anticipated drug availability by early July 2023
- o In March 2023, we announced results from a survey designed to quantify preferences of healthcare providers for Urea Cycle Disorders (UCDs) presented at the Society for Inherited Metabolic Disorders (“SIMD”) Annual Meeting. The authors concluded that optimizing nitrogen-binding medications for UCD treatment to facilitate and encourage increased patient adherence through masking taste/odor and/or enhancing other aspects of the patient experience may support improved outcomes in UCDs
- EDSIVO™ (celiprolol)
 - o Announced in October 2022 that the USPTO issued a Notice of Allowance for our patent application No. 16/930,208 and subsequently issued on December 13, 2022, as US Patent #11,523,997, for claims related to certain methods of treating vascular Ehlers-Danlos syndrome (vEDS) with celiprolol. The issued claims in the patent titled, “Method of Providing Celiprolol Therapy to a Patient,” include the dosing regimen in our ongoing Phase 3 DiSCOVER (Decentralized Study of Celiprolol on vEDS-related Event Reduction) clinical trial of EDSIVO™ (celiprolol) for the treatment of patients with COL3A1-positive vEDS
- ACER-801 (osanetant)
 - o Announced in March 2023 that topline results from our Phase 2a proof of concept clinical trial to evaluate ACER-801 (osanetant) as a potential treatment for moderate to severe Vasomotor Symptoms (VMS) associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability, when compared to placebo, to decrease the frequency or severity of hot flashes in postmenopausal women. As a result, we are pausing the ACER-801 program until we have conducted a thorough review of the full data set

Our Strategy

Our goal is to become a leading pharmaceutical company that acquires, develops and commercializes therapies for the treatment of serious rare and life-threatening diseases with significant unmet medical needs. The key elements of our strategy include:

- focus on serious rare and life-threatening diseases with significant unmet needs
- accelerate development timelines and lower costs, while reducing risk
- provide differentiated products that create value
- protect our assets via intellectual property protections and regulatory and market exclusivities
- commercialize our products in geographies that make strategic sense
- seek partners to accelerate development and commercialization

We plan to continue evaluating external opportunities to acquire or license product candidates in order to enhance our pipeline and leverage our business development, clinical development, regulatory and commercial expertise. We believe our management team has the capability and experience to continue to execute this business model.

Our Approved Product

OLPRUVA™ (sodium phenylbutyrate) for Oral Suspension



In December 2022, we and our collaboration partner, RELIEF THERAPEUTICS Holding SA (“Relief”), announced that the FDA has approved OLPRUVA™ (sodium phenylbutyrate) for oral suspension in the U.S. OLPRUVA™ is a prescription medicine used along with certain therapy, including changes in diet, for the long-term management of adults and children weighing 44 pounds (20 kg) or greater and with a body surface

area (“BSA”) of 1.2 m² or greater, with UCIDs, involving deficiencies of CPS, OTC or AS. OLPRUVA™ is not used to treat rapid increase of ammonia in the blood (acute hyperammonemia), which can be life-threatening and requires emergency medical treatment.¹

OLPRUVA™ is a proprietary and novel formulation of sodium phenylbutyrate powder, packaged for the first time in single-dose envelopes, that has shown bioequivalence to existing sodium phenylbutyrate powder but with a pH-sensitive polymer coating that is designed to minimize dissolution of the coating for up to five minutes after preparation.²

UCIDs are a group of rare, genetic disorders that can cause harmful ammonia to build up in the blood, potentially resulting in brain damage and neurocognitive impairments, if ammonia levels are not controlled.³ Any increase in ammonia over time is serious. Therefore, it is important to adhere to any dietary protein restrictions and have alternative medication options to help control ammonia levels.

OLPRUVA™ received FDA approval under section 505(b)(2) of the Federal Food, Drug and Cosmetic Act (FDCA), a regulatory pathway that allows applicants to rely, at least in part, on third party data for approval. In our New Drug Application (“NDA”), we cited preclinical and clinical safety and efficacy data from the reference listed drug (“RLD”), BUPHENYL® powder, which is approved as adjunctive therapy in the chronic management of patients with UCIDs involving deficiencies of CPS, OTC or AS. In our NDA, we also provided additional data including studies that evaluated the bioavailability and bioequivalence of OLPRUVA™ compared to BUPHENYL® powder. The data from these studies, presented at the Society for Inherited Metabolic Disorders (SIMD) Annual Meeting in April 2022 and the Genetic Metabolic Dieticians International (GMDI) Conference in May 2022, showed that OLPRUVA™ was bioequivalent to BUPHENYL® powder.^{4,5}

Under the Pediatric Research Equity Act (PREA), the FDA deferred studies of OLPRUVA™, a new dosage form of sodium phenylbutyrate, until Q4 2023. The PREA studies require development of dosage strength(s) to accommodate pediatric patients who weigh less than 20 kg and patients who weigh more than 20 kg with a body surface area of less than 1.2 m². The FDA considers that OLPRUVA™ is appropriately labeled for use in pediatric patients weighing 20 kg or more and with a BSA of 1.2 m² or more for this indication and therefore, no additional studies are needed in this pediatric population.

The FDA also required in vitro post-marketing requirement (PMR) studies to determine the feasibility of administering OLPRUVA suspension through enteral feeding tubes and to assess the potential drug interactions for sodium phenylbutyrate and its active metabolite, phenylacetate. Drug interaction studies for sodium phenylbutyrate and its active metabolite, phenylacetate, were not conducted on the 505(b)(2) reference product and are required by all recently approved new formulations of sodium phenylbutyrate.

To support the launch of OLPRUVA™ in the second quarter of 2023, subject to additional capital, we intend to continue to actively add resources to establish our commercial and medical affairs presence in the U.S. As a part of our OLPRUVA™ commercialization strategy, we have recently introduced our patient support service, OLPRUVA™ Navigator by Acer Therapeutics, that is designed to assist UCD patients with support, access, education, and patient adherence to treatment. Representatives will begin accepting prescriptions late in the second quarter of 2023. We are also actively engaged in negotiations regarding access for OLPRUVA™ with the major commercial payers and state Medicaid organizations.

In connection with the Company's ongoing support for the rare disease patient community, we have also established a pricing strategy that reflects our commitment to deliver innovative treatments that are responsibly priced and accessible to those in need. As a result, we intend to price OLPRUVA™ competitively, at a significant discount to the currently available commercial product RAVICTI®, while implementing predictable pricing that will not increase beyond the rate of inflation. We also plan to invest a portion of OLPRUVA™ revenue back into additional solutions aimed at improving outcomes for UCD patients.

Important OLPRUVA™ Safety Information

Certain medicines may increase the level of ammonia in your blood or cause serious side effects when taken during treatment with OLPRUVA™. Tell your doctor about all the medicines you or your child takes especially if you or your child takes corticosteroids, valproic acid, haloperidol, and/or probenecid.

OLPRUVA™ can cause serious side effects, including: 1) nervous system problems (neurotoxicity). Symptoms include sleepiness, tiredness, lightheadedness, vomiting, nausea, headache, confusion, 2) low potassium levels in your blood (hypokalemia) and 3) conditions related to swelling (edema). OLPRUVA™ contains salt (sodium), which can cause swelling from salt and water retention. Tell your doctor right away if you or your child get any of these symptoms. Your doctor may do certain blood tests to check for side effects during treatment with OLPRUVA™. If you have certain medical conditions such as heart, liver or kidney problems, are pregnant, planning to get pregnant or breast-feeding, your doctor will decide if OLPRUVA™ is right for you.

The most common side effects of OLPRUVA™ include absent or irregular menstrual periods, decreased appetite, body odor, bad taste or avoiding foods you ate prior to getting sick (taste aversion). These are not all of the possible side effects of OLPRUVA™. Call your doctor for medical advice about side effects. You may report side effects to the FDA at 1-800-FDA-1088.

For additional Important Safety Information, see full Prescribing Information, Patient Information and discuss with your doctor. More information is available at www.OLPRUVA.com.

Other OLPRUVA™ Investigational Lifecycle Opportunities

Subject to additional capital, we intend to explore through additional lifecycle opportunities for OLPRUVA™ (sodium phenylbutyrate) in UCD patients, as well as various disorders where proof of concept data exists, including Maple Syrup Urine Disease ("MSUD"), Pyruvate Dehydrogenase Complex Deficiency ("PCDC"), rare pediatric epilepsies, and various liver disorders.

OLPRUVA™, RAVICTI®, BUPHENYL®, and PHEBURANE® are the unregistered and registered trademarks of their respective owners.

Collaboration Agreement with Relief Therapeutics Holding AG

On January 25, 2021, we entered into an option agreement with Relief (the "Option Agreement"), pursuant to which we granted Relief an exclusive option (the "Exclusivity Option") to pursue a potential collaboration and license arrangement with us for the development, regulatory approval and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including UCDs and MSUD. The Option Agreement provided a period of time up to June 30, 2021, for the parties to perform additional due diligence and to work toward negotiation and execution of a definitive agreement with respect to the potential collaboration for OLPRUVA™. In

consideration for the grant of the Exclusivity Option, (i) we received from Relief an upfront nonrefundable payment of \$1.0 million, (ii) Relief provided to us a 12-month secured loan in the principal amount of \$4.0 million, as evidenced by a Promissory Note (the “Note”) issued by us to Relief, and (iii) we granted to Relief a security interest in all of our assets to secure performance of the Note, as evidenced by a Security Agreement (the “Security Agreement”). The Note was repayable in one lump sum within 12 months from issuance and bore interest at a rate equal to 6% per annum.

On March 19, 2021, we entered into the Collaboration Agreement with Relief (the “Collaboration Agreement”) providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. We received a \$10.0 million cash payment from Relief (i.e., a \$14.0 million “Reimbursement Payment” offset by repayment of the \$4.0 million outstanding balance of the Note, plus interest earned through the date of the Collaboration Agreement, and Relief released its security interest in all of our assets. Under the terms of the Collaboration Agreement, Relief committed to pay us up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications (the “Development Payments”). During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021, and January 14, 2022. Further, we retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where we will receive from Relief a 15% royalty on all net sales received in the Relief Territory. We could also receive a total of \$6.0 million in milestone payments based on the first European (EU) marketing approvals of OLPRUVA™ for a UCD and MSUD. There is no guarantee that OLPRUVA™ will receive regulatory authority approval in any territory outside the U.S. or become commercially available for indications still under investigation.

Our Investigational Product Candidates

EDSIVO™ (celiprolol)

EDSIVO™ is a selective adrenergic modulator (“SAM”) and, if approved for marketing by the FDA, would be a New Chemical Entity (“NCE”) in the U.S. Celiprolol is currently approved in the EU for the treatment of hypertension and angina. Ehlers-Danlos syndrome (“EDS”) is an inherited disorder caused by mutations in the genes responsible for the structure, production, or processing of collagen, an important component of the connective tissues in the human body, or proteins that interact with collagen. EDS is a spectrum disorder where patients present with various forms, the most serious of which is vascular EDS, also known as vEDS type IV, which is generally caused by a mutation in the COL3A1 gene. vEDS causes abnormal fragility in blood vessels, which can give rise to aneurysms, abnormal connections between blood vessels known as arteriovenous fistulas, arterial dissections, and spontaneous vascular ruptures, all of which can be potentially life-threatening. Gastrointestinal and uterine fragility or rupture also commonly occur in vEDS patients. Spontaneous arterial rupture has a peak incidence in the third or fourth decade of life in vEDS patients but may occur earlier and is the most common cause of sudden death in vEDS patients. Arterial rupture or dissection events occur in about 25% of patients before the age of 20 but increase to roughly 90% of patients by the age of 40. The median survival age of vEDS patients in the U.S. is 51 years, with arterial rupture being the most common cause of sudden death.⁶ Pregnancy-related complications also occur in women with vEDS and include arterial dissection or rupture, uterine rupture, hemorrhage, premature rupture of membranes, lacerations, and complications during and after surgery.

vEDS Diagnosis and Incidence

vEDS is diagnosed through clinical observation, which is usually confirmed by mutational analysis of the COL3A1 gene. In the absence of a family history of the disorder, however, most vEDS patients are not diagnosed until the occurrence of an arterial aneurysm or dissection, bowel perforation, or organ rupture. Currently, it is estimated that there are up to 7,500 COL3A1-positive vEDS patients in the U.S.⁷

Current Treatment Options for vEDS

Currently, there are no approved pharmacologic therapies anywhere in the world for vEDS. However, celiprolol, prescribed off label, has become the standard of care therapy for vEDS in Europe.⁸ Medical intervention for vEDS focuses on surgery, symptomatic treatment, genetic counseling, and prophylactic measures, such as avoiding intense physical activity, scuba diving, and violent sports. Arterial, digestive, or uterine complications in vEDS patients typically require immediate hospitalization, observation in an intensive care unit, and sometimes surgery. Pregnant women with vEDS are considered to be at risk and receive special care.

While vEDS patients are encouraged to take steps to minimize the chances of an arterial rupture or dissection, there are no pharmacologic options to reduce the likelihood of such an event, and accordingly current treatments for vEDS focus on the repair of arterial ruptures or dissection. Therefore, patients must adopt a “watch and wait” approach following any confirmed diagnosis. Unfortunately, many of these arterial events have high mortality associated with them, and thus, a pharmacologic intervention that reduces the rate of events would be clinically meaningful.

Rationale for EDSIVO™ (celiprolol) Treatment in vEDS

BBEST Trial

In October 2010, researchers at Assistance Publique—Hôpitaux de Paris, Hôpital Européen Georges Pompidou (“AP-HP”) in Paris, France, published in the *Lancet* results from its BBEST trial designed to assess the preventive effect of celiprolol for major cardiovascular events in patients with vEDS via a multicenter, prospective, randomized, open trial with blinded evaluation of clinical events.⁹

Fifty-three participants were enrolled in the BBEST trial and randomly assigned to a five-year intervention, receiving either celiprolol or no treatment with important phenotype characteristics equally balanced between the celiprolol group and the control group. Thirty-three of the 53 patients participating in the study had proven mutations in the COL3A1 gene. Of those patients with proven mutations, demographic and arterial characteristics did not differ from those of the study population as a whole. The duration of follow-up was five years or until the first qualifying cardiac or arterial event. The primary endpoint was a composite of cardiac or arterial events (rupture or dissection, fatal or not) during follow-up. Secondary endpoints were gastrointestinal or uterine rupture. The study was ended early after a consensus decision of the safety monitoring board, the methodologist of AP-HP, and the principal investigator because significant differences were recorded between the treatment group and the control group after 64 months. Mean duration of follow-up was 47 months prior to trial halt. Five of 25 patients on celiprolol a primary endpoint was recorded, compared with 14 of 28 patients in the control group. The hazard ratio (“HR”) for event-free survival, was 0.36, (95% CI 0.15—0.88; $p=0.040$), meaning that with celiprolol the risk of having a cardiac or arterial event was reduced by 64% compared to control. Combined primary and secondary endpoints affected 6 patients on celiprolol and 17 patients in the control group, (HR 0.31; 95% CI 0.14—0.71; $p=0.0097$).

As described in the figure below, in the 33 patients with COL3A1 mutations, the primary endpoint was noted in 2 of the 13 patients in the treatment group, compared with 11 of the 20 patients in the control group, (HR 0.24; 95% CI 0.08—0.71; $p=0.0406$). Combined primary and secondary endpoints were recorded in 3 of 13 patients on celiprolol and 14 of the patients in the control group, (HR 0.25; 95% CI 0.10—0.64; $p=0.0167$), correlating to a three times reduction in arterial events among treated patients compared to non-treated patients. The results in the trial did not vary significantly between those patients who had a confirmed mutation in the COL3A1 gene versus the overall 53-patient population:

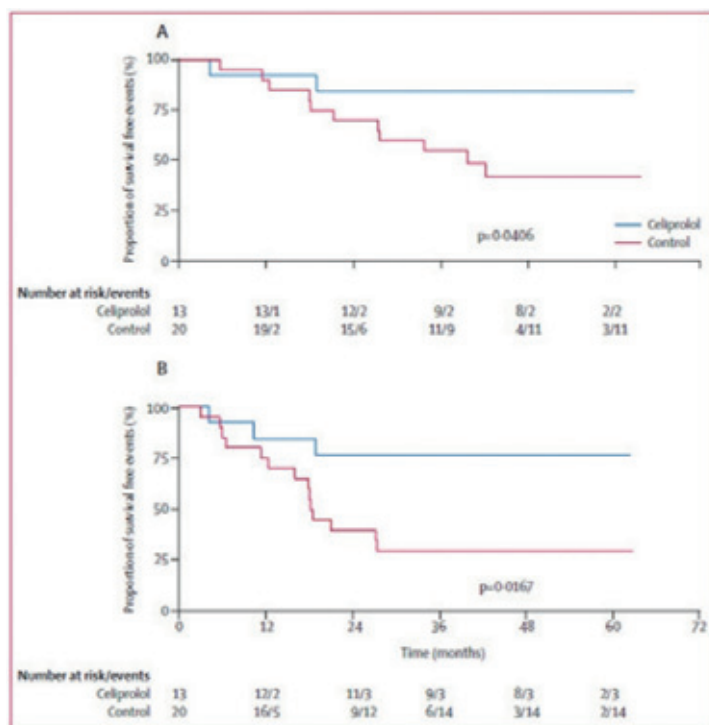


Figure 3: Kaplan-Meier curves of event-free survival in 33 patients with positive COL3A1 mutation

Primary endpoint (A). Primary and secondary endpoints (B).

AP-HP granted us an exclusive right to access and use the data generated by the BBEST trial. We have conducted a retrospective, source-verified analysis of that data, including the primary and secondary endpoints, which confirmed the published results of the BBEST trial.

Long-Term Observational Study: France

In addition to the BBEST trial, in April 2019, long-term data from a cohort of COL3A1-positive vEDS patients was published in the Journal of the American College of Cardiology (“JACC”). The publication, entitled “Vascular Ehlers-Danlos Syndrome: Long-Term Observational Study,” was authored by Michael Frank, MD, Xavier Jeunemaitre, MD, PhD, and Pierre Boutouyrie, MD, PhD, et al.¹⁰ This published study describes outcomes in 144 COL3A1-positive vEDS patients clinically monitored and treated at the French National Referral Center for Rare Vascular Diseases (Paris, France) between 2000 and 2017. Patients were followed for a median of 5.3 years, and up to 20 years. At the initial work up, 50% of patients were not treated regularly and only 33.3% were taking celiprolol; by the end of the study period, the majority (90.3%) were treated with celiprolol alone or in combination with other medications. Once the maximum tolerated dose of celiprolol was reached, 90 (62.5%) patients remained at this dose throughout their follow-up. Only five (3.5%) patients required dose reduction due to fatigue, and no serious drug-related adverse event was recorded.

Patients had a lower mortality rate than that expected from the natural history of the disease as described in previous U.S. reports. Survival curve analysis showed that those not treated with celiprolol had a significantly worse outcome than celiprolol-treated patients: survival was 80.7% (95% CI 67.8%–93.6%) in those treated with celiprolol versus 48.5% (95% CI 19.7%–77.4%) in those not treated ($p < 0.001$) after 11.1 years of follow-up. Survival was significantly higher in patients treated with a median dose of celiprolol of 400mg/day ($n=83$) vs. patients treated with a lower median dose of 217mg/d [100-300mg/day] ($n=27$), suggesting a dose effect and that 400mg/day should be considered the optimal dose. The authors also observed a relative decrease in hospitalization rates for acute arterial events during the time period in which the majority of patients were on celiprolol, suggesting a positive

effect of celiprolol on the incidence and/or severity of new arterial events. The authors concluded that in this large, long-term cohort study, vEDS patients had a higher survival rate than expected relative to the known natural history of the disease and a lower annual occurrence of arterial complications, and that celiprolol use was potentially associated with these significant improvements in clinical outcomes.

Long-Term Observational Study: Sweden

In November 2020, long-term data from COL3A1-positive vEDS patients was published in the *European Journal of Vascular and Endovascular Surgery* (“*EJVES*”), “Celiprolol treatment in patients with vascular Ehlers-Danlos Syndrome.”¹¹ This published study describes outcomes in 40 patients with COL3A1-positive vEDS that were clinically monitored and treated with celiprolol in a single center retrospective study at Uppsala University Hospital, a national referral center for vEDS patients in Sweden, between the years 2011 and 2019. Patients were followed for a median of 22 months (range 1-98 months) with a total follow up of 106 patient years. Assessments were conducted by a multidisciplinary team, including vascular surgeons, angiologists and clinical geneticists. Celiprolol was administered twice daily and titrated up by 100 mg steps to a maximum of 400 mg per day. Some patients were treated concomitantly or separately with other medications. Sixty-five percent of the patients reached the target dose of 400mg, and the medication was generally well tolerated.

The annual risk of a major vascular event was 4.7% in this study, noted as being similar to that observed in the celiprolol treatment-arm of the BBEST trial (5%) and lower than in the BBEST trial control arm (12%). Five patients suffered major vascular events, four of which were fatal. No significant predictor of vascular events was identified by the authors.

Registration Plan

Celiprolol has not been approved for any indication in the U.S. Celiprolol has been approved for the treatment of hypertension in the EU since 1984. An NDA for celiprolol for the treatment for hypertension was submitted to the FDA by Rorer (subsequently acquired by Aventis Pharma SA (“Aventis”)) in June 1987 but was withdrawn prior to FDA review and therefore never approved. We have obtained the exclusive right in North and South America from Aventis to reference the celiprolol data included in the marketing authorization dossier filed with and approved by the U.K. Medicines and Healthcare Products Regulatory Agency (“MHRA”). We have also licensed from AP-HP exclusive worldwide rights to the data from the BBEST trial.

We are developing EDSIVO™ (celiprolol), an NCE in the U.S., for the treatment of COL3A1 positive vEDS patients. Celiprolol received FDA Orphan Drug Designation for the treatment of vEDS in 2015. A Celiprolol NDA was originally submitted based on data obtained from the BBEST trial and accepted for filing in October 2018 with priority review. Following FDA review, we received a Complete Response Letter from the FDA stating that it will be necessary to conduct an adequate and well-controlled trial to determine whether celiprolol reduces the risk of clinical events in patients with vEDS. We subsequently appealed the FDA decision and while the FDA denied the appeal, it described possible paths forward for us to explore. In a Type B meeting in May 2021, we discussed with the FDA the conduct of an U.S.-based prospective, randomized, double-blind, placebo-controlled, decentralized clinical trial in patients with COL3A1 positive vEDS, and sought the FDA’s opinion on various proposed design features of the study. The official Type B meeting minutes confirmed: the acceptability of a decentralized (virtual) clinical trial design and use of an independent centralized adjudication committee; acceptability of a primary endpoint based on clinical events associated with disease outcome; agreement with modest safety data collection (based on the known safety profile of the drug^{9,10,12}); and a statistical plan that considers the rare disease classification of vEDS.

In April 2022 the FDA granted celiprolol Breakthrough Therapy designation (“BTD”) in the U.S. for the treatment of patients with COL3A1-positive vEDS. In May 2022 we reached agreement with the FDA under a Special Protocol Assessment (“SPA”) for our pivotal Phase 3 DiSCOVER (Decentralized Study of Celiprolol on vEDS-related Event Reduction) clinical trial of EDSIVO™ (celiprolol) for the treatment of patients with COL3A1-positive vEDS. In June 2022, we announced the initiation of patient screening in our Phase 3 DiSCOVER clinical trial of EDSIVO™ (celiprolol) and anticipate enrollment completion in Q4 2023. The primary objective of the DiSCOVER trial is to compare time to first occurrence of a confirmed clinical event between the celiprolol group and the placebo group among confirmed COL3A1-positive vEDS patients. The double-blind portion of the

DiSCOVER trial is intended to end if statistical significance is reached at an interim analysis which occurs at accrual of 28 vEDS-related events, estimated to occur as early as approximately 18 months after completion of full enrollment, or after accrual of 46 vEDS-related clinical events.

EDSIVO™ is an investigational drug and is not currently FDA approved for any indication. There can be no assurance that the clinical trial will be successful, or that any resubmission of an NDA will be approved.

ACER-801 (osanetant)

ACER-801 (osanetant) is an investigational non-hormonal, neurokinin 3 receptor (“NK3R”) antagonist that is being developed as a potential treatment option for patients with VMS, including menopause related VMS (“MR-VMS”) and induced VMS (“iVMS”), as well as post-traumatic stress disorder (“PTSD”), and prostate cancer. In December 2018, we entered into an exclusive license agreement with Sanofi to acquire worldwide rights to ACER-801.

In March 2023, we announced that topline results from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women. As a result, we are pausing the ACER-801 program until we have conducted a thorough review of the full data set.

MR-VMS and iVMS Background

VMS are caused by a disruption in sex hormone signaling in the brain, resulting in menopausal-like symptoms (hot flashes, night sweats, etc.) and most often occur in women during menopausal transition or in menopause (MR-VMS). VMS are causally related to decreasing estradiol concentrations, mainly in the serum and subsequently also in the temperature regulating center located in the hypothalamus. The lack of estrogen alters neurotransmitter activity, especially in the neurokinin-B, serotonergic, and noradrenergic pathways.

Menopausal transition (“MT”) begins in women between ages 45 and 55 and can last up to 10 years. During MT up to 80% of women experience MR-VMS and 64% of women with VMS experience moderate to severe symptoms. VMS leads to significant impact on patient quality of life, including sleep deprivation, lack of focus, and anxiety/depression. We believe an effective non-hormonal treatment is needed to address the needs of women with moderate to severe MR-VMS.

VMS can also be induced (“iVMS”) by anti-androgen and anti-estrogen cancer therapies and surgical procedures altering sex hormone production.^{13,14} VMS are caused by low estrogen levels leading to increased stimulatory signaling of NKB on the Kisspeptin/Neurokinin B/Dynorphin (“KNDy”) neurons in the hypothalamus. A non-hormonal treatment to manage iVMS is needed as estrogen is contraindicated for the management of VMS in patients with hormone-positive tumors, including breast and prostate tumors.

iVMS are well documented with the use of cancer therapies and certain surgical procedures. Symptoms such as hot flashes can appear immediately and be severe. Cancer therapy side effects can lead to treatment non-adherence which increases the mortality risk and/or shortens the time to recurrence. We believe a treatment for iVMS is needed to help certain cancer patients to be more likely to start and stay on critical cancer therapies.

MR VMS and iVMS Diagnosis and Incidence

Population Attribute	MR-VMS: Women during menopausal transition or in menopause w/ mod-severe hot flashes	iVMS: Women who are BRCA+ and have prophylactic bilateral oophorectomy (PBSO)	iVMS: Men with HR+ Prostate Cancer [CaP] receiving Leuprolide	iVMS: Women with HR+ Breast Cancer [CaB] receiving Tamoxifen/SERMs
Est. # of Eligible Patients w/mod-severe VMS ¹	7,000,000 (US) 20,000,000 (US/EU5/JP)	47,387 (US) 110,940 (US/EU5/JP)	74,970 (US) 177,429 (US/EU5/JP)	120,932 (US) 286,207 (US/EU5/JP)
Clinical setting	HRT was the mainstay of VMS treatment until the 2002 WHI study showed increased cardiovascular and cancer risk; leading to a precipitous drop in HRT use ¹⁷	Surgery/oophorectomy recommended between ages of 35-40 or after childbearing completion ⁴	ADT to decrease testosterone levels in high-risk localized and advanced prostate cancer ¹ Typical therapy use is 1-6 months in combination with other treatments ³	Hormone drug (SERM) used to treat and prevent hormone receptor-positive breast cancers ² Typical therapy use is 5-10 years ²
Clinical benefits of blocking hormone therapy in cancer setting	N/A	85%-95% reduction in incidence of ovarian cancer ¹¹ 53-68% reduction in breast cancer ¹²	Decreased serum testosterone to ≤50 ng/dL from week 4 through week 48 in an estimated 94% of patients ⁶	50% reduction in both invasive and non-invasive breast cancers ⁵
VMS Symptoms	80% of women during menopause transition; ¹¹ 64% experience moderate/severe ¹⁸	67% experience ¹	80% experience ³ 30-40% moderate/severe	84% experience ² 60% severe
Hormone Replacement Therapy (HRT) Use ¹⁴	Controversial; WHI publication showed HRT led to an increased risk of cancer and cardiovascular complications	Controversial; BRCA2 tend to be estrogen receptor positive	Contraindicated	Contraindicated
Unmet Needs	80-90% of women with VMS do not use HRT; majority are averse to HRT use	Nearly 60% of BRCA+ women will elect a prophylactic oophorectomy ¹³ Inducement of menopause is one of the reasons to delay or not have surgery	Concern over hot flashes make patients less likely to begin ADT and can lead to early discontinuation ¹¹	Many chose to never go on SERM therapy due to side effects Almost half discontinued by 4.5 years ¹⁵

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Rationale for Evaluation of ACER-801 Treatment for VMS

NKB/NK3R is implicated in a variety of human functions and affects the hypothalamus-pituitary-gonadal axis, which plays a critical part in the development and regulation of a number of the body’s systems, such as the reproductive and immune systems. Clinical proof of concept studies with other NK3R antagonists have shown rapid and clinically meaningful improvement in vasomotor symptoms in post-menopausal women.¹⁵

ACER-801 was originally developed by Sanofi as osanetant (SR142801) for the treatment of symptoms associated with schizophrenia. Development was discontinued in 2005. Direct human safety evidence is available from 23 completed Phase 1 and 2 studies of whom approximately 400 healthy subjects and 820 patients were treated with osanetant for schizophrenia, depression, and other indications. Data from these studies indicated no major safety concerns after single-dose and repeat-dose administration.¹⁶ ACER-801 is orally bioavailable¹⁷ and readily crosses the blood-brain barrier.¹⁸

Recent Clinical Trial Results

As noted above, in March 2023, we announced that topline results from our Phase 2a proof of concept clinical trial to evaluate ACER-801 (osanetant) as a potential treatment for moderate to severe Vasomotor Symptoms (VMS) associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women. As a result, we are pausing the ACER-801 program until we have conducted a thorough review of the full data set.

In the Phase 2a study, forty-nine postmenopausal women aged 40-65 who experienced moderate to severe hot flashes were randomized 1:1:1:1 and received either twice daily 50 mg, 100 mg, 200 mg of ACER-801 or placebo over a 14-day treatment period, followed by a 14-day safety follow-up assessment. Primary endpoints were safety and pharmacokinetics, with efficacy compared to placebo as a secondary endpoint.

Acute Stress Disorder and Post-traumatic Stress Disorder Background

Acute stress disorder ("ASD") refers to the body's immediate response to trauma, whereas post-traumatic stress disorder ("PTSD") is defined as the long-term effects of trauma. While the role of the neurokinin 3 receptor ("NK3R") pathway in the hypothalamus to manage thermoregulation is well-established in clinical trials, evaluation of osanetant in these indications would provide an opportunity to explore a different mechanism of action for the drug candidate.

In May 2021, we entered into an agreement with Emory University for an exclusive worldwide license to U.S. Patent No. 10,314,835, US Application 15/320,952, and European Patent No. EP3160469 covering certain methods of treating or preventing PTSD with osanetant.

ASD and PTSD Diagnosis and Incidence

According to the National Center for PTSD, in the U.S. about 60% of men and 50% of women experience at least one trauma in their lives leading to approximately 12 million adults in the U.S. experiencing PTSD during a given year.¹⁹ In the U.S. alone, one-third of emergency department visits are for evaluation after trauma exposures and up to 20% of people who have experienced a traumatic event will develop PTSD. In addition, within one month of a trauma, survivors show rates of ASD ranging from 6% to 33% depending on the type of trauma.^{20,21}

Rationale for ACER-801 Treatment for ASD and PTSD

Studies conducted at Emory University screened thousands of genes that were activated in the brains of mice following fear conditioning events. The top gene identified was Tac2, which is responsible for the production of the peptide, Neurokinin B (NKB), in mice. The researchers showed that the Tac2 gene, expressed by neurons specifically within the amygdala, is required for modulating fear memories, and that NKB, and its specific receptor, NK3R, are also involved in the consolidation of fear memories. By administering the potent and specific NK3R antagonist, osanetant, they were able to block fear memory consolidation shortly after exposure to a trauma, supporting development of a potential novel therapeutic approach for disorders with altered fear learning such as PTSD.²²

The Tac3 gene encodes tachykinin receptor 3 (NK3R), which belongs to the tachykinin receptor family. This family of proteins includes typical G protein-coupled receptors and belongs to the rhodopsin subfamily. NK3R functions by binding to its high-affinity ligand, neurokinin B ("NKB"), which is encoded by the Tac3 (human) gene. The role of NKB-NK3R in growth and reproduction has been extensively studied, but NKB-NK3R is also widely expressed in the nervous system from the spinal cord to the brain and is involved in both physiological and pathological processes in the nervous system.²³ In animal models, Tac2 (mice) mRNA levels are rapidly up-regulated during fear consolidation 30 minutes after fear conditioning, and subsequent NKB-NK3R activation can lead to over stress sensitization and the consolidation of fear²⁴, and treatment with osanetant has been shown to

block a critical fear/stress sensitization step in the brain.^{23,25,26} An effective therapeutic to reduce acute and persistent/long-term psychological and somatic symptoms would fulfill a large unmet need.

Registration Status in ASD and PTSD

In October 2022, following our announced expansion of our ACER-801 program into ASD and PTSD, we reported that the University of North Carolina Institute for Trauma Recovery has been awarded a \$3.0 million grant from the Department of Defense to investigate the potential of ACER-801 to reduce the frequency and severity of acute stress disorder and post-traumatic stress disorder. We are pausing the ACER-801 program in all indications until we have conducted a thorough review of the full data from our Phase 2a proof of concept clinical trial to evaluate ACER-801 (osonetant) as a potential treatment for moderate to severe Vasomotor Symptoms (VMS) associated with menopause. Topline results from this trial showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability, when compared to placebo, to decrease the frequency or severity of hot flashes in postmenopausal women.

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Commercialization Strategy

We expect that the majority of UCDS, and/or vEDS patients (if EDSIVO™ is approved) would be treated at tertiary care centers, and therefore could be addressed with a targeted sales force. UCD patients are primarily managed by metabolic geneticists and dietitians, while vEDS patients would primarily be treated by vascular medicine or cardiology specialists. We intend to build our own commercial infrastructure in the U.S. to target these centers and will evaluate whether to commercialize in other geographies ourselves or with an experienced partner, such as Relief for OLPRUVA™ (sodium phenylbutyrate) for oral suspension.

Competition

The pharmaceutical industry is highly competitive. We face competition from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. Given the significant unmet medical needs for novel therapies to treat UCDS, vEDS, iVMS, PTSD, and prostate cancer, many companies, public and private universities, and research organizations are actively engaged in the discovery, research and development of product candidates to treat these conditions. As a result, there are and will likely continue to be extensive resources invested in the discovery and development of new products to treat these unmet medical needs. We anticipate facing intense and increasing competition as new products enter the market and advanced technologies become available.

Our potential competitors and the related stage of development for their product candidates in our target indications for OLPRUVA™ (sodium phenylbutyrate) for oral suspension, EDSIVO™ (celiprolol), and ACER-801 (osanetant), include the following:

- UCDS: Horizon Pharma plc / Immedica Group (Marketed); Medunik USA (Marketed)
- vEDS: Aytu BioPharma (AR101/enzastaurin development indefinitely suspended October 2022)
- iVMS: Astellas (Phase 3); Bayer (Phase 3); Veru (Phase 2); Que Oncology (Phase 2)

Many of our competitors, either alone or with strategic partners, have or will have substantially greater financial, technical, and human resources compared with us. Accordingly, our competitors may be more successful in developing or marketing products and technologies that are more effective, safer or less costly. Additionally, our

competitors may obtain regulatory approval for their products more rapidly and may achieve more widespread market acceptance. These companies also compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical study sites and patient registration for clinical studies and acquiring technologies complementary to, or necessary for, our programs. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

There are other non-pharmaceutical therapeutic approaches that are used or may be used for our targeted indications. For example, liver transplantation may be used in some cases to treat UCIDs in pediatric patients who have developed acute liver failure.

We believe that the key competitive factors that will affect the development and commercial success of our product candidates are efficacy, safety and tolerability profile, convenience in dosing, product labeling, price, product access and continuity of supply, and the availability of reimbursement.

License Agreements

Baylor College of Medicine

In April 2014, we obtained exclusive rights to patents and certain other intellectual property relating to OLPRUVA™ for the treatment of inborn errors of BCAA metabolism, including MSUD, and preclinical and clinical data, through an exclusive license agreement with BCM. Under the terms of the agreement, as amended, we have worldwide exclusive rights to develop, manufacture, use, sell and import products incorporating the licensed intellectual property. The license agreement requires us to make upfront and annual payments to BCM, reimburse certain of BCM's legal costs, make payments upon achievement of defined milestones, and pay low single-digit percent royalties on net sales of any developed product over the royalty term.

Aventis Pharma SA

In June 2016, we entered into an agreement with Aventis Pharma SA (now Sanofi) granting us the exclusive access and exclusive right to use the data included in the marketing authorization application dossier filed with and approved by the MHRA in 1986 for the treatment of mild to moderate hypertension pursuant to the UK regulatory approval procedure, for the sole purpose of allowing us to further develop, manufacture, register and commercialize celiprolol in the U.S. and Brazil for the treatment of EDS, Marfan syndrome and Loeys-Dietz syndrome. We have paid in full for the exclusive access and right to use the data. Subsequently we amended our agreement with Sanofi to provide the same rights to data access and use for potential marketing approval in all of North and South America.

Assistance Publique—Hôpitaux de Paris, Hôpital Européen Georges Pompidou (“AP-HP”)

In August 2016, we entered into an agreement with AP-HP granting us the exclusive worldwide rights to access and use data from a multicenter, prospective, randomized, open trial related to the use of celiprolol for the treatment of vEDS. We utilized this clinical data to support the initial NDA filing for EDSIVO™ for the treatment of vEDS. The agreement requires us to make certain upfront payments to AP-HP, reimburse certain of AP-HP's costs, make payments upon achievement of defined milestones, and pay low single-digit percent royalties on net sales of celiprolol over the royalty term.

In September 2018, we entered into an additional agreement with AP-HP to acquire the exclusive worldwide intellectual property rights to three European patent applications relating to certain uses of celiprolol including (i) the optimal dose of celiprolol in treating vEDS patients, (ii) the use of celiprolol during pregnancy, and (iii) the use of celiprolol to treat kyphoscoliotic Ehlers-Danlos syndrome (type VI). Pursuant to the agreement, we will reimburse AP-HP for certain costs and will pay annual maintenance fee payments. Subject to a minimum royalty amount, we will also pay royalty payments on annual net sales of celiprolol during the royalty term in the low single digit percent range, depending upon whether there is a valid claim of a licensed patent. Under the agreement, we will control and pay the costs of ongoing patent prosecution and maintenance for the licensed applications. We subsequently filed three U.S. patent applications on this subject matter in October 2018. We may choose to limit our pursuit of patent applications to specific territories, in which case AP-HP would have the right to revise our territorial license rights accordingly. For example, we have notified AP-HP we will not further pursue any patent

rights for the pregnancy and type VI use in any country.

Sanofi

In December 2018, we entered into an exclusive license agreement with Sanofi granting us worldwide rights to ACER-801 (osanetant), a clinical-stage, selective, non-peptide tachykinin NK3 receptor antagonist. The agreement requires us to make certain upfront payments to Sanofi, make payments upon achievement of defined development and sales milestones, and pay royalties on net sales of ACER-801 over the royalty term.

Relief

On January 25, 2021, we entered into the Option Agreement with Relief, pursuant to which we granted Relief the Exclusivity Option to pursue a potential collaboration and license arrangement with us for the development, regulatory approval and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including UCDs and MSUD. The Option Agreement provided a period of time up to June 30, 2021, for the parties to perform additional due diligence and to work toward negotiation and execution of a definitive agreement with respect to the potential collaboration for OLPRUVA™. In consideration for the grant of the Exclusivity Option, (i) we received from Relief an upfront nonrefundable payment of \$1.0 million, (ii) Relief provided to us a 12-month secured loan in the principal amount of \$4.0 million, as evidenced by the Note issued by us to Relief, and (iii) we granted to Relief a security interest in all of our assets to secure performance of the Note, as evidenced by the Security Agreement. The Note was repayable in one lump sum within 12 months from issuance and bore interest at a rate equal to 6% per annum.

On March 19, 2021, we entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. We received a \$10.0 million cash payment from Relief (i.e., a \$14.0 million “Reimbursement Payment,” offset by repayment of the \$4.0 million outstanding balance of the Note plus interest earned through the date of the Collaboration Agreement), and Relief released its security interest in all of our assets. Under the terms of the Collaboration Agreement, Relief committed to pay us up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications (the “Development Payments”). During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021, and January 14, 2022. Further, we retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where we will receive from Relief a 15% royalty on all net sales received in the Relief Territory. We could also receive a total of \$6.0 million in milestone payments based on the first European (EU) marketing approvals of OLPRUVA™ for a UCD and MSUD. There is no guarantee that OLPRUVA™ will receive regulatory authority approval in territories outside the U.S. or become commercially available for indications still under investigation.

Emory University

In May 2021, we entered into an agreement with Emory University to acquire the exclusive worldwide intellectual property rights to a family of patents and patent applications related to the use of neurokinin receptor antagonists in managing conditioned fear and treating anxiety disorders including post-traumatic stress disorder. We have obtained issued claims in both Europe and the United States and continue to pursue additional claim scope in both jurisdictions. Pursuant to the agreement, we reimburse Emory for certain patent prosecution costs and annual maintenance fees. Should we obtain approval for a treatment method within the scope of a valid claim of a licensed patent, we will be obligated to make royalty payments on annual net sales of osanetant either in the low single digit

percent range, or alternatively, that meet an agreed minimum royalty.

Manufacturing

We contract with third parties for the manufacture, testing, and storage of our approved product and product candidates and intend to continue to do so in the future. We do not own and have no plans to build our own manufacturing capabilities for clinical or commercial supply. We have hired both internal resources and consultants with extensive technical, manufacturing, analytical, regulatory and quality assurance and control experience to oversee contract manufacturing and testing activities, and to compile manufacturing and quality information for our regulatory submissions.

Intellectual Property

OLPRUVA™ (sodium phenylbutyrate)

We have obtained both U.S. and foreign patents with claims related to OLPRUVA™. U.S. Pat. Nos. 11,154,521 (October 2021 press release) and 11,433,041 (issued Sept. 6, 2022) are directed to pharmaceutical compositions, including OLPRUVA™'s polymer coated, multi-particulate dosage formulation for oral administration. U.S. Pat. No. 11,202,767 (December 2021 press release) covers certain methods of use claims related to OLPRUVA™. Additionally, we have obtained patents in Europe, Israel, and Mexico related to pharmaceutical compositions, including OLPRUVA™'s polymer coated, multi-particulate dosage formulation for oral administration. These patents expire in 2036.

In October 2022 we announced that the USPTO issued a Notice of Allowance to Acer for US patent application No. 16/624,834 for claims related to a kit comprising a combination therapeutic product composed of sodium phenylbutyrate or glycerol phenylbutyrate and sodium benzoate. That application has now issued as U.S. Patent No. 11,517,547 and is exclusively licensed to Acer from Baylor College of Medicine, with an expiration date of June 28, 2038.

In July 2022, we announced that the China National Intellectual Property Administration (“CNIPA”) issued Electronic Patent Certificate ZL202122004991.9 on May 24, 2022, for Utility Model directed to OLPRUVA™ (sodium phenylbutyrate). Specifically, the newly issued patent covers dosage form claims related to OLPRUVA™'s polymer coated formulation for oral administration as a potential treatment for UCDS and MSUD. The newly issued patent has an expiration date of August 24, 2031.

We obtained exclusive rights to certain patents and other intellectual property from BCM for the use of sodium phenylbutyrate (NaPB) for the treatment of inborn errors of BCAA metabolism, including MSUD. The licensed patents cover methods and compositions for treating humans (and animals) with various formulations and prodrugs of NaPB for inborn errors of BCAA metabolism, including MSUD, and the latest expires in 2032. We made filings in the geographic regions that represent the largest incidence and prevalence of MSUD: the U.S., selected countries in Europe (including Turkey), and Brazil. BCM has been issued three patents in the U.S. and one in the European Union with respect to OLPRUVA™, each of which was exclusively licensed to us pursuant to our agreement with BCM.

We also expect to benefit from potential commercial exclusivity afforded to the first drug approved after obtaining Orphan Drug designation for the treatment of MSUD. Orphan Drug exclusivity provides, upon the approval by the FDA of a drug intended to treat a rare condition, seven years of marketing exclusivity, during which time the FDA will not approve the same drug for the same indication unless it demonstrates clinical superiority. Orphan Drug exclusivity does not prevent the FDA from approving the same drug for a different indication, or a different drug for the same indication. We were granted Orphan Drug designation for OLPRUVA™ for the treatment of MSUD by the FDA in August 2014.

Furthermore, we may qualify to receive an additional six months of pediatric exclusivity in the U.S., which runs consecutively to an existing exclusivity, if we conduct a successful pediatric study of OLPRUVA™ for the treatment of MSUD, approved by the FDA for this purpose.

EDSIVO™

We intend to protect our commercial rights to EDSIVO™ (celiprolol) in the U.S. via multiple pathways. We believe that we will be eligible for NCE exclusivity for EDSIVO™, which provides upon approval as an NCE five years of marketing exclusivity, during which time the FDA will not approve another drug with the same active ingredient, regardless of the indication for use, in the U.S. In January 2015, the FDA granted celiprolol Orphan Drug Designation, which provides upon the approval of a drug intended to treat a rare condition seven years of marketing exclusivity during which time the FDA will not approve the same drug for the same indication, unless it demonstrates clinical superiority. Orphan Drug exclusivity does not prevent the FDA from approving the same drug for a different indication, or a different drug for the same indication. NCE exclusivity and Orphan Drug exclusivity run concurrently. Furthermore, EDSIVO™ may qualify for an additional six months of pediatric exclusivity in the U.S., which requires the submission of one or more studies in pediatric subjects that meet requirements to be specified by the FDA in a written request for pediatric studies. Pediatric exclusivity can be obtained either before or after NDA approval. Pediatric exclusivity is attached to the end of an existing exclusivity and runs consecutively. We may also consider making modifications to the formulation to seek to obtain additional intellectual property. While unapproved drugs may be imported into the U.S. under specified circumstances, such as for use in clinical studies under a valid and effective IND or for further manufacture into an IND drug or an approved drug, we intend to aggressively assert our rights, via regulatory and legal means, to limit the importation of non-FDA approved versions of celiprolol. We intend to provide a robust patient assistance program (“PAP”) to offset costs associated with a high priced therapeutic to minimize the incentive for vEDS patients in the U.S. to seek to obtain celiprolol elsewhere.

In October 2022, we announced that the USPTO issued a Notice of Allowance for our patent application No. 16/930,208, exclusively licensed from Assistance Publique—Hôpitaux de Paris (AP-HP), for claims related to certain methods of vEDS with celiprolol. This application, titled “Method of Providing Celiprolol Therapy to a Patient,” has now issued as U.S. Pat. No. 11,523,997, with an expiration date of November 19, 2038. The issued patent claims include the dosing regimen in our ongoing Phase 3 DiSCOVER clinical trial of EDSIVO™ (celiprolol) for the treatment of patients with COL3A1-positive vEDS.

In October 2018, we entered into an additional agreement with AP-HP for exclusive rights to three U.S. patent applications, as described above in License Agreements.

ACER-801

We believe that ACER-801 (osanetant), if approved today by the FDA for marketing, would qualify as a new chemical entity (“NCE”) in the U.S., and as such, would be eligible for five years of market exclusivity following potential FDA approval. Additional exclusivity would depend on the indications selected and the development pathway that is chosen. We intend to explore various pathways to protect our commercial rights to ACER-801 in multiple rare and life-threatening neuroendocrine disorders. These potentially include various conditions associated with cancer, VMS, and trauma. In support of these development pathways, we continue to evaluate filing patent applications and acquiring existing intellectual property. For example, we have obtained exclusive rights to certain patent rights from Emory University for the use of neurokinin receptor antagonists in treatment of conditioned fear and post-traumatic stress disorder. The licensed patents have issued in the United States as U.S. Pat. No. 10,314,835 and select countries in Europe as EP 3160469 and have an expiration date of 2035.

If our products are approved, we intend to submit our patents, to the extent eligible, for listing by the FDA in its Approved Drug Products with Therapeutic Equivalence Evaluations, or Orange Book.

Government Regulation and Product Approval

Government authorities in the U.S. at the federal, state and local level and in other countries extensively regulate, among other things, the use of unapproved drugs, preclinical and clinical studies, development, testing, quality control, manufacture, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, import, and export of pharmaceutical products such as those we are developing. The process for obtaining approvals or authorizations to market a drug product in the U.S. and in foreign countries and jurisdictions, along with pre- and

post-approval compliance with applicable statutes and regulations, require the expenditure of substantial time and financial resources. This section discusses, in general terms, the typical approval process. Our product candidates must be approved by the FDA before they may be legally marketed in the U.S. and by the appropriate foreign regulatory agency before they may be legally marketed in foreign countries. Generally, our activities in other countries will be subject to regulation that is similar in nature and scope as that imposed in the U.S., although there can be important differences. Additionally, some significant aspects of approval requirements within the European Union are addressed uniformly, while country-specific requirements must also be met.

U.S. Drug Approval Process. In the U.S., the FDA regulates drugs under the FDCA and the FDA's implementing regulations. Drugs are also subject to other federal, state and local statutes and regulations. The process of obtaining marketing approvals and pre- and post-approval compliance with applicable federal, state, and local statutes and regulations requires the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time before or after approval, may subject an applicant to a variety of administrative or judicial sanctions, such as the FDA's complete response to a pending NDA, withdrawal of an approval, imposition of a clinical hold on a clinical study or studies, issuance of a warning letter or untitled letter, product recall, product seizure, total or partial suspension of production or distribution, injunction, fines, refusals or cancellation of government contracts, restitution, disgorgement, or civil or criminal penalties.

The standard process required by the FDA before a drug may be marketed in the U.S. generally involves the following:

- completion of preclinical laboratory tests, animal studies and formulation studies in compliance with the FDA's current good laboratory practice ("cGMP") regulations
- submission to the FDA of an IND to which the FDA has no objections and which must become effective before clinical trials in the U.S. may begin
- approval by an institutional review board ("IRB") for each clinical site before each trial may be initiated
- performance of adequate and well-controlled human clinical trials to establish the safety and efficacy of the drug candidate for each proposed indication in accordance with the FDA's current Good Clinical Practice ("cGCP") regulations, IND regulations, and human subject protection regulations
- meet Pediatric Research Equity Act ("PREA") requirements, if applicable
- submission to the FDA of an NDA
- satisfactory review by an FDA advisory committee, if applicable
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the product is produced to assess compliance with the FDA's current Good Manufacturing Practices ("cGMP") regulation and to assure that the methods used in, and the facilities and controls used for, manufacture, processing, and packing are adequate to preserve the drug's identity, strength, quality and purity
- FDA review of the NDA and decision (approved or issue a complete response letter)

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

Clinical Trials. Clinical trials involve the administration of the investigational new drug (“IND”) to subjects or patients under the supervision of qualified investigators in accordance with IND regulations and human subject protection regulations as well as cGCP standards, which include the requirement that all research patients undergo an informed consent process and provide their informed consent for participation in any clinical trial and that an IRB approve each study before it begins. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND. In addition, an IRB for each institution participating in the clinical trial must review and approve each protocol and protocol amendment for any clinical trial before it commences at that institution. Information about certain clinical trials must be submitted within specific timeframes to the NIH for public dissemination on their ClinicalTrials.gov website.

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

Phase 1: The drug is initially introduced into a small number of healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution, and excretion or, on occasion, in patients with severe problems or life-threatening disease to gain an early indication of its effectiveness.

Phase 2: The drug is administered to a limited patient population to preliminarily evaluate the efficacy of the product for a specific targeted disease, gather additional safety information and to determine dosage tolerance, optimal dosage, and method of delivery.

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

Phase 4: In some cases, the FDA may condition approval of an NDA for a product candidate on the sponsor’s agreement to conduct additional clinical trials after NDA approval. In other cases, a sponsor may voluntarily conduct additional clinical trials post-approval to gain more information about the drug. Such post-approval trials are typically referred to as Phase 4 clinical trials.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious and unexpected adverse reactions occur. Trial sponsors must monitor other information including published as well as unpublished scientific papers, reports from foreign regulatory authorities and reports of foreign commercial marketing experience for the investigational drug and notify the FDA and clinical trial investigators of certain information. Phase 1, Phase 2 and Phase 3 clinical trials may fail to be completed successfully within a specified period, or at all. Furthermore, the FDA may impose a clinical hold on one or more or all of the clinical studies or the sponsor may suspend or terminate a clinical trial or development of an investigational product at any time for a variety of reasons, including a finding that the research patients are being exposed to an unacceptable health risk. Development, or the aspects of development, that are affected by the clinical hold may not continue unless and until the sponsor addresses all of the FDA’s concerns and has been notified that the hold is removed. Similarly, an IRB can suspend or terminate its approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the protocol or the IRB’s requirements or if the drug has been associated with unexpected serious harm to patients. Nearly all Phase 3 trials and some other trials are overseen by a Data and Safety Monitoring Board (“DSMB”) which is composed of doctors, statisticians, and others who are independent of the clinical trial sponsor. Similar to IRBs, the DSMBs review the progress of a clinical trial and participant safety, but they also review data on the effectiveness of the drug being studied. DSMB members can stop a trial early if safety concerns arise or if they determine that the trial should be stopped due to “futility” meaning that the trial will not be able to answer the question or questions it set out to explore, or due to ethical considerations.

Concurrent with clinical trials, companies may need to complete additional animal trials and must develop information about the chemistry and physical characteristics of the drug and finalize a process for manufacturing the drug in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the drug candidate and, among other things, the manufacturer must

develop methods for testing the identity, strength, quality and purity of the final drug product. Additionally, appropriate packaging must be selected and tested, and stability studies must be completed to establish an expiration date and demonstrate that the drug candidate does not undergo unacceptable deterioration prior to the expiration date.

The NDA Approval Process. Assuming successful completion of the required clinical testing, the results of the preclinical studies and clinical trials, including negative or ambiguous results as well as positive findings, together with detailed information relating to the product's chemistry, manufacture, controls, and proposed labeling, among other things, are submitted to the FDA as part of an NDA to support approval to market the product for one or more indications. Under standard approval processes, in most cases, the submission of an NDA is subject to a substantial application user fee.

The FDA is required to conduct a preliminary review of an NDA within the first 60 days after submission, before accepting it for filing, to determine whether it is sufficiently complete to permit substantive review. The FDA may accept the NDA for filing, potentially refuse to file the NDA due to deficiencies but work with the applicant to rectify the deficiencies (in which case the NDA is filed upon resolution of the deficiencies) or refuse to file the NDA. The FDA must notify the applicant of a refusal to file a decision within 60 days after the original receipt date of the application. If the FDA refuses to file the NDA the applicant may resubmit the NDA with the deficiencies addressed. The resubmitted NDA is considered a new application subject to a new six- or ten-month review goal, as described below. If the NDA is resubmitted for the same product (by the same person) a new application fee will not be required. The resubmitted application is also subject to the 60-day review before the FDA accepts it for filing. Once an NDA is accepted for filing, the FDA begins an in-depth substantive review. Under PDUFA and the FDA's commitments under the current PDUFA Reauthorization Act, the FDA has a goal of reviewing and acting on 90% of standard non-priority NDA applications within six or ten months from the filing date of the NDA.

The FDA reviews an NDA to determine, among other things, whether the drug is safe and effective for its intended use and whether the facility in which it is manufactured, processed, packaged or stored meets standards designed to assure the product's continued safety, quality and purity. The FDA is required to refer an application for a novel drug or class to an advisory committee or explain why such referral was not made. An advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation in response to specific questions raised by the FDA, which may include whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

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

After the FDA evaluates the NDA and conducts its inspections, it may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug subject to specific prescribing information for specific indication(s) and, if applicable, specific post-approval requirements. A Complete Response Letter indicates that the review cycle of the application is complete but the application is not ready for approval. After receiving a Complete Response Letter, the applicant must decide within 12 months (subject to extension), if it plans to resubmit the NDA addressing the deficiencies identified by the FDA in the Complete Response Letter, withdraw the NDA, or request an opportunity for a hearing to challenge the FDA's determination. A Complete Response Letter may require additional clinical data and/or an additional pivotal Phase 3 clinical trial(s), and/or other significant, expensive and time-consuming requirements related to clinical trials, nonclinical studies or manufacturing. Even if such data are submitted, the FDA may ultimately decide that the data in the NDA does not satisfy the criteria for approval. Data from clinical trials are not always conclusive and the FDA may interpret this data differently than we interpret the data.

The FDA also may require implementation of a Risk Evaluation and Mitigation Strategy ("REMS") to mitigate any identified or suspected serious risks. The REMS plan could include medication guides, physician communication plans, assessment plans and elements to assure safe use, such as restricted distribution methods, patient registries or other risk minimization tools.

The drug testing and approval process requires substantial time, effort and financial resources, and may take several years to complete. Data obtained from clinical activities are not always conclusive and may be susceptible to varying interpretations, which could delay, limit or prevent marketing approval. The FDA may not grant marketing approval on a timely basis, or at all.

Even if the FDA approves a product, it may limit the approved indications for use for the product. The FDA requires that the approved product labeling include information regarding contraindications, warnings, or precautions. It may also require that post-approval studies, including Phase 4 clinical trials, including a long-term registry, be conducted to further assess a drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-marketing studies or surveillance programs. After approval, some types of changes to the approved product, such as adding new indications or data to the labeling or manufacturing changes, may be subject to further testing requirements and FDA review and approval. Also, after approval, the FDA may require labeling changes as new information becomes known, particularly if new risks are identified following commercial use, such as unexpected adverse events. The FDA has the authority to prevent or limit further marketing of a drug based on the results of these post-marketing studies and programs or other information that may become known after approval.

Hatch-Waxman Amendments and Exclusivity. The Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Amendments, amended the FDCA and established abbreviated pathways to market, as well as incentives for the development of new drug products. The Hatch-Waxman Amendments established section 505(b)(2) of the FDCA that provides an alternative pathway for submission of an NDA, referred to as the 505(b)(2) application, when some or all of the safety and efficacy investigations relied on for approval were not conducted by or for the applicant and for which the applicant has not obtained a right of reference, but for which the information is publicly available. The Hatch-Waxman Amendments also established the abbreviated new drug application (“ANDA”) approval pathway, which provides an expedient route for generic drugs that have the same active ingredient as a previously approved drug. At the same time, to incentivize continued pharmaceutical innovation, the Hatch-Waxman Amendments authorized periods of market exclusivity to protect certain approved new drugs from competition for five- or three-year periods.

Under the Hatch-Waxman Amendments, a new drug containing an active ingredient that had never before been approved in any other NDA, ANDA, or 505(b)(2) NDA is provided five years of market exclusivity upon approval. The FDA refers to this exclusivity as NCE exclusivity. During the NCE exclusivity period, the FDA cannot approve an ANDA or a 505(b)(2) application for a drug containing the same active ingredient. For NCE exclusivity, FDA regulations interpret “active ingredient” to mean “active moiety,” which is defined as “the molecule or ion, excluding those appended portions of the molecule that cause the drug to be an ester, salt . . . , or other noncovalent derivative . . . of the molecule, responsible for the physiological or pharmacological action of the drug substance.” Although the FDA may not approve an ANDA or 505(b)(2) NDA with the same active ingredient during the five-year NCE exclusivity period, an ANDA or 505(b)(2) NDA may be submitted to the FDA after four years if it contains a certification of patent invalidity or non-infringement.

The Hatch-Waxman Amendments also provide three years of market exclusivity for an NDA, a 505(b)(2) NDA, or a supplement to either of these applications for a drug product containing an active moiety that has been previously approved, if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant, are deemed by the FDA to be essential to the approval of the application. During this three-year exclusivity period, the FDA will not make effective the approval of any ANDA or 505(b)(2) NDA for the same active moiety for the same conditions of use. Five-year and three-year exclusivity will not delay the submission or approval of a new drug containing the same active moiety if it is the subject of a full NDA for which the applicant conducted, sponsored, or obtained a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

Other Regulatory Requirements. Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, annual establishment registration and product listing and associated user fees, compliance with the cGMP, recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion, and adverse drug experience monitoring and reporting with

the product. After approval, most changes to the approved product labeling, such as adding new indications are subject to prior FDA review and approval. Also, any post-approval changes in the drug substance, drug product, production process, quality controls, equipment, or facilities that have a substantial potential to have an adverse effect on the identity, strength, quality, purity, or potency of the drug product is subject to FDA review and approval. Any such changes that have a moderate potential to have an adverse effect on the identity, strength, quality, purity, or potency of the drug product must be submitted to the FDA for review 30 days prior to implementation. All manufacturing facilities, as well as records required to be maintained under FDA regulations, are subject to inspection or audit by the FDA. In addition, manufacturers are required to pay annual user fees for establishment registration and user fees for the submission of each new or supplemental application with clinical data.

The FDA may impose a number of post-approval requirements as a condition of approval of an NDA. For example, the FDA may require post-approval testing, including Phase 4 clinical trials, and surveillance to further assess and monitor the product's safety and effectiveness after commercialization. The Food and Drug Administration Amendments Act of 2007 gave the FDA the authority to require a REMS from drug manufacturers to manage a known or potential serious risk associated with the drug and to ensure that the benefits of a drug outweigh its risks. Examples of a REMS include, but are not limited to, a Medication Guide, a patient package insert to help mitigate a serious risk of the drug, and a communication plan to health care providers to support the implementation of an element of the REMS.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and register or obtain permits or licenses in states where they do business and are subject to periodic unannounced inspections by the FDA and state regulatory authorities with jurisdiction over their activities to determine compliance with regulatory requirements. A drug manufacturer is responsible for ensuring that its third-party contractors operate in compliance with applicable laws and regulations including the cGMP regulation. The failure of a drug manufacturer or any of its third-party contractors to comply with federal or state laws or regulations may subject the drug manufacturer to possible legal or regulatory action, such as an untitled letter, warning letter, recall, suspension of manufacturing or distribution or both, suspension of state permit or license, seizure of product, import detention, injunctive action, civil and criminal penalties.

Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require a drug manufacturer to conduct investigations and implement appropriate corrective actions to address any deviations from cGMP requirements and impose reporting and documentation requirements upon the manufacturer and any third-party contractors (including contract manufacturers and laboratories) involved in the manufacture of a drug product. Accordingly, manufacturers must continue to expend significant time, money and effort to maintain and ensure ongoing cGMP compliance and to confirm and ensure ongoing cGMP compliance of their third-party contractors.

Once an approval is granted, the FDA may withdraw the approval if there is new information or evidence that the drug is unsafe or not shown to be safe for use under the conditions of its approval, or that new information shows there is a lack of substantial evidence of effectiveness, or that the approved application contained an untrue statement of material fact, or that the required patent information was not submitted within 30 days after receiving notice from the FDA of the failure to submit such information. 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 and risk information; imposition of a post-market study requirement to assess new safety risks; or implementation of a REMS that may include distribution or other restrictions.

The FDA closely regulates drug advertising and promotional activities, including promotion of an unapproved drug, direct-to-consumer advertising, dissemination of scientific information about a drug not on the approved labeling, off-label promotion, communications with payors and formulary committees, industry-sponsored scientific and educational activities, and promotional activities involving the internet and social media. A company's promotional product claims must be true and not misleading, provide fair balance, provide adequate risk information, and be consistent with the product label approved by the FDA. Failure to comply with these

requirements can lead to regulatory actions including, among other things, warning letters, corrective advertising, injunction, violation and related penalties under the False Claims Act and result in reputational and economic harm.

Physicians may prescribe FDA-approved drugs for uses that are not described in the product's labeling and that differ from those uses tested by the manufacturer. 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 for their individual patients. The FDA does, however, regulate manufacturers' communications about their drug products and interprets the FFDCA to prohibit pharmaceutical companies from promoting their FDA-approved drug products for uses that are not specified in the FDA-approved labeling. Companies that market drugs for off-label uses have been subject to warning letters, related costly litigation, criminal prosecution, and civil liability under the FFDCA and the False Claims Act.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act ("PDMA") which regulates the distribution of drug and drug samples at the federal level and sets minimum standards for the registration and regulation of wholesale drug distributors by the states.

Orphan Designation. The Orphan Drug Act of 1983 provides incentives, including marketing exclusivity, user fee waivers and tax benefits, to companies that undertake development and marketing of products to treat rare diseases, which are defined as diseases for which there is a patient population of fewer than 200,000 persons in the U.S. or a patient population greater than 200,000 in the U.S. where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the U.S. A drug that receives Orphan Drug designation may receive up to seven years of exclusive marketing in the U.S. for that indication, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity. A drug may be entitled to an additional six months of exclusive marketing if it satisfies the requirements for pediatric exclusivity.

The European Medicines Agency ("EMA") Committee for Orphan Medicinal Products ("COMP") grants Orphan Drug designation to promote the development of products that are intended for the diagnosis, prevention or treatment of life-threatening or chronically debilitating conditions affecting not more than five in 10,000 persons in the European Union Community and for which no satisfactory method of diagnosis, prevention, or treatment has been authorized (or the product would be a significant benefit to those affected). Additionally, designation is granted for products intended for the diagnosis, prevention, or treatment of a life-threatening, seriously debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the medicinal product. In the European Union, Orphan Drug designation entitles a party to financial incentives such as reduction of fees or fee waivers and ten years of market exclusivity is granted following medicinal product approval. This period may be reduced to six years if the Orphan Drug designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity.

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 product candidates. It is impossible to predict whether further legislative changes will be enacted, or FDA regulations, guidance, policies or interpretations will be changed, or what the impact of such changes, if any, may be.

Pharmaceutical Coverage, Pricing, and Reimbursement. Significant uncertainty exists as to the coverage and reimbursement status of any drug products for which we may obtain marketing approval. Sales of any of our product candidates, if approved, will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs such as Medicare and Medicaid, commercial health insurers and managed care organizations. Some third-party payors may limit coverage to specific drug products on an approved list, also known as a formulary, which might not include all of the approved drugs for a particular indication.

In order to obtain coverage and reimbursement for any product that might be approved for sale, we may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. Whether or not we conduct such studies, our product candidates may not be considered medically necessary or cost-effective. Further, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage, and adequate reimbursement, for the product. Third-party reimbursement may not be sufficient to enable us to maintain price levels high enough to realize an appropriate return on our investment in product development.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third-party payors are increasingly challenging the prices charged for medical products and services, examining the medical necessity and reviewing the cost-effectiveness of drug products and medical services and questioning safety and efficacy. Emphasis on managed care in the U.S. has increased and we expect will continue to increase the pressure on drug pricing. If third-party payors do not consider our products to be cost-effective compared to other available therapies, they may not cover the products for which we receive FDA approval.

The U.S. government, state legislatures, and foreign governments have shown significant interest in implementing cost-containment programs to limit the growth of government-paid healthcare costs and drug prices in general, including for therapies for rare diseases. These measures include price controls, transparency requirements triggered by the introduction of new high-cost drugs into the market, drug re-importation, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Some laws and regulations have already been enacted in these areas, and additional measures have been introduced or are under consideration at both the federal and state levels. Additionally, legislation that affects reimbursement for drugs with small patient populations could be adopted, limiting payments for pharmaceuticals such as our product candidates, which could adversely affect our potential future net revenue and results.

In addition, in the U.S., the Patient Protection and Affordable Care Act ("the Affordable Care Act") and the Inflation Reduction Act contain provisions that have the potential to substantially change healthcare delivery and financing, including impacting the profitability of drugs. For example, the Affordable Care Act revised the methodology by which rebates owed by manufacturers for covered outpatient drugs are calculated under the Medicaid Drug Rebate Program, extended the Medicaid Drug Rebate Program to utilization of covered drugs dispensed to individuals enrolled in Medicaid managed care organizations and subjected manufacturers to new annual fees for certain branded prescription drugs. Given the complexity of the Affordable Care Act and the substantial requirements for regulation thereunder, the impact of the Affordable Care Act on our financial conditions and operations cannot be predicted, whether in its current form or as amended or repealed.

Pricing and reimbursement methodologies vary widely from country to country. Some countries require that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or they may instead adopt a system of direct or indirect controls on our profitability in placing the drug product on the market. Other member states allow companies to fix their own prices for drug products but monitor and control company profits. The downward pressure on healthcare costs in general, particularly prescription drugs, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. Any country that has price controls or reimbursement limitations for drug products may not allow favorable reimbursement and pricing arrangements for any of our products.

Coverage policies, third-party reimbursement rates, and drug pricing regulation may change at any time, and there is the potential for significant movement in these areas in the foreseeable future. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

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

- the federal healthcare Anti-Kickback Statute prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration (including any kickback, bribe or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid
- the federal False Claims Act and civil monetary penalties law impose penalties and provide for civil whistleblower or qui tam actions against individuals or entities for, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment or approval that are false or fraudulent or making a false record or statement to avoid, decrease or conceal an obligation to pay money to the federal government
- the civil monetary penalties statute, which imposes penalties against any person or entity who, among other things, is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent
- the federal Health Insurance Portability and Accountability Act of 1996 (“HIPAA”) among other things, imposes criminal liability for knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or 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
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and its implementing regulations, also imposes certain obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without proper written authorization
- the federal transparency requirements under the Affordable Care Act requires manufacturers of drugs, devices, biologicals and medical supplies to annually report to the Centers for Medicare & Medicaid Services (“CMS”) an agency within the U.S. Department of Health and Human Services (“HHS”) information related to payments and other transfers of value provided to physicians and teaching hospitals and certain ownership and investment interests held by physicians and their immediate family members
- analogous state and foreign laws, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; state and foreign laws that require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts

Further, the Affordable Care Act, among other things, amended the intent requirement of the federal Anti-Kickback Statute and certain criminal statutes governing healthcare fraud. A person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it. In addition, the Affordable Care Act provided

that 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.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws 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. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to it, we may be subject to significant administrative, civil, and/or criminal penalties, damages, fines, disgorgement, individual imprisonment, exclusion from government funded healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations. If any of the physicians or other providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to administrative, civil, and/or criminal sanctions, including exclusions from government funded healthcare programs.

Foreign Regulation. In order to market any product outside of the U.S., we would need to comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our products. The cost of establishing a regulatory compliance system for numerous varying jurisdictions can be very significant. Whether or not we obtain FDA approval for a product, we would need to obtain the necessary approvals by the comparable foreign regulatory authorities before we can commence clinical trials or marketing of the product in foreign countries and jurisdictions. Although many of the issues discussed above with respect to the U.S. apply similarly in the context of the EU and/or other jurisdictions, the approval process varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

The U.S. Foreign Corrupt Practices Act and Other Anti-Corruption Laws

We may be subject to a variety of domestic and foreign anti-corruption laws with respect to our regulatory compliance efforts and operations. The U.S. Foreign Corrupt Practices Act (the “FCPA”) is a criminal statute that prohibits an individual or business from paying, offering, promising or authorizing the provision of money (such as a bribe or kickback) or anything else of value (such as an improper gift, hospitality, or favor), directly or indirectly, to any foreign official, political party or candidate for the purpose of influencing any act or decision in order to assist the individual or business in obtaining, retaining, or directing business or other advantages (such as favorable regulatory rulings). The FCPA also obligates companies with securities listed in the U.S. to comply with certain accounting provisions. Those provisions require a company such as ours to (i) maintain books and records that accurately and fairly reflect all transactions, expenses, and asset dispositions, and (ii) devise and maintain an adequate system of internal accounting controls sufficient to provide reasonable assurances that transactions are properly authorized, executed and recorded. The FCPA is subject to broad interpretation by the U.S. government. The past decade has seen a significant increase in enforcement activity. In addition to the FCPA, there are a number of other federal and state anti-corruption laws to which we may be subject, including, the U.S. domestic bribery statute contained in 18 USC § 201 (which prohibits bribing U.S. government officials) and the U.S. Travel Act (which in some instances addresses private-sector or commercial bribery both within and outside the U.S.). Also, a number of the countries in which we may conduct activities have their own domestic and international anti-corruption laws, such as the UK Bribery Act 2010. There have been cases where companies have faced multi-jurisdictional liability under the FCPA and the anti-corruption laws of other countries for the same illegal act.

We can be held liable under the FCPA and other anti-corruption laws for the illegal activities of our employees, representatives, contractors, collaborators, agents, subsidiaries, or affiliates, even if we did not explicitly authorize such activity. Although we will seek to comply with anti-corruption laws, there can be no assurance that all of our employees, representatives, contractors, collaborators, agents, subsidiaries or affiliates will comply with these laws at all times. Noncompliance with these laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension and/or debarment from contracting with certain governments or other persons, the loss of export privileges, reputational harm, adverse media coverage, and other collateral consequences. In addition, our directors, officers, employees, and other representatives who engage in violations of the FCPA and certain other anti-corruption statutes may face imprisonment, fines, and penalties. If any subpoenas or investigations are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations and financial condition could be materially harmed. In addition, responding to any action will likely result in a materially significant diversion of our management's attention and resources and significant defense costs and other professional fees. Enforcement actions and sanctions could further harm our business, results of operations, and financial condition.

Human Capital/Employees

Our key human capital management objectives are to attract, retain and develop the highest quality talent. To support these objectives, our human resources programs are designed to develop talent to prepare them for critical roles and leadership positions for the future; reward and support employees through competitive pay and benefits; enhance our culture through efforts aimed at making the workplace more engaging and inclusive; acquire talent and facilitate internal talent mobility to create a high-performing and diverse workforce. As of March 24, 2023, we had 33 full-time employees, in addition to several consultants or independent contractors working for us. None of our employees are represented by a labor union or subject to a collective bargaining agreement. We have not experienced a work stoppage and consider our relations with our employees to be good.

Available Information

We are subject to the information and reporting requirements of the Securities Exchange Act of 1934 (the "Exchange Act") under which we file periodic reports, proxy and information statements and other information with the SEC. Copies of the reports, proxy statements and other information are available on the SEC's website, <https://www.sec.gov>.

Financial and other information about us is available on our website (www.acertx.com). Information on our website, or that may be accessed by links on our website, is not incorporated by reference into this report. We make available on our website, free of charge, copies of our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the Securities and Exchange Commission ("SEC"). Copies are available in print to any stockholder upon request in writing to Attention: Investor Relations, Acer Therapeutics Inc., One Gateway Center, Suite 356, 300 Washington Street, Newton, MA 02458.

Item 1A. Risk Factors.

Investing in our securities involves a high degree of risk. You should consider the following risk factors, as well as other information contained or incorporated by reference in this Annual Report on Form 10-K, before deciding to invest in our securities. The following factors affect our business, our intellectual property, the industry in which we operate and our securities. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known or which we consider immaterial as of the date hereof may also have an adverse effect on our business. If any of the matters discussed in the following risk factors were to occur, our business, financial condition, results of operations, cash flows or prospects could be materially adversely affected, the market price of our securities could decline and you could lose all or part of your investment in our securities.

Risks Related to Our Business and Financial Condition

Our existing cash and cash equivalents at December 31, 2022, together with the subsequent proceeds from the Second SWK Loan (defined below) which closed on January 31, 2023, the subsequent proceeds from our ATM facility (defined below) and the subsequent proceeds from a sale of securities (including pursuant to a registered direct offering of shares of our common stock and pre-funded warrants) which closed on March 24, 2023 (see Note 12 to our financial statements) (the “March 2023 Offering”), are expected to be sufficient to fund our anticipated operating and capital requirements into the middle of the second quarter of 2023. We will require additional financing to commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as to complete development and seek to obtain marketing approval of our product candidates and, if approved, to commercialize our product candidates. A failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product development, other operations or commercialization efforts, or to suspend or restructure our business.

Since our inception, substantially all of our resources have been dedicated to the clinical development of our product candidates. As of December 31, 2022, we had an accumulated deficit of \$140.7 million, cash and cash equivalents of \$2.3 million and current liabilities of \$19.0 million, which include \$8.4 million associated with deferred collaboration funding.

We will need to raise additional capital within the second quarter of 2023 in order to continue to finance our operations, including with respect to the commercialization of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as to pursue further clinical development and regulatory preparedness of our product candidates, preparations for a commercial launch of our product candidates, if approved, and development of any other current or future product candidates. These expenditures will include costs associated with research and development, conducting preclinical studies and clinical trials, obtaining marketing approvals, and manufacturing and supply as well as marketing and selling any products approved for sale. In addition, other unanticipated costs may arise. Because the outcome of any drug development process is highly uncertain and our activities with respect to the commercialization of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS are at a very early stage, we cannot reasonably estimate the actual amounts of additional financing that will be necessary to commercialize OLPRUVA™ or to complete the development and, if approved, commercialization of any of our current product candidates or future product candidates, if any.

Our operating plan may change as a result of factors currently unknown to us, and we may need to seek substantial additional funds, through public or private equity or debt financings or other sources, such as non-dilutive funding or strategic collaborations. Such financing may result in dilution to stockholders, imposition of debt covenants and repayment obligations, or other restrictions that may adversely affect our business.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets, which recently have been extremely challenging. For example, the volatility associated with the ongoing COVID-19 pandemic, the global supply chain issues and Russia’s invasion of Ukraine has caused significant instability and disruptions in the capital and credit markets, which may continue to be adversely affected,

including by the possibility of a wider European or global conflict and global sanctions imposed in response to Russia's invasion. The continued increases and fluctuations in interest rates and inflation have exacerbated negative economic and financial conditions. A severe or prolonged economic downturn, such as a global financial crisis, could result in a variety of risks to our business, including our ability to raise additional capital when needed on acceptable terms, if at all. The recent turmoil in the banking sector initiated by the failure of Silicon Valley Bank ("SVB") has added to the volatility in that sector. While we have no direct relationship or business with SVB, this situation has added to the difficulties in raising capital on a timely basis and on favorable terms. We cannot anticipate all of the ways in which the foregoing, and the current economic climate and financial market conditions generally, could adversely impact our business.

Our future capital requirements depend on many factors, including:

- the cost of commercialization activities for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCIDs involving deficiencies of CPS, OTC, or AS, or for any of our current product candidates and future product candidates, if any, if approved for sale, including marketing, sales and distribution costs, and preparedness of our corporate infrastructure;
- the scope, progress, results, and costs of researching and developing our current product candidates, and future product candidates, if any, including conducting preclinical and clinical trials
- the cost of seeking regulatory and marketing approvals and reimbursement for our product candidates and future product candidates, if any
- the cost of manufacturing OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCIDs involving deficiencies of CPS, OTC, or AS, as well as our current product candidates and future product candidates, if any, that we obtain approval for and successfully commercialize
- the terms and conditions of the Marathon Convertible Notes and the SWK Loans, including those which require us to repurchase the Marathon Convertible Notes, to repay the SWK Loans, to maintain minimum unencumbered liquid assets, and to otherwise meet certain additional operating and financial covenants, and those which place restrictions on our operating and financial flexibility
- the timing, receipt, and amount of payments we may receive from Relief under the Collaboration Agreement
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of such agreements
- the number and characteristics of any additional product candidates we may develop or acquire
- any product liability or other lawsuits related to our product candidates or commenced against us
- the expenses needed to attract and retain skilled personnel
- the costs associated with being a public company
- the costs involved in preparing, filing, prosecuting, maintaining, defending, and enforcing our intellectual property rights, including litigation costs and the outcome of such litigation
- the timing, receipt and amount of sales of, or royalties on, future approved product candidates, if any; and
- the amount of our market capitalization as reflected from time to time in the open market

Additional funds may not be available when we need them, on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to:

- delay, limit, reduce or terminate preclinical studies, clinical trials or other development activities for our current product candidates or future product candidates, if any
- delay, limit, reduce or terminate our research and development activities
- delay, limit, reduce or terminate our establishment of sales and marketing capabilities or other activities that may be necessary to commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, or any future approved product candidates, if any; or
- otherwise delay, limit, reduce, restructure or terminate our operations

Substantial doubt exists as to our ability to continue as a going concern.

As noted above, (i) since our inception, substantially all of our resources have been dedicated to the clinical development of our product candidates, (ii) as of December 31, 2022, we had an accumulated deficit of \$140.7 million, cash and cash equivalents of \$2.3 million, and current liabilities of \$19.0 million, which include \$8.4 million associated with deferred collaboration funding, (iii) we will need to raise additional capital within the middle of the second quarter of 2023 in order to continue to finance our operations, including with respect to the commercialization of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as to pursue further clinical development and regulatory preparedness of our product candidates, preparations for a commercial launch of our product candidates, if approved, and development of any other current or future product candidates.

Although OLPRUVA™ for oral suspension in the U.S. has been approved by the FDA for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, we have not yet achieved revenue from product sales and we expect to continue to incur losses for the foreseeable future as we continue our commercialization efforts for OLPRUVA™ as well as development of, and seeking marketing approvals for, our product candidates. These factors individually and collectively raise substantial doubt about our ability to continue as a going concern and therefore it may be more difficult for us to attract investors. Unless we are able to raise additional capital within the middle of the second quarter of 2023, to continue to finance our operations, our long-term business plan may not be accomplished, and we may be forced to cease, restructure, reduce, or delay operations, including reduction of employees which support our efforts toward the commercialization of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS.

Our efforts to raise additional funds could be affected by negative conditions in the capital markets generally, which in recent months have been especially challenging, and there are numerous companies in the pharmaceutical and biotech sectors seeking additional capital from many of the same sources, which may also limit the amount of capital, if any, available to us. The recent turmoil in the banking sector initiated by the failure of SVB has added to the volatility in that sector. While we have no direct relationship or business with SVB, this situation has added to the difficulties in raising capital on a timely basis and on favorable terms.

We entered into the Collaboration Agreement with Relief which allows them to control the development and commercialization of OLPRUVA™ in UCDs and MSUD in territories other than the U.S., Canada, Brazil, Turkey, and Japan, which may impact our ability to generate revenues and achieve or sustain profitability. In addition, we are required to provide assistance to Relief in the performance of their contractual obligations, which may distract us from achieving our objectives.

On March 19, 2021, we entered into the Collaboration Agreement, with Relief, providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and Maple Syrup Urine Disease (“MSUD”). Pursuant to the Collaboration Agreement, we retain development and commercialization rights in the U.S., Canada, Brazil, Turkey, and Japan, we split net profits from

such territories 60%: 40% in favor of Relief, Relief licenses rights for the rest of the world, and we receive a 15% royalty on net sales in Relief's licensed territories. In addition, we are required to provide assistance to Relief in the performance of its contractual obligations, which may distract us from achieving our objectives.

Aside from OLPRUVA™ for oral suspension in the U.S. which has been approved by the FDA for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS, there is no guarantee that OLPRUVA™ will receive regulatory authority approval in any territory or become commercially available for the indications under investigation.

The rights we have transferred to our product candidate OLPRUVA™ in the applicable territories, including development and commercialization rights, may impact our ability to generate revenues and achieve or sustain profitability. We are reliant on Relief's resources and efforts with respect to OLPRUVA™ in UCDS and MSUD in their applicable territories, including the pace at which Relief moves forward with development and commercialization. Relief may fail to develop or successfully commercialize OLPRUVA™ for a variety of reasons, including that Relief:

- does not have sufficient resources or decides not to devote the necessary resources due to internal constraints such as limited cash or human resources
- decides to pursue a competitive potential product
- cannot obtain the necessary regulatory approvals
- determines that the market opportunity is not attractive, or
- cannot manufacture or obtain the necessary materials in sufficient quantities from multiple sources or at a reasonable cost

In addition, we are required by our agreements with Relief to provide certain assistance in the performance of their obligations. Doing so may cause us to delay or defer achievement of our own objectives regarding OLPRUVA™ or our other programs.

If Relief does not pursue development and successfully commercialize OLPRUVA™ in the applicable territories, our ability to generate revenues and achieve or sustain profitability could be significantly hindered and may have a material adverse impact on our financial condition and results of operations.

We have identified a material weakness in our internal control over financial reporting that resulted in a restatement of our unaudited condensed interim financial statements for the three and six months ended June 30, 2022. This material weakness, if not remediated, could adversely affect our ability to report our results of operations and financial condition accurately and in a timely manner.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of our financial statements for external purposes in accordance with accounting principles generally accepted in the U.S. ("GAAP"). Our management is likewise required, on a quarterly basis, to evaluate the effectiveness of our internal controls and to disclose any changes and material weaknesses identified through such evaluation in those internal controls. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

As described elsewhere in this report, we identified a material weakness in our internal control over financial reporting related to the accounting and reporting for the Collaboration Agreement entered into with Relief, which our management has determined has been remediated as of December 31, 2022. As also described elsewhere in this report, a restatement of certain items presented in our original Form 10-Q for the period ended June 30, 2022 was required as a result of a material weakness in our internal control over accounting for debt related to the application of certain interpretive accounting guidance related to ASC 260, Earnings Per Share. Specifically, when the fair value of a contract is reported as an asset or liability for accounting purposes and the changes in fair value are recorded

through earnings, such as the Marathon Convertible Notes, the calculation of diluted earnings per share using the “if-converted” method may require an adjustment to the numerator for any changes in income or loss that would result if the contract had been reported as an equity instrument for accounting purposes during the period, and in doing so the result is dilutive to the net loss per share calculation. As a result of these material weaknesses, our management concluded that our internal control over financial reporting was not effective as of March 31, 2021, June 30, 2021, September 30, 2021, December 31, 2021, March 31, 2022, June 30, 2022, September 30, 2022, and December 31, 2022.

To respond to this material weakness, we have devoted, and plan to continue to devote, significant effort and resources to the remediation and improvement of our internal control over financial reporting. The elements of our remediation plan can only be accomplished over time, and we can provide no assurance that these initiatives will ultimately have the intended effects. For a discussion of management’s consideration of the material weaknesses identified with respect to our accounting and reporting for the Relief transaction as well as application of the “if-converted” method to the Marathon Convertible Notes in certain situations, see Part II, Item 9A, “Controls and Procedures” included in this report.

Any failure to remediate our existing or any future material weaknesses or otherwise maintain effective internal control over financial reporting could adversely impact our ability to report our financial position and results of operations on a timely and accurate basis. If our financial statements are not accurate, investors may not have a complete understanding of our operations and may lose confidence in our financial reporting and our business, reputation, results of operations, liquidity, financial condition, stock price and ability to access the capital markets could be adversely affected. In addition, we may be unable to maintain or regain compliance with applicable securities laws, stock market listing requirements and covenants regarding the timely filing of periodic reports, we may be subject to regulatory investigations and penalties, and we may face claims invoking the federal and state securities laws. Any such litigation or dispute, whether successful or not, could have a material adverse effect on our business, results of operations and financial condition.

We can provide no assurance that the measures we have taken and plan to take in the future will remediate the material weakness identified or that any additional material weaknesses or restatements of financial results will not arise in the future due to a failure to implement and maintain adequate internal control over financial reporting or circumvention of these controls. In addition, even if we are successful in strengthening our controls and procedures, in the future these controls and procedures may not be adequate to prevent or identify irregularities or errors or to facilitate the fair presentation of our financial statements.

Funding from our ATM facility with JonesTrading and Roth Capital may be limited or may be insufficient to fund our operations or to implement our strategy, especially in light of our suspension of the ATM facility in connection with the March 2023 Offering and a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023.

We will need to keep current our shelf registration statement and an offering prospectus relating to our ATM facility with JonesTrading and Roth Capital in order to use the program to sell shares of our common stock, as well as provide certain periodic deliverables required by the amended and restated sales agreement with JonesTrading and Roth Capital for the ATM facility. Due to the SEC’s “baby shelf rules,” which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company’s public float in a 12-month period, we are currently only able to issue a limited number of shares which aggregate to no more than one-third of our public float using our shelf registration statement. Subsequent to December 31, 2022, we have sold an aggregate of 1,462,254 shares of common stock under our ATM facility for gross proceeds of \$4.1 million. These sales of common stock are counted toward the maximum of one-third of our public float that can be sold in a 12-month period and reduce the remaining shares available to sell under our ATM facility during that 12-month period. The number of shares and price at which we may be able to sell shares under the ATM facility may be limited due to market conditions and other factors beyond our control.

We have a limited operating history and have incurred significant losses since our inception and anticipate that we will continue to incur losses for the foreseeable future and may never achieve or maintain profitability. The absence of any commercial sales and our limited operating history make it difficult to assess our future viability.

We are a development-stage pharmaceutical company with a limited operating history and a history of losses. Pharmaceutical product development is a highly speculative undertaking and involves a substantial degree of risk. We are focused principally on repurposing and/or reformulating existing drugs for serious rare and life-threatening diseases with significant unmet medical needs. We are not profitable and have incurred losses in each year since inception. We have only a limited operating history upon which you can evaluate our business and prospects. In addition, we have limited experience and have not yet demonstrated an ability to successfully overcome many of the risks and uncertainties frequently encountered by companies in new and rapidly evolving fields, particularly in the pharmaceutical industry. We have not generated any product sales revenue to date. We continue to incur significant research and development and other expenses related to our ongoing operations. Our net loss for the years ended December 31, 2022 and 2021 was \$26.2 million and \$15.4 million, respectively. As of December 31, 2022, we had an accumulated deficit of \$140.7 million. We expect to continue to incur losses for the foreseeable future as we continue OLPRUVA™ commercialization and our development of, and seek marketing approvals for, our product candidates.

We have devoted substantially all of our financial resources to identify, acquire, and develop our product candidates, including providing general and administrative support for our operations. To date, we have financed our operations primarily through the sale of equity securities. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to obtain funding through public or private equity or debt financings, strategic collaborations, or non-dilutive funding. We expect losses to increase as we conduct clinical trials and continue to develop our product candidates. We expect to invest significant funds into the research and development of our current product candidates to determine the potential to advance these product candidates to regulatory approval. We may also invest in acquiring or in-licensing additional product candidates to expand our pipeline.

The market for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS is limited, as we believe the prevalence is no more than approximately 2,100 individuals in the U.S. with a diagnosed patient population in the U.S. of only approximately 1,100. Thus, our potential future revenue from this market is limited. If we obtain regulatory approval to market other product candidates, our potential future revenue from any such product will depend upon the size of any market in which such product candidate may receive approval and, as with OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS, our ability to achieve sufficient market acceptance, pricing, reimbursement from third-party payors, and adequate market share cannot be assured. Even if we obtain adequate market share, because the market for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS is limited and the potential markets in which our other product candidates may ultimately receive regulatory approval could be very small, we may never become profitable despite obtaining such market share and acceptance of our products.

We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future, and our expenses will increase substantially if and as we:

- seek to establish a sales, marketing and distribution infrastructure to commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS
- seek regulatory and marketing approvals and reimbursement for our product candidates
- continue the clinical development of our product candidates
- continue efforts to discover new product candidates
- undertake the manufacturing of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDS involving deficiencies of CPS, OTC, or AS, or our product candidates or increase volumes manufactured by third parties

- advance our programs into larger, more expensive clinical trials
- initiate additional preclinical, clinical, or other trials or studies for our product candidates
- establish a sales, marketing and distribution infrastructure to commercialize any product candidates for which we may obtain marketing approval and market for ourselves
- seek to identify, assess, acquire and/or develop other product candidates
- make milestone, royalty or other payments under third-party license agreements
- seek to maintain, protect and expand our intellectual property portfolio
- seek to attract and retain skilled personnel, and
- experience any delays or encounter issues with the development and potential for regulatory approval of our clinical candidates such as safety issues, clinical trial enrollment delays, longer follow-up for planned studies, additional major studies or supportive studies necessary to support marketing approval

Further, the net losses we incur will fluctuate significantly from quarter to quarter and year to year, such that a period-to-period comparison of our results of operations may not be a good indication of our future performance.

We currently have no source of commercial product sales revenue and may never be profitable.

While we have generated revenue related to the Collaboration Agreement with Relief, we have not generated any revenues from commercial sales of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, or from any of our current product candidates. Our ability to generate product revenue depends upon our ability to successfully commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and to identify, develop and commercialize our product candidates or other product candidates that we may develop, in-license or acquire in the future. Our ability to generate product revenue from OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as future product revenue from our current or future product candidates also depends on a number of additional factors, including our ability to:

- successfully complete research and clinical development of current and future product candidates
- establish and maintain supply and manufacturing relationships with third parties, and ensure adequate and legally compliant manufacturing
- obtain regulatory approval from relevant regulatory authorities in jurisdictions where we intend to market our product candidates
- successfully establish a sales force and medical affairs, marketing, and distribution infrastructure and successfully launch and commercialize OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS
- successfully launch and commercialize any future product candidates for which we obtain marketing approval, if any, and if launched independently, successfully establish a sales force and medical affairs, marketing, and distribution infrastructure
- obtain coverage and adequate product reimbursement from third-party payors, including government payors
- achieve market acceptance for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS
- achieve market acceptance for other approved product candidates, if any
- establish, maintain and protect our intellectual property rights, and
- attract, hire and retain qualified personnel

In addition, because of the numerous risks and uncertainties associated with clinical product development, including that our product candidates may not successfully advance through development or achieve regulatory approval, we are unable to predict the timing or amount of any potential future product sales revenues. Our expenses also could increase beyond expectations if we decide to or are required by the FDA, or comparable foreign regulatory authorities, to perform studies or trials to satisfy additional unexpected activities in addition to those that we currently anticipate.

Even if we complete the development and regulatory processes described above, we anticipate incurring significant costs associated with launching and commercializing these products.

We have incurred, and expect to continue to incur, increased costs and risks as a result of being a public company.

As a public company, we are required to comply with the Sarbanes-Oxley Act of 2002 (“SOX”), as well as rules and regulations implemented by the Securities and Exchange Commission (“SEC”) and the Nasdaq Capital Market (“Nasdaq”). Changes in the laws and regulations affecting public companies, including the provisions of SOX and rules adopted by the SEC and by Nasdaq, have resulted in, and will continue to result in, increased costs as we respond to their requirements. Given the risks inherent in the design and operation of internal controls over financial reporting, the effectiveness of our internal controls over financial reporting is uncertain. If our internal controls are not designed or operating effectively, we may not be able to conclude an evaluation of our internal control over financial reporting as required or we or our independent registered public accounting firm may determine that our internal control over financial reporting was not effective. We currently have a very limited workforce, and it may be difficult to adhere to appropriate internal controls over financial reporting or disclosure controls with such limited staffing. We are not yet subject to the provisions of section 404(b) of SOX, which would require our independent registered public accounting firm’s attestation on management’s assessment of internal controls over financial reporting. Investors may lose confidence in the reliability of our financial statements, which could cause the market price of our common stock to decline and which could affect our ability to run our business effectively. As a public company, it could also be more difficult or more costly for us to obtain certain types of insurance, including directors’ and officers’ liability insurance. The impact of these events could also make it more difficult for us to attract and retain qualified persons to serve on our Board of Directors, our Board committees, and as executive officers.

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired.

We are subject to the reporting requirements of the Exchange Act, SOX and Nasdaq rules and regulations. SOX requires, among other things, that we maintain effective disclosure controls and procedures and internal controls over financial reporting. We must perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on the effectiveness of our internal controls over financial reporting in our Annual Report on Form 10-K filing for that year, as required by Section 404 of SOX.

As discussed in this report, we identified a material weakness in our internal control over financial reporting that resulted in a restatement of our unaudited condensed interim financial statements for the three months ended March 31, 2021 and June 30, 2021 relating to the Collaboration Agreement we entered into with Relief, which our management has determined has been remediated as of December 31, 2022. As also discussed in this report, a restatement of certain items presented in our original Form 10-Q for the three and six months ended June 30, 2022 was required as a result of a material weakness in our internal control over accounting for debt related to the application of certain interpretive accounting guidance related to ASC 260, Earnings Per Share. Specifically, when the fair value of a contract is reported as an asset or liability for accounting purposes and changes in the fair value are recorded through earnings, such as the Marathon Convertible Notes, the calculation of diluted earnings per share using the “if-converted” method may require an adjustment to the numerator for any changes in income or loss that would result if the contract had been reported as an equity instrument for accounting purposes during the period, and in doing so the result is dilutive to the net loss per share calculation. Although we are committed to continuing to improve our internal control processes, and although we will continue to diligently and vigorously review our internal controls over financial reporting, we cannot be certain that, in the future, a material weakness will not exist or otherwise be discovered. We may discover other weaknesses in our system of internal financial and accounting

controls and procedures that could result in a material misstatement of our financial statements. Our internal control over financial reporting will not prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If we are not able to comply with the requirements of Section 404 of SOX, or if we are unable to maintain proper and effective internal controls, we may not be able to produce timely and accurate financial statements. If that were to happen, the market price of our common stock could decline and we could be subject to penalties or investigations by Nasdaq or the SEC.

We face risks related to health epidemics including but not limited to the COVID-19 pandemic which could adversely affect our business.

Our business could be materially adversely affected by the effects of a widespread outbreak of contagious disease, including the recent pandemic of COVID-19, a respiratory illness caused by a novel coronavirus. While our employees work remotely a large part of the time, these effects could include disruptions or restrictions on our employees' ability to travel, as well as disruptions at or closures of our facilities or the facilities of our manufacturers and suppliers, which could adversely impact our development activities and other operations. Health professionals may reduce staffing and reduce or postpone meetings with clients, colleagues, and others in response to the spread of an infectious disease. Such events may result in a period of business disruption, and in reduced operations, any of which could materially affect our business, financial condition, and results of operations. In addition, a significant outbreak of contagious diseases in the human population could result in a widespread health crisis that could adversely affect the economies and financial markets of many countries, resulting in an economic downturn or volatility that could adversely affect our manufacturers and suppliers and otherwise adversely impact our development activities and other operations. Current estimates of the possible impact of global issues on the drug supply chain and its application to our potential products may also be affected by the manufacturing steps required to be undertaken to produce finished product, including manufacture of active pharmaceutical ingredient, excipients, packaging, and labelling.

The extent to which the COVID-19 pandemic will continue to affect our business, results of operations, and financial condition is difficult to predict. The outbreak has affected, and could potentially continue to affect, the business of the FDA, EMA or other health authorities, which has resulted and could continue to result in delays in meetings and other activities related to our product candidates and our planned clinical trials and ultimately in the review and approval of our product candidates. The spread of COVID-19 has slowed and may continue to slow enrollment of clinical trials and reduce the number of eligible patients for our clinical trials, thereby making recruitment more difficult and competitive. Prolonged disruptions to businesses, manufacturing and supply chain, including shelter-in-place or similar orders imposed by federal, state or local government authorities, and economic downturns can lead to material adverse effects on our business operations, including layoffs and/or suspension of our business operations. The COVID-19 outbreak and mitigation measures also have had and may continue to have an adverse impact on global economic conditions which could have an adverse effect on our business and financial condition, including impairing our ability to raise capital when and in the amount needed. The extent to which COVID-19 impacts our business will depend on future developments, which are highly uncertain and cannot be predicted, including new information which may emerge concerning the severity of COVID-19 and the actions to contain COVID-19 or treat its impact, among others. In addition, any COVID-19 infection of any of our employees could have a significant impact on our ability to conduct business.

Any acquisitions that we make could disrupt our business and harm our financial condition.

We expect to evaluate potential strategic acquisitions of complementary businesses, products or technologies worldwide. We may also consider joint ventures, licensing and other collaborative projects. We may not be able to identify appropriate acquisition candidates or strategic partners, or successfully negotiate, finance or integrate acquisitions of any businesses, products or technologies. Furthermore, the integration of any acquisition and management of any collaborative project may divert our management's time and resources from our core business

and disrupt our operations. As a company, we have limited experience with acquiring other companies, or with acquiring products outside of the U.S. Any cash acquisition we pursue would divert the cash we have on our balance sheet from our present clinical development programs. Any stock acquisitions would dilute our stockholders' ownership.

Risks Related to the Marathon Convertible Notes and SWK Loans

The requirement that we repay in cash the outstanding principal balance and accrued interest on the SWK Loans plus interest and fees (including a repayment premium) and the Marathon Convertible Notes which we are committed to repurchase at a premium (which is subject to escalation), and certain operating and financial covenants and restrictions on our operating and financial flexibility under the SWK Loans and the Marathon Convertible Notes, could materially adversely affect our business plans, liquidity, financial condition, results of operations and viability, including but not limited to a loss of control over our cash and other assets, in which the lenders have a security interest, and prevent us from taking actions that we would otherwise consider to be in our best interests.

The secured convertible notes issued to MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P., (the "Holders"), in an aggregate principal amount of \$6.0 million (the "Marathon Convertible Notes"), bear interest at an annual rate of 6.5%, with such interest payable quarterly; provided, however, that accrued and unpaid interest through March 31, 2023 shall be deferred and shall become due and payable in cash, together with any accrued and unpaid interest on each Marathon Convertible Note after March 31, 2023, on April 15, 2023. Additionally, subject to the restrictions set forth in a subordination agreement among SWK Funding LLC ("SWK"), as agent and lender, and each of the Holders (the "Subordination Agreement"), we are required to repurchase the Marathon Convertible Notes, on or before the fifth business day following the earlier of June 15, 2023 and our receipt of gross proceeds of at least \$40.0 million from the issuance or sale of debt, equity or hybrid securities, loans or other financing on a cumulative basis since January 1, 2023 (excluding the Second SWK Loan, defined below) at a price equal to 200% (the "Buy-Out Percentage") of the outstanding principal amount of the Marathon Convertible Notes, together with any accrued but unpaid interest thereon to the date of such repurchase; provided, that if we are prohibited from effectuating such repurchases pursuant to the Subordination Agreement, the repurchase is to occur on or before the fifth business day after such prohibition is no longer applicable; and provided further, that if such repurchase has not occurred by April 15, 2023, the Buy-Out Percentage shall be increased by 2500 basis points for each 90-day period after April 15, 2023, pro-rated for the actual number of days elapsed in the 90-day period before the repurchase actually occurs (i.e., the Buy-Out Percentage would be 212.5% 45 days after April 15, 2023).

Our senior secured term loan facility with SWK as the agent (the "SWK Loans"), in a principal amount of \$13.9 million, bears interest at an annual rate equal to the three-month term rate based on the Secured Overnight Financing Rate ("Term SOFR") (or such other rate as may be agreed between SWK and us following the date on which three-month Term SOFR is no longer available), subject to a 1.0% Term SOFR floor, plus a margin of 11.0%, and is therefore sensitive to changes in interest rates. If three-month Term SOFR can no longer be determined or if the applicable governmental authority ceases to supervise or sanction such rates, then we will endeavor to agree with SWK on an alternate rate of interest that gives due consideration to the then prevailing market convention for determining interest for comparable loans in the U.S. We cannot predict what the impact of any such alternative rate would be to our interest expense. However, the discontinuation, reform, or replacement of Term SOFR or any other benchmark rates may result in fluctuating interest rates that may have a negative impact on our interest expense and cash flows. Furthermore, we cannot predict or quantify the time, effort and cost required to transition to the use of new benchmark rates, including with respect to negotiating and implementing any necessary changes to the SWK Loans, and implementing changes to our systems and processes.

We have the option to capitalize the accrued interest on the SWK Loans until May 15, 2023. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women, the principal amount of the SWK Loans amortizes at a monthly rate of \$0.6 million starting April 15, 2023, until we have issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net proceeds from

the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly, with the final maturity being March 4, 2024. We must also pay an exit fee to SWK as follows: (i) with respect to \$6.9 million in principal amount, a fee which, when added to all principal, interest, and origination and other fees paid to SWK with respect to such principal amount, but excluding the value of any warrants issued to SWK in connection with the SWK Loans, equals such principal amount multiplied by 1.5; and (ii) with respect to \$7.0 million in principal amount funded at the end of January 2023 (the “Second SWK Loan”), a fee which, when added to all principal, interest, and origination and other fees paid to SWK with respect to such principal amount, but excluding the value of any warrants issued to SWK in connection with the SWK Loans, equals such principal amount multiplied by (A) if the repayment occurs on or before April 15, 2023, 1.18, (B) if the repayment occurs on or after April 16, 2023 but prior to May 16, 2023, 1.28667, (C) if the repayment occurs on or after May 16, 2023 but prior to June 16, 2023, 1.39334 or (D) if the repayment occurs on or after July 16, 2023, 1.5. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, we are required to maintain for purposes of the SWK Loans unencumbered liquid assets of not less than the lesser of (x) the outstanding principal amount of the SWK Loans or (y) \$3.0 million (as opposed to \$1.5 million for clause (y) prior to the announcement of such topline results).

The Marathon Convertible Notes and the SWK Loans are secured by a first and second priority lien on all of our assets (including our intellectual property). Our failure to repurchase the Marathon Convertible Notes when required, or to pay any cash for principal reduction or accrued interest on the Marathon Convertible Notes or the SWK Loans, would constitute a default under the relevant indebtedness. In such event, or if a default otherwise occurs, including as a result of our failure to comply with the restrictive covenants contained therein, the interest rate on the outstanding principal balance of the SWK Loans will increase by 3% from the occurrence and during the continuance of an event of default. If not timely cured, the lenders could take such actions as may be available to senior secured creditors generally, and specifically under the loan agreements governing the SWK Loans and the Marathon Convertible Notes, including assertion of control over some or all of our assets.

The Marathon Convertible Notes and the SWK Loans restrict our ability to incur new indebtedness, sell assets, and pursue certain mergers, acquisitions, or consolidations that we may believe to be in our best interest. In addition, the SWK Loans contain financial covenants that require us to maintain a minimum amount of unencumbered liquid assets (as noted above) as well as other covenants and restrictions that could materially adversely affect our business plans, liquidity, financial condition, results of operations and viability and prevent us from taking actions that we would otherwise consider to be in our best interests. If we default under the SWK Loans, the lenders will be able to declare all obligations immediately due and payable, including certain fees and other obligations. The lenders could declare an event of default upon the occurrence of any event that they interpret as a material adverse change or material adverse effect. Any declaration by the lenders of an event of default could significantly harm our business and prospects and could cause the price of our common stock to decline.

The obligations, security interests and covenants of the Marathon Convertible Notes and the SWK Loans could have important consequences on our business. In particular, they could:

- require us to dedicate a substantial portion of our cash flow from operations to service our indebtedness or comply with liquidity covenants, thereby reducing the amount of our cash available for other purposes
- limit our ability to obtain additional funds and otherwise raise additional capital for working capital, acquisitions, research and development expenditures, and general corporate purposes
- limit our ability to conduct acquisitions, joint ventures or other similar arrangements
- limit our flexibility in planning for, or reacting to, changes in our business and the pharmaceutical and biotechnology industry in which we operate and compete
- increase our vulnerability to general adverse economic and industry conditions, or
- place us at a competitive disadvantage compared to our competitors that have lower fixed costs or better access to capital resources

The debt service requirements of the Marathon Convertible Notes and the SWK Loans could intensify these risks. Our ability to make scheduled payments of interest or principal or to repurchase or refinance our indebtedness depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not generate cash flow from operations in the future sufficient to service our debt and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. No assurances can be given that we will be successful in making the required payments under our indebtedness, or in refinancing our obligations on favorable terms, or at all. Should we determine to refinance, it could be further dilutive to our stockholders. Our ability to refinance our indebtedness will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations.

The number of shares registered for resale on behalf of the holders of the Marathon Convertible Notes is significant in relation to our trading volume.

All of the shares of common stock underlying the Marathon Convertible Notes that we registered for resale on behalf of holders are “restricted securities” as that term is defined in Rule 144 under the Securities Act. We registered the offer and resale by the holders of the shares underlying the Marathon Convertible Notes to satisfy certain registration rights we granted to the holders, and so that the shares may be offered for resale into the public market by the holders. If all such shares were sold into the market all at once or at about the same time, it could depress the market price of our stock during the period the registration statement covering the resale of the shares remains effective and also could affect our ability to raise equity capital.

A substantial number of shares of our common stock may be issued pursuant to the terms of the Marathon Convertible Notes, which could cause the price of our common stock to decline.

The Marathon Convertible Notes are convertible into shares of our common stock immediately after issuance at a conversion price of \$2.50, for an aggregate of 2,400,000 shares upon conversion of the original principal amount (without taking into account the limitations on the conversion of the Marathon Convertible Notes). Furthermore, the number of shares of common stock to be issued upon conversion of the Marathon Convertible Notes may be substantially greater if accrued but unpaid interest on the Marathon Convertible Notes is converted into shares of common stock at the same time as the principal is converted. We are unable to predict if and when the holders will convert their Marathon Convertible Notes, and whether or not any accrued but unpaid interest will also be converted. While accrued interest on the Marathon Convertible Notes is payable in cash according to their terms, any accrued but unpaid interest is also convertible into shares of common stock at the same time as the holder otherwise converts principal on the Marathon Convertible Notes.

We registered 2,478,000 shares of our common stock for resale by the holders in the event that up to six months of accrued but unpaid interest is included in the conversion. The actual number of shares issued upon conversion of the Marathon Convertible Notes may be more or less than this amount depending upon the outstanding principal balance and the amount of any accrued but unpaid interest at the time. We may need to register more shares if the accrued but unpaid interest at the time of conversion represents more than 78,000 shares of our common stock. The foregoing amount of shares registered does not take into account the limitations on conversion of the Marathon Convertible Notes.

Risks Related to the Clinical Development and Marketing Approval of Our Product Candidates

The marketing approval processes of the FDA and comparable foreign authorities are lengthy, time-consuming and inherently unpredictable, and if we are ultimately unable to obtain marketing approval for our product candidates, our business will be substantially harmed.

Other than OLPRUVA™ for oral suspension in the U.S. which has been approved by the FDA for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, none of our current product

candidates has gained marketing approval for sale in the U.S. or any other country, and we cannot guarantee that we will ever have any other marketable products. Our business is substantially dependent on our ability to complete the development of, obtain marketing approval for, and successfully commercialize our product candidates in a timely manner. We cannot commercialize our product candidates in the U.S. without first obtaining approval from the FDA to market each product candidate. Similarly, we cannot commercialize our product candidates outside of the U.S. without obtaining regulatory approval from comparable foreign regulatory authorities. Our product candidates could fail to receive marketing approval for many reasons, including the following:

- the FDA or comparable foreign regulatory authorities may find inadequate the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies
- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication (for example, topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women)
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks
- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of any clinical trials we conduct or rely upon for regulatory approval
- the FDA or comparable foreign regulatory authorities may find the human subject protections for our clinical trials inadequate and place a clinical hold on an investigational new drug application ("IND") at the time of its submission precluding commencement of any trials or a clinical hold on one or more clinical trials at any time during the conduct of our clinical trials
- the FDA could determine that we cannot rely on Section 505(b)(2) of the Federal Food, Drug and Cosmetic Act ("FDCA") for any or all of our product candidates, and we may be required to conduct clinical trials or provide other forms of substantial evidence of effectiveness instead of, or in addition to, relying on third-party data, as is the position of the FDA with respect to our New Drug Application ("NDA") for EDSIVO™
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from non-clinical studies or clinical trials
- the FDA could determine that we have identified the wrong reference listed drug or drugs or that approval of our 505(b)(2) application for any of our product candidates is blocked by patent or non-patent exclusivity of the reference listed drug or drugs
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of an application to obtain marketing approval in the U.S. or elsewhere, and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner that would delay marketing approval

Before obtaining marketing approval for the commercial sale of any drug product for a target indication, we must demonstrate in preclinical studies and well-controlled clinical trials and, to the satisfaction of the applicable regulatory authorities, that the product is safe and effective for its intended use and that the manufacturing facilities, processes, and controls are adequate to preserve the drug's identity, strength, quality and purity. In the U.S., it is necessary to submit and obtain approval of an NDA from the FDA. An NDA must include extensive preclinical and clinical data and supporting information to establish the product safety and efficacy for each desired indication. The NDA must also include significant information regarding the chemistry, manufacturing, and controls for the product. After the submission but before approval of the NDA, the manufacturing facilities used to manufacture a product candidate must be inspected by the FDA to ensure compliance with the applicable Current Good Manufacturing

Practice (“cGMP”) requirements. The FDA and the Competent Authorities of the Member States of the European Economic Area (“EEA”) and comparable foreign regulatory authorities, may also inspect our clinical trial sites and audit clinical study data to ensure that our studies are properly conducted in accordance with the IND regulations, human subject protection regulations, and current good clinical practice (“cGCP”).

Obtaining approval of an NDA is a lengthy, expensive and uncertain process, and approval may not be obtained. Upon submission of an NDA, the FDA must make an initial determination that the application is sufficiently complete to accept the submission for filing. We cannot be certain that any submissions, even those that are or have been accepted for filing and reviewed by the FDA, will ultimately be approved. If the application is not accepted for review, or if the FDA finds after review that the NDA is not approvable as submitted, the FDA may require that we conduct additional clinical studies or preclinical testing or take other actions before it will reconsider our application. If the FDA requires additional studies or data, we would incur increased costs and delays in the marketing approval process, which may require us to reduce headcount or other expenses and/or expend more resources than we have available. In addition, the FDA may not consider any additional information to be complete or sufficient to support the filing or approval of the NDA.

Regulatory authorities outside of the U.S., such as in Europe and Japan and in emerging markets, also have requirements for approval of drugs for commercial sale with which we must comply prior to marketing in those areas. Regulatory requirements can vary widely from country to country and could delay or prevent the introduction of our product candidates. Clinical trials conducted in one country may not be accepted or the results may not be found adequate by regulatory authorities in other countries, and obtaining regulatory approval in one country does not mean that regulatory approval will be obtained in any other country. However, the failure to obtain regulatory approval in one jurisdiction could have a negative impact on our ability to obtain approval in a different jurisdiction. Approval processes vary among countries and can involve additional product candidate testing and validation and additional administrative review periods. Seeking foreign regulatory approval could require additional non-clinical studies or clinical trials, which could be costly and time-consuming. Foreign regulatory approval may include all of the risks associated with obtaining FDA approval. For all of these reasons, we may not obtain foreign regulatory approvals on a timely basis, if at all.

The process to develop, obtain marketing approval for, and commercialize product candidates is long, complex and costly, both inside and outside of the U.S., and approval is never guaranteed. The time required to obtain approval by the FDA and comparable foreign authorities is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of the regulatory authorities. In addition, approval policies, regulations, or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate’s clinical development and may vary among jurisdictions. Even if our product candidates were to successfully obtain approval from regulatory authorities, any such approval might significantly limit the approved indications for use, including more limited patient populations, require that precautions, warnings or contraindications be included on the product labeling, including black box warnings, require expensive and time-consuming post-approval clinical studies, risk evaluation and mitigation strategies or surveillance as conditions of approval, or, through the product label, the approval may limit the claims that we may make, which may impede the successful commercialization of our product candidates. Following any approval for commercial sale of our product candidates, certain changes to the product, such as changes in manufacturing processes and additional labeling claims, as well as new safety information, may require new studies and will be subject to additional FDA notification, or review and approval. Also, marketing approval for any of our product candidates may be withdrawn. If we are unable to obtain marketing approval for our product candidates in one or more jurisdictions, or any approval contains significant limitations, our ability to market to our full target market will be reduced and our ability to realize the full market potential of our product candidates will be impaired. Furthermore, we may not be able to obtain sufficient funding or generate sufficient revenue and cash flows to continue or complete the development of any of our current or future product candidates.

If we are unable to obtain approval under Section 505(b)(2) of the FDCA or if we are required to generate additional data related to safety or efficacy in order to seek approval under Section 505(b)(2), we may be unable to meet our anticipated development and commercialization timelines, and could decide not to pursue

further development, depending on the expected time, cost, and risks associated with generating any such additional data, which could have a negative impact on the success of our product development efforts.

Traditional drug development typically relies upon Section 505(b)(1) of the FDCA for seeking marketing authorization in the U.S., where the sponsor of the product candidate (i.e., the applicant for marketing authorization) is required to conduct all of the studies needed to demonstrate the safety and efficacy of such candidate, a pathway that we plan to use for EDSIVO™ and ACER-801. Our strategy for seeking marketing authorization in the U.S. for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, OLPRUVA™ relied on Section 505(b)(2) of the FDCA, and our intended strategy for other product candidates may rely on Section 505(b)(2) of the FDCA, which permits use of a marketing application, referred to as a 505(b)(2) application, where at least some of the information needed to demonstrate the safety and efficacy of the product candidate at issue for approval comes from studies not conducted by or for the applicant and for which the applicant has not obtained a right of reference or use. The FDA interprets this to mean that an applicant may rely for approval on such data as that found in published literature or the FDA's finding of safety or effectiveness, or both, of a previously approved drug product owned by a third party. There is no assurance that the FDA would find third-party data relied upon by us in a 505(b)(2) application sufficient or adequate to support approval, and the FDA may require us to generate additional data to support the safety and efficacy of our product candidates. Depending on the time, nature, risk, and cost of obtaining that data or undertaking the required activities, we may decide that we are not able or willing to proceed with development, and may or may not reduce headcount and spending accordingly.

If the data to be relied upon in a 505(b)(2) application are related to drug products previously approved by the FDA and covered by patents that are listed in the FDA's Orange Book, we would be required to submit with our 505(b)(2) application a Paragraph IV Certification in which we must certify that we do not infringe the listed patents or that such patents are invalid or unenforceable, and provide notice to the patent owner or the holder of the approved NDA. The patent owner or NDA holder would have 45 days from receipt of the notification of our Paragraph IV Certification to initiate a patent infringement action against us. If an infringement action is initiated, the approval of our NDA would be subject to a stay of up to 30 months or more while we defend against such a suit. Approval of our product candidates under Section 505(b)(2) may, therefore, be delayed until patent exclusivity expires or until we successfully challenge the applicability of those patents to our product candidates. Alternatively, we might elect a Section 505(b)(1) pathway to generate sufficient clinical data so that we would no longer need to rely on third-party data. However, a Section 505(b)(1) pathway would likely be costly and time-consuming and there would be no assurance that such data generated from such additional activities would be sufficient to seek or obtain approval.

We may not be able to obtain shortened review of our applications, and the FDA may not agree that our product candidates qualify for marketing approval. If we are required to generate additional data to support approval, we may be unable to meet anticipated or reasonable development and commercialization timelines, may be unable to generate the additional data at a reasonable cost, or at all, and may be unable to obtain marketing approval of our product candidates. If the FDA changes its interpretation of Section 505(b)(2) allowing reliance on data in a previously approved drug application owned by a third party, or if there is a change in the law affecting Section 505(b)(2), this could delay or even prevent the FDA from approving any Section 505(b)(2) application that we submit.

Marketing approval may be substantially delayed or may not be obtained for one or all of our product candidates if regulatory authorities require additional or more studies to assess the safety and efficacy of our product candidates. We could decide not to pursue further development of one or all of our product candidates, depending on, among other things, the expected time, cost, and risks associated with generating any such additional data.

We may be unable to initiate or complete development of our product candidates on schedule, if at all. The completion of the studies for certain of our product candidates will require us to obtain substantial additional funding beyond our current resources. In addition, regulatory authorities may require additional or more time-consuming studies to assess the safety or efficacy of our product candidates than we are currently planning. For example, in June 2019, we received a Complete Response Letter from the FDA regarding our NDA for EDSIVO™

for the treatment of vascular Ehlers-Danlos syndrome (“vEDS”). The Complete Response Letter stated that it will be necessary to conduct an adequate and well-controlled trial to determine whether celiprolol reduces the risk of clinical events in patients with vEDS. In light of the FDA’s Complete Response Letter regarding our NDA for EDSIVO™, we halted precommercial activities. In December 2019, we submitted a Formal Dispute Resolution Request to the Office of New Drugs appealing the FDA’s decision as outlined in the Complete Response Letter. In March 2020, we received a response to our Formal Dispute Resolution Request from the Office of New Drugs of the FDA stating that it had denied our appeal of the Complete Response Letter in relation to the NDA for EDSIVO™. In its Appeal Denied letter, the Office of New Drugs (i) described possible paths forward for us to explore that could provide the substantial evidence of effectiveness needed to support a potential resubmission of the EDSIVO™ NDA for the treatment of patients with vEDS with a confirmed COL3A1 mutation and (ii) referred to the FDA Guidance document issued in December 2019, where substantial evidence of effectiveness can be provided by two or more adequate and well-controlled studies demonstrating efficacy, or a single positive adequate and well-controlled study plus confirmatory evidence.

Following a Type B meeting with the FDA in the second quarter of 2021, we are now conducting a U.S.-based prospective, randomized, double-blind, placebo-controlled, decentralized pivotal clinical trial in patients with COL3A1-positive vEDS, which we refer to as the DiSCOVER trial. The proposed design features of the trial under SPA agreement with the FDA include: the acceptability of a decentralized (virtual) clinical trial design and use of an independent centralized adjudication committee; acceptability of a primary endpoint based on clinical events associated with disease outcome; agreement with modest safety data collection (based on the known safety profile of the drug); and a statistical plan that considers the rare disease classification of vEDS. In the fourth quarter of 2021, we submitted a protocol for the prospective pivotal trial, along with an IND. In April 2022, we received breakthrough therapy designation and reached agreement on a SPA in May 2022. The trial plan is to enroll approximately 150 COL3A1-positive vEDS patients in the U.S., and the duration of the trial is estimated to be approximately 3.5 years to complete once fully enrolled (based on statistical power calculations and number of primary events). Additional capital will be needed to fund the trial through and beyond the second quarter of 2023. One interim analysis (based on number of primary events) is planned at approximately 18 months after full enrollment. There can be no assurance that the resulting data from the trial would be adequate to support approval of our NDA. We may also conclude at any point that the cost, risk and uncertainty of obtaining that additional data does not justify continuing with the development of EDSIVO™.

We currently do not have, and may not be able to obtain, adequate funding to complete the necessary steps for approval for any or all of our product candidates. Additional delays may result if the FDA, an FDA Advisory Committee (if one is convened to review any NDA we file) or another regulatory authority indicates that a product candidate should not be approved or there should be restrictions on approval, such as the requirement for a Risk Evaluation and Mitigation Strategy (“REMS”), to ensure the safe use of the drug. Delays in marketing approval or rejections of applications for marketing approval in the U.S. or other markets may result from many factors, including:

- the FDA’s or comparable foreign regulatory authorities’ disagreement with the design or implementation of any clinical trials we conduct or rely on for regulatory approval
- regulatory requests for additional analyses, reports, data, non-clinical and preclinical studies and clinical trials
- regulatory questions or disagreement by the FDA or comparable regulatory authorities regarding interpretations of data and results and the emergence of new information regarding our current or future product candidates or the field of research
- unfavorable or inconclusive results of clinical trials and supportive non-clinical studies, including unfavorable results regarding safety or efficacy of our product candidates during clinical trials
- failure to meet the level of statistical significance required for approval
- inability to demonstrate that a product candidate’s clinical and other benefits outweigh its safety risks
- lack of adequate funding to commence or continue our clinical trials due to unforeseen costs or other business decisions

- regulatory authorities may find inadequate the manufacturing processes or facilities of the third-party manufacturers with which we contract for clinical and commercial supplies
- we may have insufficient funds to pay the significant user fees required by the FDA upon the filing of an NDA, and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner that would delay marketing approval

The lengthy and unpredictable approval process, as well as the unpredictability of future clinical trial results, may result in our failure to obtain marketing approval to market our product candidates, which would significantly harm our business, results of operations and prospects and could lead to reduction in headcount.

Clinical drug development involves a lengthy and expensive process with an uncertain outcome. Clinical development of product candidates for rare diseases carries additional risks, such as recruiting patients in a very small patient population.

Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. The FDA and comparable foreign regulatory authorities have substantial discretion in the approval process and determining when or whether marketing approval will be obtained for our current product candidates. Even if we believe the data collected from clinical trials of our current product candidates are promising, such data may not be sufficient to support approval by the FDA or comparable foreign authorities. Our future clinical trial results may not be successful.

It is impossible to predict the extent to which the clinical trial process may be affected by legislative and regulatory developments. Due to these and other factors, our current product candidates or future product candidates could take a significantly longer time to gain marketing approval than expected or may never gain marketing approval. This could delay or eliminate any potential product revenue by delaying or terminating the potential commercialization of our current product candidates.

Preclinical trials must also be conducted in accordance with the FDA and comparable foreign authorities' legal requirements, regulations or guidelines, including current Good Laboratory Practice ("cGLP"), an international standard meant to harmonize the conduct and quality of nonclinical studies and the archiving and reporting of findings. Preclinical studies including long-term toxicity studies and carcinogenicity studies in animals may result in findings that may require further evaluation, which could affect the risk-benefit evaluation of clinical development, or which may lead the regulatory agencies to delay, prohibit the initiation of or halt clinical trials or delay or deny marketing authorization applications. Failure to adhere to the applicable cGLP standards or misconduct during the course of preclinical trials may invalidate the data and require one or more studies to be repeated or additional testing to be conducted.

Clinical trials must also be conducted in accordance with the FDA and comparable foreign authorities' legal requirements, regulations or guidelines, including human subject protection requirements and cGCP. Clinical trials are subject to further oversight by these governmental agencies and Institutional Review Boards ("IRBs"), at the medical institutions where the clinical trials are conducted. In addition, clinical trials must be conducted with supplies of our current product candidates produced under cGMP and other requirements. Clinical trials are usually conducted at multiple sites, potentially including some sites in countries outside the U.S. and the European Union, which may subject us to further delays and expenses as a result of increased shipment costs, additional regulatory requirements and the engagement of foreign and non-EU clinical research organizations, as well as expose us to risks associated with clinical investigators who are unknown to the FDA or the European regulatory authorities, and with different standards of diagnosis, screening and medical care.

The commencement and completion of clinical trials for our current product candidates may be delayed, suspended or terminated as a result of many factors, including but not limited to:

- the delay or refusal of regulators or IRBs to authorize us to commence a clinical trial at a prospective trial site and changes in regulatory requirements, policies and guidelines
- the FDA or comparable foreign regulatory authorities disagreeing as to the design or implementation of our clinical trials
- failure to reach agreement on acceptable terms with prospective contract research organizations (“CROs”) and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites
- delays in patient enrollment and variability in the number and types of patients available for clinical trials
- the inability to enroll a sufficient number of patients in trials to ensure adequate statistical power to detect statistically significant treatment effects
- lower than anticipated retention rates of patients and volunteers in clinical trials
- clinical sites deviating from trial protocol or dropping out of a trial
- adding new clinical trial sites
- negative or inconclusive results, which may require us to conduct additional preclinical or clinical trials or to abandon projects that we expect to be promising
- safety or tolerability concerns could cause us to suspend or terminate a trial if we find that the participants are being exposed to unacceptable health risks
- regulators or IRBs requiring that we or our investigators suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements
- our third-party research and manufacturing contractors failing to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all
- difficulty in maintaining contact with patients after treatment, resulting in incomplete data
- delays in establishing the appropriate dosage levels
- the quality or stability of our current product candidates falling below acceptable standards
- the inability to produce or obtain sufficient quantities of our current product candidates to complete clinical trials, and
- exceeding budgeted costs due to difficulty in predicting accurately the costs associated with clinical trials

Patient enrollment is a significant factor in the timing of clinical trials and is affected by many factors, including the size and nature of the patient population, the proximity of patients to clinical sites, the eligibility criteria for the trial, the design of the clinical trial, competing clinical trials and clinicians’ and patients’ perceptions as to the potential advantages of the drug being studied in relation to other available therapies, including any new drugs or treatments that may be approved for the indications we are investigating. In addition, the ongoing COVID-19 pandemic may materially adversely affect our ability to recruit qualified subjects for our clinical trials for our product candidates. It is impossible to predict that impact on our clinical trials and our business.

There are significant requirements imposed on us and on clinical investigators who conduct clinical trials that we sponsor. Although we are responsible for selecting qualified clinical investigators, providing them with the information they need to conduct the clinical trial properly, ensuring proper monitoring of the clinical trial, and ensuring that the clinical trial is conducted in accordance with the general investigational plan and protocols contained in the IND, we cannot ensure the clinical investigators will maintain compliance with all regulatory requirements at all times. The pharmaceutical industry has experienced cases where clinical investigators have been found to incorrectly record data, omit data, or even falsify data. We cannot ensure that the clinical investigators in

our trials will not make mistakes or otherwise compromise the integrity or validity of data, any of which would have a significant negative effect on our ability to obtain marketing approval, our business, and our financial condition.

We could encounter delays if a clinical trial is suspended or terminated by us, by the IRBs of the institutions in which such trial is being conducted, by the data safety monitoring board (“DSMB”) for such trial, or by the FDA or comparable foreign regulatory authorities. We or such authorities may impose a suspension or termination due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or comparable foreign regulatory authorities resulting in the imposition of a clinical hold, safety issues or adverse side effects, failure to demonstrate a benefit from using the drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. If we experience delays in the completion or termination of any clinical trial of our current product candidates, the commercial prospects of our current product candidates will be harmed, and our ability to generate product revenues from our product candidates will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow our development and approval process and jeopardize our ability to commence product sales and generate revenues. Many 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 marketing approval of our product candidates.

Any of these occurrences could materially adversely affect our business, financial condition, results of operations, and prospects. In addition, many 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 marketing approval of our current product candidates. Significant clinical trial delays could also allow our competitors to bring products to market before we are able to do so, shorten any periods during which we have the exclusive right to commercialize our current product candidates and impair our ability to commercialize our current product candidates, which may harm our business, financial condition, results of operations, and prospects.

Clinical failure can occur at any stage of clinical development. Because the results of earlier clinical trials are not necessarily predictive of future results, any product candidate we advance through clinical trials may not have favorable results in later clinical trials or receive marketing approval.

Clinical failure can occur at any stage of our clinical development. For example, topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women.

The results of preclinical studies and early clinical trials of our product candidates may not be predictive of the results of later-stage clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. A number of companies in the pharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles, notwithstanding promising results in earlier trials. Clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical or preclinical testing. Data obtained from tests are susceptible to varying interpretations, and regulators may not interpret our data as favorably as we do, which may delay, limit or prevent marketing approval.

In addition, the design of a clinical trial can determine whether our results will support approval of a product or approval of a product for desired indications, and flaws or shortcomings in the design of a clinical trial may not become apparent until the clinical trial is well advanced. Further, clinical trials of potential products often reveal that it is not practical or feasible to continue development efforts. If one of our product candidates is found to be unsafe or lack efficacy, we will not be able to obtain marketing approval for it and our business would be harmed. For example, if the results of our clinical trials of our product candidates do not achieve pre-specified endpoints or we are unable to provide primary or secondary endpoint measurements deemed acceptable by the FDA or comparable foreign regulators or if we are unable to demonstrate an acceptable level of safety relative to the efficacy associated with our proposed indications, the prospects for approval of our product candidates would be materially and adversely affected. A number of companies in the pharmaceutical industry, including those with greater resources and experience than us, have suffered significant setbacks in Phase 2 and Phase 3 clinical trials, even after seeing promising results in earlier clinical trials.

In some instances, there can be significant variability in safety and/or efficacy results between different trials of the same product candidate due to numerous factors, including differences in trial protocols and design, the size and type of the patient population, adherence to the dosing regimen and the rate of dropout among clinical trial participants. We do not know whether any clinical trials we may conduct will demonstrate consistent and/or adequate efficacy and safety to obtain marketing approval for our product candidates.

As an organization, we have limited experience in designing and completing clinical trials and may be unable to do so efficiently or at all for our current product candidates or any product candidate we develop.

We will need to conduct clinical trials of our product candidates. The conduct of clinical trials and the submission of a successful NDA is a complicated process. As an organization, we have limited experience in designing and completing clinical trials, and we have limited experience in preparing and submitting regulatory filings. Consequently, we may be unable to successfully and efficiently execute and complete necessary clinical trials in a way that leads to NDA submission and approval of our product candidates. We may require more time and incur greater costs than anticipated and may not succeed in obtaining marketing approval of the product candidates we develop. Failure to commence or complete, or delays in, our planned clinical trials would prevent us from or delay us in commercializing our current product candidates or any other product candidate we develop.

Our product candidates may cause undesirable adverse effects or have other properties that could delay or prevent their marketing approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if obtained.

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 marketing approval by the FDA or other comparable foreign authorities. If any of our current product candidates or any other product candidate we develop is associated with serious adverse, undesirable or unacceptable side effects, we may need to abandon such candidate's development or limit development to certain uses or subpopulations in which such side effects are less prevalent, less severe or more acceptable from a risk-benefit perspective. Many compounds that initially showed promise in early-stage or clinical testing have later been found to cause side effects that prevented further development of the compound. Results of our trials could reveal a high and unacceptable prevalence of these or other side effects. In such an event, our trials could be suspended or terminated, and the FDA or comparable foreign regulatory authorities could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. The drug-related side effects could affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims.

For OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and for other product candidates that receive marketing approval, if any, and we

or others may identify undesirable side effects caused by such products and a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw approvals of such product
- we may be required to recall a product or change the way such product is administered to patients
- additional restrictions may be imposed on the marketing of the particular product or the manufacturing process for the product or any component thereof
- regulatory authorities may require the addition of labeling statements, such as a precaution, “black box” warning or other warnings or a contraindication
- we or our collaborators may be required to implement a REMS or create a medication guide outlining the risks of such side effect for distribution to patients
- we or our collaborators could be sued and held liable for harm caused to patients
- the product may become less competitive, or
- our reputation may suffer

Any of these events could prevent us from achieving or maintaining market acceptance of our product candidates, if approved, and could materially adversely affect our business, financial condition, results of operations and prospects.

Even if we receive marketing approval for our product candidates, such approved products will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. Additionally, our product candidates, if approved, could be subject to labeling and other restrictions, and we may be subject to penalties and legal sanctions if we fail to comply with regulatory requirements or experience unanticipated problems with our approved products.

For OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and for other product candidates that receive marketing approval, 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, as well as continued compliance with cGMP regulations and GCP for any clinical trials that we conduct post-approval. Any marketing approvals that we receive for our product candidates may also be subject to limitations on the approved indicated uses for which the product may be marketed or to conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor safety and efficacy.

Later discovery of previously unknown problems with an approved product, including adverse events of unanticipated severity or frequency, or with manufacturing operations or processes, or failure to comply with regulatory requirements, or evidence of acts that raise questions about the integrity of data supporting the product approval, may result in, among other things:

- restrictions on the marketing or manufacturing of the product, withdrawal of the product from the market, or voluntary or mandatory product recalls
- fines, warning letters, or holds on clinical trials
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us, or suspension or revocation of product approvals
- product seizure or detention, or refusal to permit the import or export of products
- injunctions or the imposition of civil or criminal penalties

The FDA's policies may change and additional government regulations may be enacted that could prevent, limit or delay marketing approval, manufacturing or commercialization of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the U.S. or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or we are not able to maintain regulatory compliance, we may lose any marketing approval that may have been obtained and we may not achieve or sustain profitability, which would adversely affect our business.

Agencies such as the FDA and national competition regulators in European countries regulate the promotion and uses of drugs not consistent with approved product labeling requirements. If we are found to have improperly promoted our current product candidates for uses beyond those that are approved, we may become subject to significant liability.

Regulatory authorities such as the FDA and national competition agencies in Europe strictly regulate the promotional claims that may be made about prescription products, such as OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as our product candidates, EDSIVO™, ACER-801, or ACER-2820, if approved. In particular, a product may not be promoted for uses that are not approved by the FDA or comparable foreign regulatory authorities as reflected in the product's approved labeling, known as "off-label" use, nor may it be promoted prior to obtaining marketing approval. If we receive marketing approval for our product candidates for our proposed indications, physicians may nevertheless use our products for their patients in a manner that is inconsistent with the approved label if the physicians personally believe in their professional medical judgment it could be used in such manner. Although physicians may prescribe legally available drugs for off-label uses, manufacturers may not market or promote such off-label uses.

In addition, the FDA requires that promotional claims not be "false or misleading" as such terms are defined in the FDA's regulations. For example, the FDA requires substantial evidence, which generally consists of two adequate and well-controlled clinical trials, for a company to make a claim that its product is superior to another product in terms of safety or effectiveness. Generally, unless we perform clinical trials meeting that standard comparing our product candidates to competitive products and these claims are approved in our product labeling, we will not be able to promote our current product candidates as superior to other products. If we are found to have made such claims, we may become subject to significant liability. In the U.S., the federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in improper promotion. The FDA has also requested that companies enter into consent decrees or corporate integrity agreements. The FDA could also seek permanent injunctions under which specified promotional conduct is monitored, changed or curtailed.

Our current and future relationships with healthcare professionals, investigators, consultants, collaborators, actual customers, potential customers and third-party payors in the U.S. and elsewhere may be subject, directly or indirectly, to applicable anti-kickback, fraud and abuse, false claims, physician payment transparency, health information privacy and security and other healthcare laws and regulations, which could expose us to sanctions.

Healthcare providers, physicians and third-party payors in the U.S. and elsewhere will play a primary role in the recommendation and prescription of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and for any other drug products for which we may obtain marketing approval. Our current and future arrangements with healthcare professionals, investigators, consultants, collaborators, actual customers, potential customers and third-party payors may expose us to broadly applicable fraud and abuse and other healthcare laws, including, without limitation, the federal Anti-Kickback Statute and the federal False Claims Act, that may constrain the business or financial arrangements and relationships through which we sell, market and distribute any drug candidates for which we obtain marketing approval. In addition, we may be subject to physician payment transparency laws and patient privacy and security regulation by the U.S. federal government and states and by the foreign jurisdictions in which we conduct our business. The applicable federal, state and foreign healthcare laws that may affect our ability to operate include the following:

- the federal Anti-Kickback Statute, which 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, or in return for, either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service, for which payment may be made, in whole or in part, under federal and state healthcare programs such as Medicare and Medicaid
- federal civil and criminal false claims laws and civil monetary penalty laws, including the federal False Claims Act, which impose criminal and civil penalties, including civil whistleblower or qui tam actions, against individuals or entities for, among other things, knowingly presenting, or causing to be presented, to the federal government, including the Medicare and Medicaid programs, 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
- the civil monetary penalties statute, which imposes penalties against any person or entity who, among other things, is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent
- the federal Health Insurance Portability and Accountability Act of 1996 (“HIPAA”), which created new federal criminal statutes that prohibit knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private), 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 by any trick or device a material fact or making any materially false statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 (“HITECH”) and its implementing regulations, which impose obligations on covered entities, including healthcare providers, health plans, and healthcare clearinghouses, as well as their respective business associates that create, receive, maintain or transmit individually identifiable health information for or on behalf of a covered entity, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without proper written authorization
- the federal Open Payments program, created under Section 6002 of the Patient Protection and Affordable Care Act (“the Affordable Care Act”) and its implementing regulations, which imposed annual reporting requirements for manufacturers of drugs, devices, biologicals and medical supplies for certain payments and “transfers of value” provided to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members, where failure to submit timely, accurately and completely the required information for all covered payments, transfers of value and ownership or investment interests may result in civil monetary penalties, and
- analogous state and foreign laws, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry’s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government or otherwise restrict payments that may be made to healthcare providers; state and foreign laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts

Further, the Affordable Care Act, among other things, amended the intent requirement of the federal Anti-Kickback Statute and certain criminal statutes governing healthcare fraud. A person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it. In addition, the Affordable Care Act provided that 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.

Efforts to ensure that our future business arrangements with third parties will comply with applicable healthcare laws and regulations may 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. 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, including, without limitation, damages, fines, imprisonment, exclusion from participation in government healthcare programs, such as Medicare and Medicaid, and the curtailment or restructuring of our operations, which could significantly harm our business. If any of the physicians or other healthcare providers or entities with whom we expect to do business, including our current and future collaborators, if any, are found not to be in compliance with applicable laws, those persons or entities may be subject to criminal, civil or administrative sanctions, including exclusion from participation in government healthcare programs, which could also affect our business.

The impact of recent healthcare reform legislation and other changes in the healthcare industry and healthcare spending on us is currently unknown and may adversely affect our business model.

In the U.S. and some foreign jurisdictions, legislative and regulatory changes and proposed changes regarding the healthcare system could prevent or delay marketing approval of our drug candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any drug candidates for which we obtain marketing approval.

Our revenue prospects could be affected by changes in healthcare spending and policy in the U.S. and abroad. We operate in a highly regulated industry and new laws and judicial decisions, or new interpretations of existing laws or decisions, related to healthcare availability, the method of delivery or payment for healthcare products and services could negatively impact our business, financial condition, results of operations and prospects. There is significant interest in promoting healthcare reform, as evidenced by the enactment in the U.S. of the Affordable Care Act. Among other things, the Affordable Care Act contains provisions that may reduce the profitability of drug products, including, for example, revising the methodology by which rebates owed by manufacturers for covered outpatient drugs under the Medicaid Drug Rebate Program are calculated, extending the Medicaid Drug Rebate Program to utilization of prescriptions of individuals enrolled in Medicaid managed care plans, imposing mandatory discounts for certain Medicare Part D beneficiaries, and subjecting drug manufacturers to payment of an annual fee.

We expect that the Affordable Care Act, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved product. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue or commercialize our drugs.

It is likely that federal and state legislatures within the U.S. and foreign governments will continue to consider changes to existing healthcare legislation including the Affordable Care Act. It is also possible that the executive branch may take certain steps by executive action which could modify or solidify aspects of the Affordable Care Act. Certain stakeholders are also pursuing litigation challenging certain provisions which, if successful, would have the effect of modifying some or all of the provisions of the Affordable Care Act. We cannot predict the reform initiatives that may be adopted or litigation outcomes in the future or whether initiatives that have been adopted will

be repealed or modified. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare may adversely affect:

- the demand for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and for any other drug products for which we may obtain marketing approval
- our ability to set a price that we believe is fair for a product
- our ability to obtain coverage and reimbursement approval for a product
- our ability to generate revenues and achieve or maintain profitability, and
- the level of taxes that we are required to pay

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, financial condition or results of operations.

Our research, development and commercialization activities and our third-party manufacturers' and suppliers' activities involve the controlled storage, use, and disposal of hazardous materials, including the components of our product candidates and other hazardous compounds. We and our manufacturers and suppliers are subject to laws and regulations governing the use, manufacture, storage, handling, and disposal of these hazardous materials. In some cases, these hazardous materials and various wastes resulting from their use are stored at our and our manufacturers' facilities pending their use and disposal. We cannot eliminate the risk of contamination, which could cause an interruption of our commercialization efforts, research and development efforts and business operations, environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling, and disposal of these materials and specified waste products. Although we believe that the safety procedures utilized by us and our third-party manufacturers for handling and disposing of these materials generally comply with the standards prescribed by these laws and regulations, we cannot guarantee that this is the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, we may be held liable for any resulting damages and such liability could exceed our resources and state or federal or other applicable authorities may curtail our use of specified materials and/or interrupt our business operations. Furthermore, environmental laws and regulations are complex, change frequently, and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. We do not currently carry biological or hazardous waste insurance coverage.

Other Risks Related to Our Business

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

Our success as a pharmaceutical company depends on our continued ability to attract, retain and motivate highly qualified management and scientific and clinical personnel. The loss of the services of any of our senior management could delay or prevent obtaining marketing approval or commercialization of our product candidates.

As of March 24, 2023, we had a workforce of 33 full-time employees, in addition to several consultants or independent contractors, to conduct our planned business operations. If our projections prove to be inaccurate or if we are forced to implement any workforce reductions, we may not have sufficient staffing to pursue our research and development goals.

We may not be able to attract or retain qualified management and scientific personnel in the future due to the intense competition for a limited number of qualified personnel among pharmaceutical businesses, and other pharmaceutical, biotechnology and other businesses. Our failure to attract, hire, integrate and retain qualified personnel could impair our ability to achieve our business objectives.

We may not be able to win government, academic institution or non-profit contracts or grants, which could affect the timing or continued development of one or more of our product candidates, and ACER-2820 in particular.

From time to time, we may apply for contracts or grants from government agencies, non-profit entities and academic institutions. For example, we are pursuing several financing options, including federally-funded research contracts and grants and other potentially non-dilutive funding sources, to fund our planned ACER-2820 development program for the potential treatment of patients with COVID-19. Such contracts or grants can be highly attractive because they provide capital to fund the ongoing development of our product candidates without diluting our stockholders. However, there is often significant competition for these contracts or grants. Entities offering contracts or grants may have requirements to apply for or to otherwise be eligible for certain contracts or grants that our competitors may be able to satisfy that we cannot. In addition, such entities may make unfavorable decisions as to whether to offer contracts or make grants, to whom the contracts or grants may or will be awarded and the size of the contracts or grants to each awardee. Even if we are able to satisfy the award requirements, there is no guarantee that we will be a successful awardee. Therefore, we may not be able to win any contracts or grants in a timely manner, if at all.

If a successful product liability claim or series of claims is brought against us for uninsured liabilities or in excess of insured liabilities, we could be forced to pay substantial damage awards.

The use of any of our product candidates in clinical trials, and the sale of any approved products such as OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, may expose us to product liability claims. We currently maintain product liability insurance coverage in amounts we consider to be reasonable for our stage of development. We intend to monitor the amount of coverage we maintain as our commercialization efforts progress for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and as the size and design of our clinical trials evolve, and if we are successful in such commercialization efforts or obtaining approval to commercialize any of our other product candidates, adjust the amount of coverage we maintain accordingly. However, there is no assurance that such insurance coverage will fully protect us against some or all of the claims to which we might be subject. We might not be able to maintain adequate insurance coverage at a reasonable cost or in sufficient amounts or scope to protect us against potential losses. In the event a claim is brought against us, we might be required to pay legal and other expenses to defend the claim, as well as uncovered damages awards resulting from a claim brought successfully against us.

Furthermore, whether or not we are ultimately successful in defending any such claims, we might be required to direct financial and managerial resources to such defense and adverse publicity could result, all of which could harm our business.

Our employees, independent contractors, investigators, contract research organizations, consultants, collaborators and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements and insider trading.

We are exposed to the risk that our employees and other third parties may engage in fraudulent conduct or other illegal activity. Misconduct by employees and other third parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violate FDA regulations, including those laws requiring the reporting of true, complete and accurate information to the FDA, manufacturing standards, federal and state healthcare fraud and abuse laws and regulations, or laws that require the reporting of financial information or data accurately. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws intended to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and

regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Activities subject to these laws also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter employee and other third-party misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate.

Our internal computer systems, or those of our development collaborators, third-party clinical research organizations or other contractors or consultants, may fail or suffer cybersecurity or other security breaches, which could result in a material disruption of our product development programs.

Despite the implementation of security measures, our internal computer systems and those of our current and any future CROs and other contractors, consultants and collaborators are vulnerable to cybersecurity breaches and damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. In addition, there has recently been a significant increase in ransomware and cybersecurity attacks related to the ongoing conflict between Russia and Ukraine, which could lead to interruptions, delays, or loss of critical data if we or one of our partners is the subject of such an attack. While we have not experienced any such material system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our commercialization efforts, our development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our marketing approval efforts and significantly increase our costs to recover or reproduce the data. Likewise, we intend to rely on third parties to manufacture our products and product candidates and to conduct clinical trials, and similar events relating to their computer systems could also have a material adverse effect on our business. To the extent that any disruption or cybersecurity or other security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, our further development and commercialization efforts could be delayed, and our reputation could be harmed.

Risks Related to Commercialization of Our Product Candidates

Even if we obtain the required regulatory approvals in the U.S. and other territories, the commercial success of our product candidates will depend on, among other factors, market awareness and acceptance of our product candidates.

Despite the FDA's approval of OLPRUVATM for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, and even if we obtain marketing approval for other product candidates, the products may not gain market acceptance among physicians, key opinion leaders, healthcare payors, patients and the medical community. Market acceptance of any approved products depends on a number of factors, including:

- the timing of market introduction
- the efficacy and safety of the product, as demonstrated in clinical trials
- the clinical indications for which the product is approved and the label approved by regulatory authorities for use with the product, including any precautions, warnings or contraindications that may be required on the label
- acceptance by physicians, key opinion leaders and patients of the product as a safe and effective treatment

- the cost, safety and efficacy of treatment in relation to alternative treatments
- the availability of coverage and adequate reimbursement and pricing by third-party payors and government authorities
- the number and clinical profile of competing products
- the growth of drug markets in our various indications
- relative convenience and ease of administration
- marketing and distribution support
- the prevalence and severity of adverse side effects, and
- the effectiveness of our sales and marketing efforts

Market acceptance is critical to our ability to generate revenue. Any product candidate, if approved and commercialized, may be accepted in only limited capacities or not at all. If any approved products are not accepted by the market to the extent that we expect, we may not be able to generate revenue and our business would suffer.

If the market opportunities for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, or for other product candidates to treat rare diseases are smaller than we believe they are, then our revenues may be adversely affected and our business may suffer.

The market for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS is limited, and the diseases that some of our current and future product candidates are being developed to address are rare. Our projections of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with our product candidates, and our assumptions relating to pricing are based on estimates. Given the small number of patients who have some of the diseases that we are targeting, our eligible patient population and pricing estimates may differ significantly from the actual market addressable by our product candidates.

For OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, we believe the prevalence is no more than approximately 2,100 individuals in the U.S. with a diagnosed patient population in the U.S. of only approximately 1,100. It is estimated that there are up to 7,500 COL3A1-positive vEDS patients in the U.S. As new studies are performed the estimated prevalence of these diseases may change. The number of patients may turn out to be lower than expected. There can be no assurance that the prevalence of UCDs or vEDS in the study populations accurately reflect the prevalence of these diseases in the broader world population. If our estimates of the prevalence of UCDs or vEDS or of the number of patients who may benefit from treatment with OLPRUVA™ or EDSIVO™ prove to be incorrect, the market opportunities for OLPRUVA™ and for our other product candidates may be smaller than we believe they are, our prospects for generating revenue may be adversely affected and our business may suffer. Likewise, the potentially addressable patient population for OLPRUVA™ and for each of these other product candidates may be limited or may not be amenable to treatment with OLPRUVA™ or our other product candidates, and new patients may become increasingly difficult to identify or gain access to, which would adversely affect our business, financial condition, results of operations and prospects.

We currently have limited marketing and sales experience. If we are unable to establish sales and marketing capabilities or enter into agreements with third parties to market and sell our product candidates, we may be unable to generate any product sales revenue.

We have never commercialized a product candidate and, although precommercial activities had been conducted for OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as for EDSIVO™ prior to our receipt of the FDA's Complete Response Letters with respect to such development program, we currently do not have fully developed marketing, sales or distribution capabilities for any marketed products. In order to commercialize OLPRUVA™ for oral

suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, we are building marketing, sales, medical affairs, distribution, managerial and other non-technical capabilities or making arrangements with third parties to perform these services, any for any of our other product candidates that receive marketing approval we would have to build marketing, sales, medical affairs, distribution, managerial and other non-technical capabilities or make arrangements with third parties to perform these services, and we may not be successful in doing any of the foregoing. Building a targeted specialty sales force is expensive and time consuming. Any failure or delay in the development of our internal sales, marketing and distribution capabilities would adversely impact our commercialization efforts. We may choose to collaborate with third parties that have their own sales forces and established distribution systems, in lieu of or to augment any sales force and distribution systems we may create. If we are unable to enter into collaborations with third parties for the commercialization of approved product candidates, if any, on acceptable terms or at all, or if any such collaborator does not devote sufficient resources to the commercialization of our product or otherwise fails in commercialization efforts, we may not be able to successfully commercialize our product candidates that receive marketing approval. If we are not successful in commercializing our product candidates that receive marketing approval, either on our own or through collaborations with one or more third parties, our potential future revenue will be materially and adversely impacted.

If we fail to enter into strategic relationships or collaborations, our business, financial condition, commercialization prospects and results of operations may be materially adversely affected.

Our product development programs and the commercialization of our product candidates that receive marketing approval, including OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, will require substantial additional cash to fund expenses. Therefore, in addition to financing the development of our product candidates through additional equity financings or through debt financings, we may decide to enter into collaborations with pharmaceutical or biopharmaceutical companies for the development and potential commercialization of our product candidates and, with respect to OLPRUVA™ and in addition to the Collaboration Agreement with Relief, for the commercialization of OLPRUVA™.

We face significant competition in seeking appropriate collaborators. Collaborations are complex and time-consuming to negotiate and document. We may also be restricted under existing and future collaboration agreements from entering into agreements on certain terms with other potential collaborators. We may not be able to negotiate collaborations on acceptable terms, or at all. If that were to occur, we may have to curtail the development of a particular product, reduce or delay one or more of our development programs, delay our potential commercialization or reduce the scope of our sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we will not be able to bring our product candidates to market and generate product revenue. Our existing Collaboration Agreement with Relief, and any other collaboration agreements, could be subject to the following risks, each of which may materially harm our business, commercialization prospects and financial condition:

- we may not be able to control the amount or timing of resources that the collaborator devotes to the product development program, or, where a product has been approved, the product commercialization program
- the collaborator may experience financial difficulties and thus not commit sufficient financial resources to the product development program, or, where a product has been approved, the product commercialization program
- we may be required to relinquish important rights such as marketing, distribution and intellectual property rights
- a collaborator could move forward with a competing product developed either independently or in collaboration with third parties, including our competitors, or
- business combinations or significant changes in a collaborator's business strategy may adversely affect a collaborator's willingness to complete its obligations under any arrangement

Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, which could make it difficult for us to sell our products profitably.

There is significant uncertainty related to third-party coverage and reimbursement of newly approved pharmaceuticals. Market acceptance and sales of any approved product candidates will depend significantly on the availability of coverage and adequate reimbursement from third-party payors and may be affected by existing and future healthcare reform measures. Patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Government authorities and third-party payors, such as private health insurers, health maintenance organizations, and government payors like Medicare and Medicaid, decide which drugs they will pay for and establish reimbursement levels. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for drugs and products. Coverage and reimbursement may not be available for any product that we commercialize and, even if coverage is provided, the level of reimbursement may not be satisfactory. Inadequate reimbursement levels may adversely affect the demand for, or the price of, any drug candidate for which we obtain marketing approval.

Reimbursement by a third-party payor may depend upon a number of factors, including the third-party payor's determination that use of a product is, among other things:

- a covered benefit under its health plan
- safe, effective and medically necessary
- appropriate for the specific patient
- cost-effective, and
- neither experimental nor investigational

Obtaining coverage and adequate reimbursement approval for a product from a government or other third-party payor is a time consuming and costly process that could require us to conduct expensive pharmacoeconomic studies and provide supporting scientific, clinical and cost-effectiveness data for the use of our products to the payor. We may not be able to provide data sufficient to gain acceptance with respect to coverage and adequate reimbursement. In addition to examining the medical necessity and cost-effectiveness of new products, coverage may be limited to specific drug products on an approved list, or formulary, which might not include all of the FDA-approved drug products for a particular indication. There may also be formulary placements that result in lower reimbursement levels and higher cost-sharing borne by patients, any of which could have an adverse effect on our revenues and profits. Moreover, a third-party payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Adequate third-party reimbursement may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development. Additionally, coverage and reimbursement for drug products can differ significantly from payor to payor. One third-party payor's decision to cover a particular drug product does not ensure that other payors will also provide coverage for the drug product, or even if coverage is available, establish an adequate reimbursement rate. In addition, pricing of orphan and rare disease drug treatments is under increased pressure given the overall healthcare cost climate generally, and pricing of pharmaceutical products specifically.

We cannot be sure that coverage or adequate reimbursement will be available for any of our product candidates. Also, we cannot be sure that reimbursement amounts will not reduce the demand for, or the price of, our products. If reimbursement is not available or is available only to limited levels, we may not be able to commercialize certain of our products. In the U.S., third-party payors are increasingly attempting to contain healthcare costs by limiting both coverage and the level of reimbursement of new drugs. Third-party payors are increasingly challenging the prices charged for medical products and services, examining the medical necessity and reviewing the cost-effectiveness of drug products and medical services and questioning safety and efficacy. As a result, significant uncertainty exists as to whether and how much third-party payors will reimburse patients for their use of newly approved drugs, which in turn will put pressure on the pricing of drugs. Additionally, emphasis on managed care in the U.S. has increased and we expect will continue to increase the pressure on drug pricing. If third-party payors do not consider our products to be cost-effective compared to other available therapies, they may not

cover the products for which we receive FDA approval or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit.

Coverage policies, third-party reimbursement rates and drug pricing regulation (including indirect techniques of pricing pressure, such as allowing reimportation from markets outside the U.S.) may change at any time, and there is the potential for significant movement in these areas in the foreseeable future. Even if favorable coverage and reimbursement status is attained for one or more products for which we receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

We face substantial competition, which may result in others discovering, developing or commercializing products for our targeted indications before, or more successfully, than we do.

The life sciences industry is highly competitive, and we face significant competition from many pharmaceutical, biopharmaceutical and biotechnology companies that are generally developing and marketing therapeutic products. Such competition may include large pharmaceutical and biotechnology companies, specialty pharmaceutical and generic companies and medical technology companies. Our future success depends on our ability to demonstrate and maintain a competitive advantage with respect to the design, development and commercialization of our product candidates for the treatment of orphan and ultra-orphan diseases for which there is a small patient population in the U.S. A drug designated an Orphan Drug may receive up to seven years of exclusive marketing in the U.S. for that indication. Our objective is to design, develop and commercialize product candidates by repurposing or reformulating existing drugs, generally for orphan diseases, with significant unmet medical needs.

Many of our potential competitors have significantly greater financial, manufacturing, marketing, development, technical and human resources than we do. Large pharmaceutical and biotechnology companies, in particular, have extensive experience in clinical testing, obtaining regulatory approvals, recruiting patients and in manufacturing clinical products. These companies also have significantly greater research and marketing capabilities than we do and may also have products that have been approved or are in late stages of development, and have collaborative arrangements in our target markets with leading companies and research institutions. Established companies may also invest heavily to accelerate discovery and development of compounds that could make the product candidates that we develop obsolete. As a result of all of these factors, the obtaining of Orphan Drug designation for our product candidates to treat rare diseases is highly desirable to our viability since our competitors may, among other things:

- have greater name and brand recognition, financial and human resources
- develop and commercialize products that are or are perceived to be safer, more effective, less expensive, or more convenient or easier to administer
- obtain quicker marketing approval
- establish superior proprietary positions
- have access to more manufacturing capacity as well as to more cost-effective manufacturing capacity
- implement more effective approaches to sales and marketing, or
- form more advantageous strategic alliances

Should any of these events occur, our business, financial condition, results of operations, and prospects could be materially adversely affected. If we are not able to compete effectively against potential competitors, our business will not grow and our financial condition and operations will suffer.

We believe that our ability to successfully compete in the rare disease category will depend in part on our ability to obtain Orphan Drug designation for our product candidates to treat rare diseases as well as:

- our ability to design and successfully execute appropriate clinical trials
- our ability to recruit and enroll patients for our clinical trials

- the results of our clinical trials and the efficacy and safety of our product candidates
- the speed at which we develop our product candidates
- achieving and maintaining compliance with regulatory requirements applicable to our business
- the timing and scope of regulatory approvals, including labeling
- adequate levels of reimbursement under private and governmental health insurance plans, including Medicare and Medicaid
- our ability to protect intellectual property rights related to our product candidates
- our ability to commercialize and market OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as any of our other product candidates that may receive marketing approval
- our ability to manufacture and sell commercial quantities of any approved product candidates to the market
- acceptance of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as any of our other product candidates by physicians, other healthcare providers and patients, and
- the cost of treatment in relation to alternative therapies

If our competitors are able to obtain Orphan Drug exclusivity for their products that are the same drug as our product candidates, we may not be able to have competing products approved by the applicable regulatory authority for a significant period of time or benefit from that exclusivity.

We have Orphan Drug exclusivity designation in the U.S. and the European Union for OLPRUVA™ for MSUD and in the U.S. for EDSIVO™ for vEDS. If we are unable to maintain our current Orphan Drug exclusivities, it may have a material negative effect on our business.

Generally, if a product with an Orphan Drug designation subsequently receives the first marketing approval for the indication for which it has such designation, that product is entitled to a period of marketing exclusivity, which precludes the applicable regulatory authority from approving another marketing application for the same drug for the same indication for that time period. The applicable period is seven years in the U.S. and ten years in the European Union. The exclusivity period in the European Union can be reduced to six years if the product no longer meets the criteria for Orphan Drug designation or if its commercialization is sufficiently profitable so that market exclusivity is no longer justified. Orphan Drug exclusivity may be lost if the FDA or the EMA determines that the request for designation was materially defective or if the manufacturer is unable to ensure sufficient quantity of the product to meet the needs of patients with the rare disease or condition. Maintaining Orphan Drug exclusivity for OLPRUVA™ and EDSIVO™ may be important to the product candidate's success, which we may not be able to do. For example, if a competitive product that treats the same disease as our product candidate is shown to be clinically superior to our product candidate, any Orphan Drug exclusivity we have obtained will not block the approval of such competitive product and we may effectively lose what had previously been Orphan Drug exclusivity. Orphan Drug exclusivity for OLPRUVA™ or EDSIVO™ also will not bar the FDA from approving another celirolol drug product or a sodium phenylbutyrate ("NaPB") product, for another indication. In the U.S., reforms to the Orphan Drug Act, if enacted, could also materially affect our ability to maintain Orphan Drug exclusivity for OLPRUVA™ for MSUD and EDSIVO™ for vEDS.

Price controls, importation of drug products from outside the U.S., or other rules may be imposed in domestic or foreign markets, which may adversely affect our future profitability.

The U.S. government, state legislatures, and foreign governments have shown significant interest in implementing cost-containment programs to limit the growth of government-paid healthcare costs and drug prices in general, including for therapies for rare diseases. These measures include price controls, transparency requirements

triggered by the introduction of new high-cost drugs into the market, drug re-importation, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Some laws and regulations have already been enacted in these areas, and additional measures have been introduced or are under consideration at both the federal and state levels. Additionally, legislation that affects reimbursement for drugs with small patient populations could be adopted, limiting payments for pharmaceuticals such as our product candidates, which could adversely affect our potential future net revenue and results. Adoption of such controls and measures and tightening of restrictive policies in jurisdictions with existing controls and measures could limit payments for pharmaceuticals such as our drug product candidates and could adversely affect our net revenue and results.

In some countries, particularly member states of the European Union, the pricing of prescription drugs is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after receipt of marketing approval for a product. In addition, there can be considerable pressure by governments and other stakeholders on prices and reimbursement levels, including as part of cost containment measures. Political, economic and regulatory developments may further complicate pricing negotiations, and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various European Union member states and parallel distribution, or arbitrage between low-priced and high-priced member states, can further reduce prices. There is also the potential for a reference pricing system using drug prices from other countries, sometimes referred to as “most favored nation” treatment. In some countries, we may be required to conduct a clinical trial or other studies that compare the cost-effectiveness of our product candidates to other available therapies in order to obtain or maintain reimbursement or pricing approval. Publication of discounts by third-party payors or authorities may lead to further pressure on the prices or reimbursement levels within the country of publication and other countries. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be adversely affected.

Rapid technological change could make our product candidates obsolete.

Pharmaceutical technologies have undergone rapid and significant change, and we expect that they will continue to do so. As a result, there is significant risk that our product candidates may be rendered obsolete or uneconomical by new discoveries before we recover all or any expenses incurred in connection with their development. If any of our product candidates are rendered obsolete by advancements in pharmaceutical technologies, our business will suffer.

Government controls and healthcare reform measures could adversely affect our business.

The business and financial condition of pharmaceutical and biotechnology companies are affected by the efforts of governmental and third-party payors to contain or reduce the costs of healthcare. In the U.S. and in foreign jurisdictions, there have been, and we expect that there will continue to be, a number of legislative and regulatory proposals aimed at changing the healthcare system. For example, in some foreign countries, particularly in Europe, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a product candidate. To obtain reimbursement or pricing approval in some countries, we may be required to conduct additional clinical trials that compare the cost-effectiveness of any product candidate to other available therapies. If reimbursement of any product candidate is unavailable or limited in scope or amount in a particular country, or if pricing is set at unsatisfactory levels, we may be unable to achieve or sustain profitability in such country. In the U.S., the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (“MMA”) changed the way Medicare covers and pays for pharmaceutical products. The legislation established Medicare Part D, which expanded Medicare coverage for outpatient prescription drug purchases by the elderly but provided authority for limiting the number of drugs that will be covered in any therapeutic class. The MMA also introduced a new reimbursement methodology based on average sales prices for physician-administered drugs. Any negotiated prices for any product candidate covered by a Part D prescription drug plan will likely be lower than the prices that might otherwise be obtained outside of the Medicare Part D prescription drug plan. Moreover, while Medicare Part D applies only to drug benefits for Medicare beneficiaries, private payors often follow Medicare coverage policy and payment limitations in setting their own payment rates. Any reduction in payment under Medicare Part D may result in a similar reduction in payments from non-governmental payors.

The U.S. and several other jurisdictions are considering, or have already enacted, a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell any product candidate. Among policy-makers and payors in the U.S. and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access to healthcare. In the U.S., the pharmaceutical industry has been a particular focus of these efforts and has been significantly affected by major legislative initiatives and executive actions. There have been, and likely will continue to be, legislative and executive regulatory proposals at the federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare may adversely affect: the demand for any product candidate; the ability to set a price that we believe is fair for any product candidate; our ability to generate revenues and achieve or maintain profitability; the level of taxes that we are required to pay; and the availability of capital.

Risks Related to Third Parties

We rely on third-party suppliers and other third parties for manufacture of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as any of our other product candidates, and our dependence on these third parties may impair or delay the commercialization of OLPRUVA™ as well as the advancement of our research and development programs and the development of our other product candidates.

We do not currently own or operate manufacturing facilities for clinical or commercial production of our product candidates. We lack the resources and the capability to manufacture OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS, as well as any of our other product candidates on a clinical or commercial scale. Instead, we rely on, and expect to continue to rely on, third parties for the supply of raw materials and manufacture of drug supplies necessary to conduct our preclinical studies and clinical trials and for our commercialization efforts. Our reliance on third parties may expose us to more risk than if we were to manufacture OLPRUVA™ or our other product candidates ourselves. Delays in production by third parties could delay our clinical trials or have an adverse impact on our commercial activities. In addition, the fact that we are dependent on third parties for the manufacture of and formulation of OLPRUVA™ and our other product candidates means that we are subject to the risk that OLPRUVA™ or our other product candidates may have manufacturing defects that we have limited ability to prevent or control. Although we oversee these activities to ensure compliance with our quality standards, budgets and timelines, we have had and will continue to have less control over the manufacturing of OLPRUVA™ and our other product candidates than potentially would be the case if we were to manufacture OLPRUVA™ or our other product candidates ourselves. Further, due to the ongoing impact of the COVID-19 pandemic, new pandemic lockdowns in China, global supply chain issues, Russia's invasion of Ukraine, or other reasons, the third parties we deal with could experience increased costs in transportation, logistics, raw materials and other costs, may have difficulty sourcing raw materials, may have staffing difficulties, might undergo changes in priorities or may become financially distressed, which would adversely affect the manufacturing and production of our product candidates. In addition, a third party could be acquired by, or enter into an exclusive arrangement with, one of our competitors, which would adversely affect our ability to access the formulations we require.

The facilities used by our current contract manufacturers and any future manufacturers to manufacture our product candidates must be inspected by the FDA after we submit our NDA for a product candidate. For example, the Complete Response Letter we received in June 2022 for OLPRUVA™ (before it was approved by the FDA in December 2022 for oral suspension in the U.S. for the treatment of certain patients with UCDs involving deficiencies of CPS, OTC, or AS) identified satisfactory inspection of our packaging and labeling contract vendor as a necessary prerequisite to any approval for marketing. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturers for compliance with the regulatory requirements, known as cGMPs, for manufacture of both active drug substances and finished drug products. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, the FDA may refuse to approve any of our NDAs. If the FDA or a comparable foreign regulatory authority does not approve our NDA because of concerns about the manufacture of our product

candidates or if significant manufacturing issues arise in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop our product candidates, to obtain marketing approval of our NDA or to continue to market our product candidates, if approved. Although we are ultimately responsible for ensuring compliance with these regulatory requirements, we do not have day-to-day control over a contract manufacturing organization (“CMO”) or other third-party manufacturer’s compliance with applicable laws and regulations, including cGMPs and other laws and regulations, such as those related to environmental health and safety matters. Any failure to achieve and maintain compliance with these laws, regulations and standards could subject us to the risk that we may have to suspend the manufacturing of OPLRUVA™ or our other product candidates or that obtained approvals could be revoked, which would adversely affect our business and reputation. In addition, third-party contractors, such as our CMOs, may elect not to continue to work with us due to factors beyond our control. Although we have contracts in place, they may also refuse to work with us because of their own financial difficulties, business priorities or other reasons, at a time that is costly or otherwise inconvenient for us. If we were unable to find adequate replacement or another acceptable solution in time, our clinical trials could be delayed or our commercial activities could be harmed.

Problems with the quality of the work of third parties may lead us to seek to terminate our working relationships and use alternative service providers. However, making this change may be costly and may delay clinical trials. In addition, it may be very challenging, and in some cases impossible, to find replacement service providers that can develop and manufacture our drug candidates in an acceptable manner and at an acceptable cost and on a timely basis. The sale of products containing any defects or any delays in the supply of necessary services could adversely affect our business, financial condition, results of operations, and prospects.

Growth in the costs and expenses of components or raw materials may also adversely affect our business, financial condition, results of operations, and prospects. Supply sources could be interrupted from time to time and, if interrupted, supplies may not be resumed (whether in part or in whole) within a reasonable timeframe and at an acceptable cost or at all.

We plan to rely on third parties to conduct clinical trials for our product candidates. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, it may cause delays in commencing and completing clinical trials of our product candidates or we may be unable to obtain marketing approval for or commercialize our product candidates.

Clinical trials must meet applicable FDA and foreign regulatory requirements. We do not have the ability to independently conduct clinical trials for any of our product candidates. We have and will continue to rely on third parties, such as CROs, medical institutions, clinical investigators and contract laboratories, to conduct all of our clinical trials of our product candidates; however, we remain responsible for ensuring that each of our clinical trials is conducted in accordance with our investigational plan and protocol. Moreover, the FDA and other foreign regulatory authorities require us to comply with IND and human subject protection regulations and current good clinical practice standards, commonly referred to as GCPs, for conducting, monitoring, recording, and reporting the results of clinical trials to ensure that the data and results are scientifically credible and accurate and that the trial subjects are adequately informed of the potential risks of participating in clinical trials. Our reliance on third parties does not relieve us of these responsibilities and requirements. Regulatory authorities enforce these GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of our third-party contractors fail to comply with applicable GCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. There is no assurance that upon inspection by a given regulatory authority, such regulatory authority will determine that any of our clinical trials comply with GCPs. Our failure to comply with these regulations may require us to repeat clinical trials, which would delay the marketing approval process.

There are significant requirements imposed on us and on clinical investigators who conduct clinical trials that we sponsor. Although we are responsible for selecting qualified CROs or clinical investigators, providing them with the information they need to conduct the clinical trials properly, ensuring proper monitoring of the clinical trials, and ensuring that the clinical trials are conducted in accordance with the general investigational plan and protocols contained in the IND, we cannot ensure that the CROs or clinical investigators will maintain compliance with all regulatory requirements at all times. The pharmaceutical industry has experienced cases where clinical investigators have been found to incorrectly record data, omit data, or even falsify data. We cannot ensure that the CROs or clinical investigators in our trials will not make mistakes or otherwise compromise the integrity or validity of data, any of which would have a significant negative effect on our ability to obtain marketing approval, our business, and our financial condition.

We or the third parties we rely on may encounter problems in clinical trials that may cause us or the FDA or foreign regulatory agencies to delay, suspend or terminate our clinical trials at any phase. These problems could include the possibility that we may not be able to manufacture sufficient quantities of materials for use in our clinical trials, conduct clinical trials at our preferred sites, enroll a sufficient number of patients for our clinical trials at one or more sites, or begin or successfully complete clinical trials in a timely fashion, if at all. Furthermore, we, the FDA or foreign regulatory agencies may suspend clinical trials of our product candidates at any time if we or they believe the subjects participating in the trials are being exposed to unacceptable health risks, whether as a result of adverse events occurring in our trials or otherwise, or if we or they find deficiencies in the clinical trial process or conduct of the investigation.

The FDA and foreign regulatory agencies could also require additional clinical trials before or after granting of marketing approval for any products, which would result in increased costs and significant delays in the development and commercialization of such products and could result in the withdrawal of such products from the market after obtaining marketing approval. Our failure to adequately demonstrate the safety and efficacy of a product candidate in clinical development could delay or prevent obtaining marketing approval of the product candidate and, after obtaining marketing approval, data from post-approval studies could result in the product being withdrawn from the market, either of which would likely have a material adverse effect on our business.

In addition, the above risks are compounded by uncertainties related to the ongoing COVID-19 pandemic, which could affect our CROs' businesses internally (for example, maintaining staffing levels and ongoing financial viability), as well as their ability to perform their obligations to us under our agreements (such as recruitment of subjects for clinical trials in an increasingly uncertain and competitive business environment).

Risks Related to Our Intellectual Property

Our proprietary rights may not adequately protect our technologies and product candidates.

Our commercial success will depend in part on our ability to obtain patents and protect our existing patent position as well as our ability to maintain adequate protection of other intellectual property for our technologies, product candidates, and any future products in the U.S. and other countries. If we do not adequately protect our intellectual property, competitors may be able to use our technologies and erode or negate any competitive advantage we may have, which could harm our business and ability to achieve profitability. The laws of some foreign countries do not protect our proprietary rights to the same extent or in the same manner as U.S. laws, and we may encounter significant problems in protecting and defending our proprietary rights in these countries. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our proprietary technologies, product candidates and any future products are covered by valid and enforceable patents or are effectively maintained as trade secrets.

We apply for patents covering both our technologies and product candidates, as we deem appropriate. However, we may fail to apply for patents on important technologies or product candidates in a timely fashion, or at all. Our existing patents and any future patents we obtain may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products and technologies. We cannot be certain that our patent applications will be approved or that any patents issued will adequately protect our intellectual property.

While we are responsible for and typically have control over the filing and prosecuting of patent applications and maintaining patents which cover making, using or selling OLPRUVA™, EDSIVO™, or ACER-801, we may lose any such rights if we decide to allow any licensed patent to lapse. If we fail to appropriately prosecute and maintain patent protection for any of our product candidates, our ability to develop and commercialize those product candidates may be adversely affected and we may not be able to prevent competitors from making, using and selling competing products.

Moreover, the patent positions of pharmaceutical companies are highly uncertain and involve complex legal and factual questions for which important legal principles are evolving and remain unresolved. As a result, the validity and enforceability of patents cannot be predicted with certainty. In addition, we do not know whether:

- we or our licensors were the first to make the inventions covered by each of our issued patents and pending patent applications
- we or our licensors were the first to file patent applications for these inventions
- any of the patents that cover our product candidates will be eligible to be listed in the FDA's compendium of "Approved Drug Products with Therapeutic Equivalence Evaluation," sometimes referred to as the FDA's Orange Book
- others will independently develop similar or alternative technologies or duplicate any of our technologies
- any of our or our licensors' pending patent applications will result in issued patents
- any of our or our licensors' patents will be valid or enforceable
- any patents issued to us or our licensors and collaborators will provide us with any competitive advantages, or will be challenged by third parties
- we will develop additional proprietary technologies that are patentable
- the U.S. government will exercise any of its statutory rights to our intellectual property that was developed with government funding, or
- our business may infringe the patents or other proprietary rights of others

The actual protection afforded by a patent varies based on products or processes, from country to country, and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory related extensions, the availability of legal remedies in a particular country, the validity and enforceability of the patents and our financial ability to enforce our patents and other intellectual property. Our ability to maintain and solidify our proprietary position for our products will depend on our success in obtaining effective claims and enforcing those claims once granted. Our issued patents and those that may issue in the future, or those licensed to us, may be challenged, narrowed, invalidated or circumvented, and the rights granted under any issued patents may not provide us with proprietary protection or competitive advantages against competitors with similar products. Due to the extensive amount of time required for the development, testing and regulatory review of a potential product, it is possible that, before any of our product candidates can be commercialized, any related patent may expire or remain in force for only a short period following commercialization, thereby reducing any advantage of the patent.

We may also rely on trade secrets to protect some of our technology, especially where we do not believe patent protection is appropriate or obtainable. However, trade secrets are difficult to maintain. While we use reasonable efforts to protect our trade secrets, we or any of our collaborators' employees, consultants, contractors or scientific and other advisors may unintentionally or willfully disclose our proprietary information to competitors and

we may not have adequate remedies in respect of that disclosure. Enforcement of claims that a third party has illegally obtained and is using trade secrets is expensive, time consuming and uncertain. In addition, foreign courts are sometimes less willing than U.S. courts to protect trade secrets. If our competitors independently develop equivalent knowledge, methods and know-how, we would not be able to assert our trade secrets against them and our business could be harmed.

We are a party to license or similar agreements under which we license intellectual property, data, and/or receive commercialization rights relating to OLPRUVA™, EDSIVO™ and ACER-801. If we fail to comply with obligations in such agreements or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business; any termination of such agreements would adversely affect our business.

In April 2014, we entered into an agreement with Baylor College of Medicine pursuant to which we obtained an exclusive worldwide license to develop and commercialize NaPB (OLPRUVA™) for treatment of MSUD. In August 2016, we entered into an agreement with Assistance Publique—Hôpitaux de Paris, Hôpital Européen Georges Pompidou (“AP-HP”), pursuant to which we obtained an exclusive worldwide right to access and use data from the Ong trial, which we used to support an NDA filing for EDSIVO™ for the treatment of vEDS. In September 2018, we entered into an additional agreement with AP-HP pursuant to which we obtained the exclusive worldwide intellectual property rights to three European patent applications relating to certain uses of celiprolol including (i) the optimal dose of celiprolol in treating vEDS patients, (ii) the use of celiprolol during pregnancy and (iii) the use of celiprolol to treat kyphoscoliotic Ehlers-Danlos syndrome (type VI). In December 2018, we entered into an exclusive license agreement with Sanofi granting us worldwide rights to ACER-801, a clinical-stage, selective, non-peptide tachykinin NK3 receptor antagonist. Under each license agreement, we are subject to commercialization and development diligence obligations, royalty payments and other obligations. If we fail to comply with any of these obligations or otherwise breach any of these license agreements, the licensor may have the right to terminate the license in whole or in part or to terminate the exclusive nature of the license. The loss of the licenses granted to us under our agreements with these licensors or the rights provided therein would prevent us from developing, manufacturing or marketing products covered by the license or subject to supply commitments, and could materially harm our business, financial condition, results of operations and prospects.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the U.S. can be less extensive than those in the U.S. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the U.S. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the U.S., or from selling or importing products made using our inventions in and into the U.S. or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement rights are not as strong as those in the U.S. These products may compete with our product candidates in jurisdictions where we do not have any issued patents and our patent claims or other intellectual rights may not be effective or sufficient to prevent them from so competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries do not favor the enforcement of patents and other intellectual property protection, which could make it difficult for us to stop the infringement of our patents generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

The patent protection for our product candidates may expire before we are able to maximize their commercial value, which may subject us to increased competition and reduce or eliminate our opportunity to generate product revenue.

The patents for our product candidates have varying expiration dates and, if these patents expire, we may be subject to increased competition and we may not be able to recover our development costs or market any of our approved products profitably. In some of the larger potential market territories, such as the U.S. and Europe, patent term extension or restoration may be available to compensate for time taken during aspects of the product's development and regulatory review. For example, depending on the timing, duration and specifics of FDA marketing approval of our product candidates, if any, one of the U.S. patents covering each of such approved product(s) or the use thereof may be eligible for up to five years of patent term restoration under the Hatch-Waxman Act. The Hatch-Waxman Act allows a maximum of one patent to be extended per FDA-approved product. Patent term extension also may be available in certain foreign countries upon regulatory approval of our product candidates.

Nevertheless, we may not be granted patent term extension either in the U.S. or in any foreign country because of, for example, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the term of extension, as well as the scope of patent protection during any such extension, afforded by the governmental authority could be less than we request. In addition, even though some regulatory authorities may provide some other exclusivity for a product under their own laws and regulations, we may not be able to qualify the product or obtain the exclusive time period. If we are unable to obtain patent term extension/restoration or some other exclusivity, we could be subject to increased competition and our opportunity to establish or maintain product revenue could be substantially reduced or eliminated. Furthermore, we may not have sufficient time to recover our development costs prior to the expiration of our U.S. and foreign patents.

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

The U.S. Patent and Trademark Office ("USPTO") and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent prosecution process. Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on any issued patent and/or pending patent applications are due to be paid to the USPTO and foreign patent agencies in several stages over the lifetime of a patent or patent application. We employ an outside firm and rely on our outside counsel to pay these fees. While an inadvertent lapse may sometimes be cured by payment of a late fee or by other means in accordance with the applicable rules, there are many situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If we fail to maintain the patents and patent applications directed to our product candidates, our competitors might be able to enter the market earlier than should otherwise have been the case, which would have a material adverse effect on our business.

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

Competitors may infringe our patents or other intellectual property rights. To counter infringement or unauthorized use, we may be required to file infringement claims, directly or through our licensors, which can be expensive and time consuming. In addition, in an infringement proceeding, a court may decide that a patent of our licensor is not valid or is unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of the patents we license at risk of being invalidated or interpreted narrowly and could put our licensors' patent applications at risk of not issuing.

Interference proceedings brought by the USPTO may be necessary to determine the priority of inventions with respect to our patents or the patents of our licensors. An unfavorable outcome could require us to cease using the technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if a prevailing party does not offer us a license on terms that are acceptable to us. Litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distraction of our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our proprietary rights, particularly in countries where the laws may not protect those rights as fully as in the U.S. In addition, potential infringers of our intellectual property rights may have substantially more resources than we do to defend their position, which could adversely affect the outcome of any such dispute.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential and proprietary information could be compromised by disclosure during this type of litigation. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock.

Third-party claims of intellectual property infringement or misappropriation may adversely affect our business and could prevent us from developing or commercializing our product candidates.

Our commercial success depends in part on us not infringing the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the U.S., involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, ex-parte review and inter partes reexamination and post-grant review proceedings before the USPTO and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications owned by third parties exist in the fields in which we are developing and may develop our product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our product candidates may be subject to claims of infringement of the patent rights of third parties. If a third party claims that we infringe on their products or technology, we could face a number of issues, including:

- infringement and other intellectual property claims which, with or without merit, can be expensive and time-consuming to litigate and can divert management's attention from our core business
- substantial damages for past infringement, which we may have to pay if a court decides that our product infringes on a competitor's patent
- a court prohibiting us from selling or licensing our product unless the patent holder licenses the patent to us, which the collaborator would not be required to do
- if a license is available from a patent holder, we may have to pay substantial royalties or grant cross licenses to our patents, and
- redesigning our processes so they do not infringe, which may not be possible or could require substantial funds and time

Third parties may assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of OLPRUVA™ or our other product candidates that we failed to identify. For example, certain applications that will not be filed outside the U.S. remain confidential until issued as patents. Patent applications in the U.S. and elsewhere are otherwise generally published only after a waiting period of approximately 18 months after the earliest filing. Therefore, patent applications covering OLPRUVA™ or our other product candidates could have been filed by others without the knowledge of us or our licensors. Additionally, pending patent applications which have been published can, subject to certain limitations, be later amended in a manner that could cover OLPRUVA™ or our other product candidates or the use or manufacture of OLPRUVA™ or our other product candidates. We may also face a claim of misappropriation if a third party believes that we inappropriately obtained and used trade secrets of such third party. If we are found to have misappropriated a third party's trade secrets, we may be prevented from further using such trade secrets, limiting our ability to develop our product candidates, and we may be required to pay damages.

If any third-party patents were held by a court of competent jurisdiction to cover aspects of our materials, formulations, methods of manufacture or methods for treatment, the holders of any such patents would be able to block our ability to develop and commercialize the applicable product candidate until such patent expired or unless we obtain a license. These licenses may not be available on acceptable terms, if at all. Even if we were able to obtain a license, the rights may be nonexclusive, which could result in our competitors gaining access to the same intellectual property.

Ultimately, we could be prevented from commercializing a product, or be forced to cease some aspect of our business operations, if, as a result of actual or threatened patent infringement claims, we are unable to enter into licenses on acceptable terms.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of OLPRUVA™ or our other product candidates. Defending against claims of patent infringement or misappropriation of trade secrets could be costly and time-consuming, regardless of the outcome. Thus, even if we were to ultimately prevail, or to settle at an early stage, such litigation could burden us with substantial unanticipated costs. In addition, litigation or threatened litigation could result in significant demands on the time and attention of our management team, distracting them from the pursuit of other company business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure. In addition, the uncertainties associated with litigation could have a material adverse effect on our ability to raise the funds necessary to continue our commercialization efforts, continue our clinical trials, continue our research programs, license necessary technology from third parties, or enter into development collaborations that would help us bring OLPRUVA™ or our other product candidates to market.

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

As is the case with other pharmaceutical companies, our success is heavily dependent on intellectual property, particularly on obtaining and enforcing patents and patent rights. Obtaining and enforcing patents and patent rights in the specialty pharmaceutical industry involves both technological and legal complexity, and therefore, is costly, time-consuming and inherently uncertain. In addition, the U.S. has recently enacted and is currently implementing wide-ranging patent reform legislation. Further, several recent U.S. Supreme Court rulings have either narrowed the scope of patent protection available in certain circumstances or weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents and patent rights, once obtained.

For our U.S. patent applications containing a claim not entitled to priority before March 16, 2013, there is a greater level of uncertainty in the patent law. In September 2011, the Leahy-Smith America Invents Act (the "America Invents Act" or "AIA") was signed into law. The AIA includes a number of significant changes to U.S. patent law, including provisions that affect the way patent applications will be prosecuted, reviewed after issuance, and may also affect patent litigation. The USPTO is currently developing regulations and procedures to govern administration of the AIA, and many of the substantive changes to patent law associated with the AIA. It is not clear what other, if any, impact the AIA will have on the operation of our business. Moreover, the AIA and its implementation could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of patent rights, all of which could have a material adverse effect on our business and financial condition.

An important change introduced by the AIA is that, as of March 16, 2013, the U.S. transitioned to a "first-inventor-to-file" system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. A third party that files a patent application in the USPTO after that date but before the filing of a patent application by a licensor or us could therefore be awarded a patent covering an invention of ours even if said licensor or we had made the invention before it was made by the third party. This will require us to be cognizant going forward of the time from invention to filing of a patent application. Furthermore, our ability to obtain and maintain valid and enforceable patent rights depends on whether the

differences between the licensor's or our technology and the prior art allow our technology to be patentable over the prior art. Since patent applications in the U.S. and most other countries are confidential for a period of time after filing, we cannot be certain that a licensor or we were the first to either (a) file any patent application related to our product candidates or (b) invent any of the inventions claimed in our patents or patent applications.

Among some of the other changes introduced by the AIA are changes that limit where a patentee may file a patent infringement suit and providing opportunities for third parties to challenge any issued patent in the USPTO. This applies to all U.S. patents, even those issued before March 16, 2013. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal court necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid as unpatentable even though the same evidence may be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate patent rights that would not have been invalidated if first challenged by the third party as a defendant in a district court action.

Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

Intellectual property rights do not address all potential threats to our competitive advantage.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business, or permit us to maintain our competitive advantage. The following examples are illustrative:

- Others may be able to make products that are similar to our product candidates but that are not covered by the claims of the patents that we license from others or may license or own in the future
- Others may independently develop similar or alternative technologies or otherwise circumvent any of our technologies without infringing our intellectual property rights
- Any of our collaborators might not have been the first to conceive and reduce to practice the inventions covered by the patents or patent applications that we license or will, in the future, own or license
- Any of our collaborators might not have been the first to file patent applications covering certain of the patents or patent applications that we license or will, in the future, license
- Issued patents that have been licensed to us may not provide us with any competitive advantage, or may be held invalid or unenforceable, as a result of legal challenges by our competitors
- Our competitors might conduct research and development activities in countries where we do not have license rights, or in countries where research and development safe harbor laws exist, and then use the information learned from such activities to develop competitive products for sale in our major commercial markets
- Ownership of patents or patent applications licensed to us may be challenged by third parties
- The patents of third parties or pending or future applications of third parties, if issued, may have an adverse effect on our business

Confidentiality agreements with employees, consultants and others may not adequately prevent disclosure of trade secrets and protect other proprietary information.

We consider proprietary trade secrets and/or confidential know-how and unpatented know-how to be important to our business. We may rely on trade secrets and/or confidential know-how to protect our technology, especially where patent protection is believed by us to be of limited value. However, trade secrets and/or confidential know-how can be difficult to maintain as confidential.

To protect this type of information against disclosure or appropriation by competitors, our policy is to require our employees, consultants, contractors and advisors to enter into confidentiality agreements with us. However, current or former employees, consultants, contractors and advisers may unintentionally or willfully disclose our confidential information to competitors, and confidentiality agreements may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. Enforcing a claim that a third party obtained illegally and is using trade secrets and/or confidential know-how is expensive, time consuming and unpredictable. The enforceability of confidentiality agreements may vary from jurisdiction to jurisdiction.

Failure to obtain or maintain trade secrets and/or confidential know-how trade protection could adversely affect our competitive position. Moreover, our competitors may independently develop substantially equivalent proprietary information and may even apply for patent protection in respect of the same. If successful in obtaining such patent protection, our competitors could limit our use of our trade secrets and/or confidential know-how.

We may need to license certain intellectual property from third parties, and such licenses may not be available or may not be available on commercially reasonable terms.

A third party may hold intellectual property, including patent rights that are important or necessary to the development or commercialization of OLPRUVA™ or our other product candidates. It may be necessary for us to use the patented or proprietary technology of third parties to commercialize OLPRUVA™ or our other product candidates, in which case we would be required to obtain a license from these third parties. Such a license may not be available on commercially reasonable terms or at all, which could materially harm our business.

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

We have received confidential and proprietary information from third parties. In addition, we employ individuals who were previously employed at other biotechnology or pharmaceutical companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise improperly used or disclosed confidential information of these third parties or our employees' former employers.

Further, we may be subject to ownership disputes in the future arising, for example, from conflicting obligations of consultants or others who are involved in developing our product candidates. We may also be subject to claims that former employees, consultants, independent contractors, collaborators or other third parties have an ownership interest in our patents or other intellectual property. Litigation may be necessary to defend against these and other claims challenging our right to and use of confidential and proprietary information. If we fail in defending any such claims, in addition to paying monetary damages, we may lose our rights therein. Such an outcome could have a material adverse effect on our business.

Even if we are successful in defending against these claims, litigation could result in substantial cost and be a distraction to our management and employees.

We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.

We may also be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents and other intellectual property. We may be subject to ownership disputes in the future arising, for example, from conflicting obligations of consultants or others who are involved in developing our product candidates. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.

Because we rely on third parties to assist with research and development and to manufacture our product candidates, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, consulting agreements or other similar agreements with our advisors, employees, third-party contractors and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

In addition, these agreements typically restrict the ability of our advisors, employees, third-party contractors and consultants to publish data potentially relating to our trade secrets, although our agreements may contain certain limited publication rights. For example, any academic institution that we may collaborate with in the future will usually expect to be granted rights to publish data arising out of such collaboration, provided that we are notified in advance and given the opportunity to delay publication for a limited time period in order for us to secure patent protection of intellectual property rights arising from the collaboration, in addition to the opportunity to remove confidential or trade secret information from any such publication. In the future we may also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either through breach of our agreements with third parties, independent development or publication of information by any of our third-party collaborators. A competitor's discovery of our trade secrets would impair our competitive position and have an adverse impact on our business.

Risks Related to Our Securities

Our share price is very volatile, may not reflect the underlying value of our net assets or business prospects, and you may not be able to resell your shares at a profit or at all.

The market price of our common stock could be subject to significant fluctuations. The market prices for securities of pharmaceutical and biotechnology companies, and early-stage drug discovery and development companies like ours in particular, have historically been highly volatile and may continue to be highly volatile in the future. The following factors, in addition to other risk factors described in this section, may have a significant impact on the market price of our common stock:

- announcements of significant changes in our business or operations
- the development status of any of our drug candidates, including clinical study results and determinations by regulatory authorities with respect thereto
- the commercialization status of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients with UCs involving deficiencies of CPS, OTC, or AS
- the initiation, termination or reduction in the scope of any collaboration arrangements or any disputes or developments regarding such collaborations
- market conditions
- the impact of short selling or the impact of a potential “short squeeze” resulting from a sudden increase in demand for our stock
- our capital and our inability to obtain additional funding

- announcements of technological innovations, new commercial products, or other material events by our competitors or by us
- disputes or other developments concerning our proprietary rights
- changes in, or failure to meet, securities analysts' or investors' expectations of our financial performance
- additions or departures of key personnel
- discussions of our business, products, financial performance, prospects or stock price by the financial and scientific press and online investor communities
- public concern as to, and legislative action with respect to, the pricing and availability of prescription drugs or the safety of drugs and drug delivery techniques
- regulatory developments in the U.S. and in foreign countries
- dilutive effects of sales of shares of common stock by us or our stockholders, including by holders of the Marathon Convertible Notes upon conversion, and sales of common stock acquired upon exercise by the holders of options, and
- our ability to sell shares of common stock pursuant to our at-the-market facility with Jones Trading Institutional Services and Roth Capital Partners, LLC

Broad market and industry factors, as well as economic and political factors, also may materially adversely affect the market price of our common stock. As noted, the short-, medium-, and long-term impacts of the COVID-19 pandemic on the U.S. and global economies generally, and on our business specifically, are difficult to predict.

As recently as mid-December 2022, we were not in compliance with the Nasdaq continued listing requirements. While we were notified on December 23, 2022 that we were back in compliance with the continued listing requirements, if we are unable to maintain such compliance, our common stock could be delisted, which could adversely affect our common stock's market price and liquidity and could reduce our ability to raise capital.

The Nasdaq Capital Market's continued listing standards for our common stock require, among other things, that we maintain either (i) stockholders' equity of \$2.5 million, (ii) market value of listed securities of \$35 million or (iii) net income from continuing operations of \$500,000 in the most recently completed fiscal year or in two of the last three most recently completed fiscal years. On May 31, 2022, we received a letter from the Staff of Nasdaq indicating that for the prior 30 consecutive business days our minimum Market Value of Listed Securities ("MVLS"), was below the \$35 million required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq listing rule 5550(b)(2). Our stockholder's equity and net income from continuing operations were also below the alternate listing standards levels at that time. In accordance with Nasdaq listing rules, we had 180 calendar days, or until November 28, 2022, to regain compliance. On November 29, 2022, we were notified by the Staff of Nasdaq that, based upon our continued non-compliance with Nasdaq Listing Rule 5550(b)(2), our shares of common stock were subject to delisting unless we timely requested a hearing before the Nasdaq Hearings Panel. Following our timely request for a hearing, on December 23, 2022, we were notified by the Staff that we had regained compliance and therefore the scheduled hearing was canceled. Previously, on December 29, 2021, we received a letter from the Staff of Nasdaq similar to the May 31, 2022 letter, although we were able to regain compliance following receipt of the December 29, 2021 letter with the applicable continued listing standards prior to the end of March 2022, and the matter was closed.

In addition, pursuant to Nasdaq Listing Rules, we are required to maintain a minimum bid price of \$1.00 per share for continued listing on Nasdaq. Following the announcement of topline results in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women, our stock has traded below the required minimum bid price for continued listing on Nasdaq.

There can be no assurance that we will be able to maintain compliance with Nasdaq listing standards. Our failure to continue to meet these requirements could result in our common stock being delisted from the Nasdaq Capital Market. If our common stock were delisted from the Nasdaq Capital Market, among other things, this could result in a number of negative implications, including reduced market price and liquidity of our common stock as a result of the loss of market efficiencies associated with the Nasdaq, the loss of federal preemption of state securities laws, as well as the potential loss of confidence by suppliers, partners, employees and institutional investor interest, fewer business development opportunities, greater difficulty in obtaining financing and breaches of or events of default under certain contractual obligations (including an event of default under the loan agreement for the Marathon Convertible Notes).

We have been a defendant in securities litigation in the past and may become the target of securities litigation in the future, which may be costly and time-consuming to defend.

Following periods of market volatility in the price of a company's securities or the reporting of unfavorable news, security holders have often instituted class action litigation. This risk is especially relevant for us because pharmaceutical companies like ours have experienced significant stock price volatility in recent years. For example, we were named in a putative securities class action complaint and several stockholder derivative actions, which have been subsequently settled, as a result of the decline in our stock price following a 2019 Complete Response Letter from the FDA regarding our NDA for EDSIVO™. If we become involved in this type of litigation in the future, regardless of the outcome, we could incur substantial legal costs and our management's attention could be diverted from the operation of our business, causing our business to suffer.

Our "blank check" preferred stock could be issued to prevent a business combination not desired by management or our majority stockholders.

Our charter authorizes the issuance of "blank check" preferred stock with such designations, rights and preferences as may be determined by our Board of Directors without stockholder approval. Our preferred stock could be utilized as a method of discouraging, delaying, or preventing a change in control and as a method of preventing stockholders from receiving a premium for their shares in connection with a change of control.

Future sales of our common stock or the issuance of additional debt, convertible debt or other equity securities could cause dilution, and the sale of such common stock by us or by holders of our Marathon Convertible Notes, or the perception that such sales may occur, could cause the price of our stock to decline.

Sales of additional shares of our common stock, as well as securities convertible into or exercisable for common stock, could result in substantial dilution to our stockholders and cause the market price of our common stock to decline. An aggregate of 19,624,280 shares of common stock were outstanding as of December 31, 2022. As of such date, another 2,794,850 shares of common stock were issuable upon exercise of outstanding options, 250,000 shares of common stock were issuable upon exercise of warrants issued to SWK pursuant to the SWK Credit Agreement, and the Marathon Convertible Notes were outstanding and convertible by the holders into shares of common stock (including 2,400,000 shares upon conversion of the original principal amount, without taking into account the limitations on the conversion of the Marathon Convertible Notes, plus additional shares if accrued but unpaid interest on the Marathon Convertible Notes is converted into shares of common stock). Following December 31, 2022, we have issued to SWK a warrant to acquire another 250,000 shares of common stock in connection with the SWK Second Loan, we have issued 1,462,254 shares of common stock in connection with the ATM facility, and we have issued 2,335,000 shares of common stock and pre-funded warrants to purchase up to 585,306 shares of common stock in connection with the March 2023 Offering. A substantial majority of the outstanding shares of our common stock, as well as a substantial majority of the shares of common stock issuable upon exercise of outstanding options, are freely tradable without restriction or further registration under the Securities Act of 1933.

We may sell additional shares of common stock, as well as securities convertible into or exercisable for common stock, in subsequent public or private offerings. We may also issue additional shares of common stock, as well as securities convertible into or exercisable for common stock, to finance future acquisitions. We will need to raise additional capital in order to initiate or complete additional development activities for all of our product candidates or to pursue additional disease indications for our product candidates, and this may require us to issue a substantial amount of securities (including common stock as well as securities convertible into or exercisable for common stock). There can be no assurance that our capital raising efforts will be able to attract the capital needed to execute on our business plan and sustain our operations. Moreover, we cannot predict the size of future issuances of our common stock, as well as securities convertible into or exercisable for common stock, or the effect, if any, that future issuances and sales of our securities will have on the market price of our common stock. Sales of substantial amounts of our common stock by us or by the holders of our Marathon Convertible Notes, as well as securities convertible into or exercisable for common stock, including shares issued in connection with an acquisition or securing funds to complete any clinical trial plans, or the perception that such sales could occur, may result in substantial dilution and may adversely affect prevailing market prices for our common stock. In addition, the perception in the public markets that the holders of our Marathon Convertible Notes may sell all or a portion of their shares upon conversion as a result of our registration of such shares for resale by the holders could also in and of itself have a material adverse effect on the market price of our common stock.

On November 9, 2018, we entered into a sales agreement with Roth Capital Partners, LLC, and on March 18, 2020, an amended and restated sales agreement was entered into with JonesTrading Institutional Services LLC and Roth Capital Partners, LLC. The agreement provides a facility for the offer and sale of shares of common stock from time to time having an aggregate offering price of up to \$50.0 million depending upon market demand and subject to various limitations, in transactions deemed to be an at-the-market offering. We have no obligation to sell any shares of common stock pursuant to the agreement and may at any time suspend sales pursuant to the agreement. Each party may terminate the agreement at any time without liability. As of December 31, 2022, \$33.5 million remained available under this facility, subject to various limitations. In connection with the March 2023 Offering, we suspended the ATM facility and agreed to a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023.

We presently do not intend to pay cash dividends on our common stock.

We currently anticipate that no cash dividends will be paid on our common stock in the foreseeable future. While our dividend policy will be based on the operating results and capital needs of the business, it is anticipated that all earnings, if any, will be retained to finance the future expansion of our business.

We may issue debt and equity securities or securities convertible into equity securities, any of which may be senior to our common stock as to distributions and in liquidation, which could negatively affect the value of our common stock.

In the future, we may attempt to increase our capital resources by entering into debt or debt-like financing that is unsecured or secured by up to all of our assets, or by issuing additional debt or equity securities, which could include issuances of secured or unsecured commercial paper, medium-term notes, senior notes, subordinated notes, guarantees, preferred stock, hybrid securities, or securities convertible into or exchangeable for equity securities. In the event of our liquidation, our lenders and holders of our debt and preferred stock would receive distributions of available assets before distributions to the holders of our common stock. Because our decision to incur debt and issue securities in future offerings may be influenced by market conditions and other factors beyond our control, we cannot predict or estimate the amount, timing or nature of our future offerings or debt financings. Further, market conditions could require us to accept less favorable terms for the issuance of our securities in the future.

Because a prior year merger resulted in an ownership change under Section 382 of the Internal Revenue Code, our pre-merger net operating loss carryforwards and certain other tax attributes will be subject to limitation or elimination. The net operating loss carryforwards and certain other tax attributes of our former wholly-owned subsidiary may also be subject to limitations as a result of ownership changes.

Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an “ownership change,” 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 and taxes may be limited. In general, an “ownership change” occurs if there is a cumulative change in a company’s ownership by “five-percent shareholders” that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. We experienced an ownership change on July 17, 2015 and August 3, 2018, and may experience ownership changes in the future as a result of previous or future transactions in our stock, some of which may be outside our control. As a result, if we earn net taxable income, our ability to use our pre-change net operating loss carryforwards, or other pre-change tax attributes, to offset U.S. federal and state taxable income and taxes may be subject to significant limitations.

Because of their ownership of our common stock, insiders may influence significant corporate decisions.

As of December 31, 2022, our executive officers and directors and their affiliates beneficially owned or controlled 18% of the outstanding shares of our common stock. Accordingly, these executive officers, directors and their affiliates will have substantial influence over the outcome of corporate actions requiring stockholder approval, including the election of directors, any merger, consolidation or sale of all or substantially all of our assets or any other significant corporate transactions. This concentration of ownership may also delay or prevent a change of control of our company, even if such a change of control would benefit our other stockholders.

Anti-takeover provisions in our organizational documents and Delaware law might discourage, delay, or prevent an acquisition attempt or change in control of our company that you might consider favorable.

Our certificate of incorporation and bylaws contain provisions that may delay or prevent an acquisition or change in control of our company. Among other things, these provisions:

- authorize the Board of Directors to issue, without stockholder approval, blank-check preferred stock that, if issued, could operate as a “poison pill” to dilute the stock ownership of a potential hostile acquirer to prevent an acquisition that is not approved by the Board of Directors
- establish advance notice requirements for stockholder nominations of directors and for stockholder proposals that can be acted on at stockholder meetings
- limit who may call stockholder meetings
- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent
- provide that vacancies on our Board of Directors may be filled only by a majority of directors then in office, even if less than a quorum
- require a super-majority of votes to approve certain amendments to our charter as well as to amend our bylaws generally, and
- authorize us to indemnify officers and directors against losses that they may incur in investigations and legal proceedings resulting from their services to us, which may include services in connection with takeover defense measures

Further, as a Delaware corporation, we are also subject to provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. Section 203 generally prohibits us from engaging in a business combination with interested stockholders subject to certain exceptions.

These anti-takeover provisions and other provisions under Delaware law, our charter and our bylaws could discourage, delay or prevent a transaction involving an acquisition attempt or a change in control of our company, including actions that our stockholders may deem advantageous, or negatively affect the trading price of our common stock. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect directors of your choosing and to cause us to take other corporate actions you desire.

Our certificate of incorporation designates the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit a stockholder's ability to bring a claim in a judicial forum that the stockholder believes is more convenient or favorable for disputes with us or our directors, officers or other employees.

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for:

- any derivative action or proceeding brought on our behalf
- any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders
- any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, or
- any action asserting a claim against us governed by the internal affairs doctrine

Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. As a result, the exclusive forum provision will not apply to suits brought to enforce any duty or liability created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all suits brought to enforce any duty or liability created by the Securities Act or the rules and regulations thereunder. As a result, the exclusive forum provision will not apply to suits brought to enforce any duty or liability created by the Securities Act or any other claim for which the federal and state courts have concurrent jurisdiction.

Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and consented to the provisions of our certificate of incorporation described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that the stockholder believes is more convenient or favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. Alternatively, if a court were to find these provisions of our certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business, financial condition or results of operations.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Effective with a lease amendment signed October 15, 2021, effective June 1, 2022, we leased 1,600 square feet of office space located in Newton Massachusetts, which lease expired on December 31, 2022, and we are continuing to lease on a month-to-month basis. We also lease 3,677 square feet of office space located in Bend, Oregon. Effective with a lease amendment signed on June 22, 2022, this lease will expire on June 30, 2025. See Note 5 to our financial statements for a discussion of our leases.

Item 3. Legal Proceedings.

From time to time, we may become involved in litigation or proceedings relating to claims arising out of our operations.

We are not currently a party to any other legal proceedings that, in the opinion of our management, are likely to have a material adverse effect on our business. Regardless of outcome, litigation could have an adverse impact on our business because of defense and settlement costs, diversion of management resources and other factors.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

Market Information and Holders

Our common stock is traded on the Nasdaq Capital Market under the symbol “ACER.”

As of March 24, 2023, there were approximately 84 registered holders of our common stock. This number does not include stockholders for whom shares were held in “nominee” or “street name.”

Dividends

We have never declared or paid any cash dividends on our common stock and we do not intend to pay cash dividends in the foreseeable future. We currently expect to retain any future earnings to fund the operation and expansion of our business.

Item 6. [Reserved].

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

The following discussion of our financial condition and results of operations should be read in conjunction with the accompanying financial statements and the related footnotes thereto.

Overview

We are a pharmaceutical company focused on the acquisition, development, and commercialization of therapies for serious rare and life-threatening diseases with significant unmet medical needs. We identify and develop treatments where science can be applied in new ways for use in diseases with high unmet need.

In the U.S., OLPRUVA™ (sodium phenylbutyrate) for oral suspension is approved for the treatment of urea cycle disorders (“UCDs”) involving deficiencies of carbamylphosphate synthetase (“CPS”), ornithine transcarbamylase (“OTC”), or argininosuccinic acid synthetase (“AS”).¹ We are also advancing a pipeline of investigational product candidates, including EDSIVO™ (celiprolol) for the treatment of vascular Ehlers-Danlos syndrome (“vEDS”) patients with a confirmed type III collagen (COL3A1) mutation, and ACER-801 (osanetant) for the treatment of vasomotor symptoms (“VMS”), post-traumatic stress disorder (“PTSD”), and prostate cancer. We also intend to explore additional lifecycle opportunities for OLPRUVA™ (sodium phenylbutyrate) in various disorders where proof of concept data exists, subject to additional capital.

Going Concern

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the U.S. (“GAAP”), which contemplate our continuation as a going concern. We have suffered recurring losses from operations, negative cash flows from operations, have a net working capital deficiency, have a net capital deficiency, and have minimum unencumbered liquid assets requirements under our SWK Credit Agreement. While we have received approval for OLPRUVA™, we have yet to launch the product and establish a source of commercial product revenues and, as such, have been dependent on funding operations through the sale of equity securities, through a collaboration agreement, and through debt instruments. Since inception, we have experienced significant losses and incurred negative cash flows from operations. We have an accumulated deficit of \$140.7 million as of December 31, 2022 and expect to incur further losses over the foreseeable future as we develop our business. We have spent, and expect to continue to spend, a substantial amount of funds in connection with implementing our business strategy, including our planned product development efforts and potential precommercial activities.

As of December 31, 2022, we had cash and cash equivalents of \$2.3 million and current liabilities of \$19.0 million, which include \$8.4 million associated with deferred collaboration funding. Our cash and cash equivalents available at December 31, 2022, together with the proceeds from the Second Term Loan (defined below) of \$7.0 million which funded on January 31, 2023, net proceeds from our ATM (defined below) facility subsequent to December 31, 2022, totaling \$4.0 million from the sale of 1,462,254 shares for gross aggregate proceeds of \$4.1 million and an average per share price of \$2.81 less offering costs of \$0.1 million, and \$2.7 million of gross proceeds from a sale of securities (including 2,335,000 shares of common stock and pre-funded warrants to purchase up to 585,306 shares of common stock pursuant to a registered direct offering as well as warrants to purchase up to 2,920,306 shares of common stock in a concurrent private placement) which closed on March 24, 2023 (see Note 12 to our financial statements) (the “March 2023 Offering”), are expected to be sufficient to fund our anticipated operating and capital requirements into the middle of the second quarter of 2023.

We will need to raise additional capital to fund continued operations beyond the middle of the second quarter of 2023. We may not be successful in our efforts to raise additional funds or achieve profitable operations. We continue to explore potential opportunities and alternatives to obtain the additional resources that will be necessary to support our ongoing operations beyond the middle of the second quarter of 2023, including raising additional capital through either private or public equity or debt financing, or additional program collaborations or non-dilutive funding, as well as using our ATM facility which has \$29.4 million available as of March 24, 2022, although we suspended our ATM facility in connection with the March 2023 Offering and entered into a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any

shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023. (See At-the Market Facility and Common Stock Purchase Agreement in Note 9 as well as Note 12 to our financial statements.) Moreover, due to the SEC’s “baby shelf rules,” which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company’s public float, we are only able to issue a limited number of shares under our ATM facility. From May 19, 2020 through March 24, 2023, we have raised gross proceeds of \$20.6 million from the ATM facility and gross proceeds of \$4.0 million from an equity line purchase agreement with Lincoln Park (defined below), which equity line facility was completed on December 30, 2022.

On March 4, 2022, we entered into a Credit Agreement (the “SWK Credit Agreement”) with the lenders party thereto and SWK Funding LLC (“SWK”), as the agent, sole lead arranger and sole bookrunner, which provided for a senior secured term loan facility in an aggregate amount of \$6.5 million in a single borrowing (the “Original Term Loan”). The Original Term Loan funding closed on March 14, 2022. The proceeds of the Original Term Loan were used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement (as defined and described below) and the Marathon Credit Agreement (as defined and described below) and for other working capital and general corporate purposes. On August 19, 2022, we entered into an amendment (the “First Amendment”) to the SWK Credit Agreement, which extended the date through which we have the option to capitalize interest on the SWK Credit Agreement and which revised our minimum cash requirement under the Original Term Loan. On January 30, 2023, we entered into a Second Amendment (the “Second Amendment”) to the SWK Credit Agreement. In addition to other provisions, the Second Amendment provides for an additional senior secured term loan to be made to us in an aggregate amount of \$7.0 million in a single borrowing which funded on January 31, 2023 (the “Second Term Loan”, and together with the Original Term Loan, the “SWK Loans”).

The SWK Loans made under the SWK Credit Agreement, as amended by the Second Amendment (the “Current SWK Credit Agreement”) bear interest at an annual rate of the sum of (i) 3-month SOFR, subject to a 1% floor, plus (ii) a margin of 11%, with such interest payable quarterly in arrears. In the event of default, the interest rate will increase by 3% per annum over the contract rate effective at the time of default but shall not be higher than the maximum rate permitted to be charged by applicable laws. We have the option to capitalize such interest commencing on the date on which the Original Term Loan was funded and continuing until May 15, 2023. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women, the principal amount of the SWK Loans amortizes at a monthly rate of \$0.6 million starting April 15, 2023, until we have issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net proceeds from the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly. The final maturity date of the SWK Loans is March 4, 2024. We have the option to prepay the SWK Loans in whole or in part. Upon the repayment of the Original Term Loan (whether voluntary or at scheduled maturity), we must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid to SWK under the SWK Credit Agreement on or prior to the prepayment date) equal to 1.5 times the outstanding principal amount of the Original Term Loan, plus any and all payment-in-kind interest amounts. Upon the repayment of the Second Term Loan (whether voluntary or at scheduled maturity), we must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid in cash to SWK under the SWK Credit Agreement with respect to the Second Term Loan) equal to the outstanding principal amount of the Second Term Loan (inclusive of payment-in-kind interest amounts) multiplied by: (i) if the repayment occurs on or before April 15, 2023, 1.18, (ii) if the repayment occurs on or after April 16, 2023 but prior to May 16, 2023, 1.28667, (iii) if the repayment occurs on or after May 16, 2023 but prior to June 16, 2023, 1.39334, and (iv) if the repayment occurs on or after July 16, 2023, 1.5. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, we are required to maintain for purposes of the SWK Loans unencumbered liquid assets of not less than the lesser of (x) the outstanding principal amount of the SWK Loans or (y) \$3.0 million (as opposed to \$1.5 million for clause (y) prior to the announcement of such topline results).

The SWK Loans are secured by a first priority lien on all of our assets and any of our future subsidiaries pursuant to a Guarantee and Collateral Agreement entered into on March 4, 2022, between us and SWK, as agent

(the “SWK Security Agreement”). The SWK Credit Agreement contains customary representations and warranties and affirmative and negative covenants. We paid to SWK \$0.1 million in origination fees on the date on which the Original Term Loan was funded.

In connection with the execution of the SWK Credit Agreement, we issued a warrant (the “First SWK Warrant”) to purchase 150,000 shares of our common stock at an exercise price of \$2.46 per share. In connection with the execution of the First Amendment, we issued to SWK an additional warrant to purchase 100,000 shares of our common stock at an exercise price of \$1.51 per share (such warrant, the “Second SWK Warrant”). In connection with the execution of the Second Amendment, we issued to SWK an additional warrant to purchase 250,000 shares of our common stock at an exercise price of \$2.39 per share (such warrant, the “Third SWK Warrant” and, together with the First SWK Warrant and Second SWK Warrant, the “SWK Warrants”). SWK may exercise the SWK Warrants in accordance with the terms thereof for all or any part of such shares of common stock from the date on which the Original Term Loan was funded or such SWK Warrant was issued, as applicable, until and including March 4, 2029.

On March 4, 2022, we also entered into a Secured Convertible Note Purchase Agreement with MAM Aardvark, LLC (“Marathon”) and Marathon Healthcare Finance Fund, L.P. (“Marathon Fund” and together with “Marathon” each a “Holder” and collectively the “Holders”) (the “Marathon Convertible Note Purchase Agreement”) pursuant to which we issued and sold to the Holders secured convertible notes (the “Marathon Convertible Notes”) in an aggregate amount of up to \$6.0 million (the “Convertible Note Financing”). The Convertible Note Financing closed on March 14, 2022. The proceeds of the Convertible Note Financing were used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement and for other working capital and general corporate purposes. On January 30, 2023, we entered into an Amendment Agreement (the “Marathon Amendment Agreement”) with Marathon and Marathon Fund with respect to the Marathon Convertible Notes.

The Marathon Convertible Notes bear interest at an annual rate of 6.5%, with such interest payable quarterly; provided, however, that each of the Holders have agreed to defer payment by us of accrued and unpaid interest on their respective Marathon Convertible Note existing on the date of the Marathon Amendment Agreement through March 31, 2023, with such deferred interest, together with any accrued and unpaid interest on each Marathon Convertible Note incurred after March 31, 2023, to be due and payable in cash by us on April 15, 2023. Subject to the restrictions set forth in a subordination agreement among each of the Holders and SWK, as agent and lender, we are required to repurchase each Marathon Convertible Note, on or before the fifth (5th) business day (but with five (5) business days’ notice) following the earlier of June 15, 2023 or our receipt of gross proceeds of at least \$40.0 million from the issuance or sale of equity, debt and/or hybrid securities, loans or other financing on a cumulative basis since January 1, 2023 (excluding the Second Term Loan), at a price equal to 200% (the “Buy-Out Percentage”) of the outstanding principal amount of such Marathon Convertible Note, together with any accrued but unpaid interest thereon to the date of such repurchase; provided, that if we are prohibited from effectuating such repurchases pursuant to the subordination agreement with SWK, we are required to cause the repurchase to occur on or before the fifth (5th) business day following the earlier of such prohibition being no longer applicable or the payment in full of all senior indebtedness described in such subordination agreement, but with five (5) business days’ notice; and provided, further, that if such repurchase has not occurred by April 15, 2023, the Buy-Out Percentage shall be increased by 2500 basis points for each 90-day period after April 15, 2023, pro-rated for the actual number of days elapsed in the 90-day period before repurchase actually occurs (for example, if the repurchase occurs on May 30, 2023, the Buy-Out Percentage shall be increased to 212.5%). Each of the Holders also has the right to convert all or any portion of the outstanding principal amount plus any accrued but unpaid interest under the Marathon Convertible Note held by such Holder into shares of common stock at a conversion price of \$2.50 per share, subject to adjustment. Each Holder has certain rights with respect to the registration by us for resale of the shares of common stock issuable upon conversion of the Marathon Convertible Note held by such Holder which are forth in the Marathon Convertible Note Purchase Agreement. Any outstanding principal, together with all accrued and unpaid interest, will be payable on the earlier of the third anniversary of the date of issuance, or upon a change of control of us.

Pursuant to the Marathon Convertible Note Purchase Agreement, the Marathon Convertible Notes are secured by a lien on collateral representing substantially all of our assets, although such security interest is subordinated to our obligations under the SWK Credit Agreement.

On March 4, 2022, we also entered into a Credit Agreement (the “Marathon Credit Agreement”) with the lenders party thereto and Marathon, as the agent, sole lead arranger and sole bookrunner, which provided for a senior secured term loan facility in an aggregate amount of up to \$42.5 million in a single borrowing (the “Term Loan”). The Term Loan was available to be borrowed only following full FDA approval for marketing of ACER-001 and until December 31, 2022. We received approval for our NDA for ACER-001 on December 22, 2022, and we and Marathon agreed to an Extension Agreement with respect to the Term Loan on December 30, 2022, which extended the commitment date for funding the Term Loan to January 16, 2023. We elected to terminate the Marathon Credit Agreement by entering into a Termination Agreement on January 30, 2023, which terminated the Credit Agreement and an associated Royalty Agreement.

On March 19, 2021, we entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. The Collaboration Agreement is the culmination of the option agreement (the “Option Agreement,” together the “Agreements”) previously entered into between us and Relief on January 25, 2021. Pursuant to the Agreements, we received from Relief an upfront non-refundable payment of \$1.0 million and a reimbursement payment of \$14.0 million. Under the terms of the Collaboration Agreement, Relief committed to pay us Development Payments (the “Development Payments”) of up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. We could also receive a total of \$6.0 million in milestone payments based on the first European marketing approvals of OLPRUVA™ for a UCD and MSUD. The terms of the Agreements are further described in Critical Accounting Estimates later in this section and in the Revenue Recognition and Accounting for Collaboration Agreements section of Note 2 to our financial statements.

If we are unable to obtain additional funding to support our current or proposed activities and operations, we may not be able to continue our operations as proposed, which may require us to suspend or terminate any ongoing development activities, modify our business plan, curtail various aspects of our operations, cease operations, or seek relief under applicable bankruptcy laws. In such event, our stockholders may lose a substantial portion or even all of their investment.

These factors individually and collectively raise substantial doubt about our ability to continue as a going concern for at least 12 months from the date these financial statements are available, or March 27, 2023. Our financial statements do not include any adjustments or classifications that may result from our possible inability to continue as a going concern.

Revenue

We have not generated any revenue from product sales. While we received approval for OLPRUVA™ on December 22, 2022, we do not expect to generate any revenue from product sales unless and until we commercialize OLPRUVA™ and/or any of our product candidates.

Our revenue and collaboration funding to date consist of activities in connection with a collaboration agreement, including a license of intellectual property. We expect that any revenue or collaboration funding we generate will fluctuate from quarter to quarter as a result of the timing of achievement of contractually specified milestones, if any, the timing and amount of payments relating to such milestones, and the extent to which any products are approved and successfully commercialized.

If our product candidates are not developed in a timely manner, if regulatory approval is not obtained for them, or if such product candidates are not commercialized, our ability to generate future revenue, and our results of operations and financial position, would be adversely affected.

Activities Associated with Collaboration Agreement

From time to time, we will recognize collaboration funding as a reduction to research and development expenses and general and administrative expenses amounts attributed to providing services to our collaboration partner for which we have been reimbursed.

Research and Development Expenses

Research and development expenses consist of costs associated with the development of our product candidates. Our research and development expenses include:

- employee-related expenses, including salaries, benefits, and stock-based compensation
- external research and development expenses incurred under arrangements with third parties, such as contract research organizations (“CROs”), contract manufacturing organizations, consultants, and our scientific advisors
- license fees and other direct costs of acquiring intellectual property

We expense research and development costs as incurred. We account for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses as the service has been performed or as the goods have been received. From time to time, in connection with the Collaboration Agreement with Relief, we may recognize “contra-expense” for the research and development activities which were funded by the Collaboration Agreement. These contra-expense amounts are disclosed parenthetically on the face of the financial statements.

At any time, we are working on multiple programs. Our internal resources, employees, and infrastructure are not directly tied to any one research or drug discovery project and are typically deployed across multiple projects.

Since our inception in December 2013, we have spent a total of \$86.5 million in research and development expenses through December 31, 2022. Of that amount, \$37.2 million was directly related to EDSIVO™; \$29.5 million was directly related to OLPRUVA™, offset by \$13.9 million of collaboration funding; \$11.7 million was directly related to ACER-801; \$5.4 million was directly related to ACER-2820; and \$2.7 million was related to other development activities.

We expect our research and development expenses to be substantial for the foreseeable future as we continue to conduct our ongoing regulatory activities, initiate new preclinical and clinical trials, and build upon our pipeline. The process of conducting clinical trials and preclinical studies necessary to obtain regulatory approval, preparing to seek regulatory approval, and preparing for commercialization in the event of regulatory approval, is costly and time-consuming. While we received approval for OLPRUVA™ on December 22, 2022 for oral suspension in the U.S. for the treatment of certain patients with UCs involving deficiencies of CPS, OTC, or AS, we may never succeed in achieving marketing approval for any of our other product candidates.

Successful development of product candidates is highly uncertain and may not result in approved products. Completion dates and completion costs can vary significantly for each product candidate and are difficult to predict. We anticipate we will make determinations as to which programs to pursue and how much funding to direct to each program on an ongoing basis in response to our ability to enter into new strategic alliances with respect to each program or potential product candidate, the scientific and clinical success of each product candidate, the timing and ability to obtain regulatory approval for our product candidates (if any), and ongoing assessments as to each product candidate’s commercial potential. We will need to raise additional capital and may seek to do so through public or private equity or debt financings, government or other third-party funding, marketing and distribution arrangements and other collaborations, strategic alliances and licensing arrangements or a combination of these approaches. However, we may be unable to raise additional funds or enter into such other arrangements when needed on favorable terms or at all. Our failure to raise capital or enter into such other arrangements as and when needed would have a negative impact on our financial condition and our ability to develop our product candidates, pursue regulatory approvals, and operate our business as planned.

General and Administrative Expenses

General and administrative expenses consist primarily of employee-related expenses, including salaries, benefits, and stock-based compensation; external precommercial costs; and professional fees for legal, business consulting, auditing, and tax services. We expect that general and administrative expenses will be substantial in the future. From time to time, in connection with the Collaboration Agreement with Relief, we may recognize “contra-expense” for the general and administrative activities which were funded by the Collaboration Agreement. These contra-expense amounts are disclosed parenthetically on the face of the financial statements.

Other Income (Expense), Net

Other income (expense), net consists primarily of changes in the value of liabilities measured at fair value, interest income and of gains and losses resulting from the revaluation of assets and liabilities denominated in foreign currencies. We earn interest income from interest-bearing accounts and money market funds, which we classify as cash and cash equivalents. We incur interest expense from loans and notes payable. We record as part of other income (expense), net, transaction gains and losses on foreign currency denominated assets and liabilities when they are revalued each period due to changes in underlying exchange rates. We also record gain on extinguishment of debt as part of other income (expense), net.

Critical Accounting Estimates

This management’s discussion and analysis of financial condition and results of operations is based on our financial statements, which have been prepared in accordance with GAAP. The preparation of these financial statements requires our management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, and expenses. On an ongoing basis, we evaluate these estimates and judgments. We base our estimates on historical experience and on various assumptions that we believe to be reasonable under the circumstances. These estimates and assumptions form the basis for making judgments about the carrying values of assets and liabilities and the recording of revenue and expenses that are not readily apparent from other sources. Actual results may differ materially from these estimates. Additionally, we refer to our significant accounting policies which are included in Note 2 to our financial statements. We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving our judgments and estimates. During the year ended December 31, 2022, we have updated our critical accounting policies to include debt and convertible debt.

Revenue Recognition and Accounting for Collaboration Agreements

Our revenue and collaboration funding are generated from a single collaboration agreement which included the sale of a license of intellectual property. We analyze our collaboration agreements to assess whether they are within the scope of ASC Topic 808, *Collaborative Arrangements* (“ASC 808”) to determine whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards that are dependent on the commercial success of such activities. To the extent the arrangement is within the scope of ASC 808, we assess whether aspects of the arrangement between us and the collaboration partner are within the scope of other accounting literature. If we conclude that some or all aspects of the arrangement represent a transaction with a customer, we account for those aspects of the arrangement within the scope of ASC Topic 606, *Revenue from Contracts with Customers* (“ASC 606”). If we conclude that some or all aspects of the arrangement are within the scope of ASC 808 and do not represent a transaction with a customer, we recognize our share of the allocation of the shared costs incurred with respect to the jointly conducted activities as a component of the related expense in the period incurred. Pursuant to ASC 606, a customer is a party that has contracted with an entity to obtain goods or services that are an output of the entity’s ordinary activities in exchange for consideration. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. If we conclude a counterparty to a transaction is not a customer or otherwise not within the scope of ASC 606 or ASC 808, we consider the guidance in other accounting literature as applicable or by analogy to account for such transaction.

We determine the units of account within the Collaboration Agreement utilizing the guidance in ASC 606 to

determine which promised goods or services are distinct. In order for a promised good or service to be considered “distinct” under ASC 606, the customer can benefit from the good or service either on its own or together with other resources that are readily available to the customer (i.e., the good or service is capable of being distinct), and the entity’s promise to transfer the good or service to the customer is separately identifiable from other promises in the contract (i.e., the promise to transfer the good or service is distinct within the context of the contract).

For any units of account that fall within the scope of ASC 606, where the other party is a customer, we evaluate the separate performance obligation(s) under each contract, determine the transaction price, allocate the transaction price to each performance obligation considering the estimated stand-alone selling prices of the services and recognize revenue upon the satisfaction of such obligations at a point in time or over time dependent on the satisfaction of one of the following criteria: (1) the customer simultaneously receives and consumes the economic benefits provided by the vendor’s performance; (2) the vendor creates or enhances an asset controlled by the customer; and (3) the vendor’s performance does not create an asset for which the vendor has an alternative use and the vendor has an enforceable right to payment for performance completed to date.

Variable consideration is included in the transaction price only to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

Revenue for a sales-based or usage-based royalty promised in exchange for a license of intellectual property is recognized only when (or as) the later of the following events occurs: (i) the subsequent sale or usage occurs, or (ii) the performance obligation to which some or all of the sales-based or usage-based royalty has been allocated has been satisfied (or partially satisfied).

On January 25, 2021, we entered into the Option Agreement with Relief pursuant to which we granted Relief an exclusive option (the “Exclusivity Option”) to pursue a potential collaboration and license arrangement with us for the development, regulatory approval and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including UCDs and MSUD. The Option Agreement provided a period of time up to June 30, 2021 for the parties to perform additional due diligence and to work toward negotiation and execution of a definitive agreement with respect to the potential collaboration for ACER-001. In consideration for the grant of the Exclusivity Option, (i) we received from Relief an upfront nonrefundable payment of \$1.0 million, (ii) Relief provided to us a 12-month secured loan in the principal amount of \$4.0 million, as evidenced by a Promissory Note (the “Note”) issued by Acer to Relief, and (iii) we granted to Relief a security interest in all of its assets to secure performance of the Note, as evidenced by a Security Agreement (the “Security Agreement”). The Note was repayable in one lump sum within 12 months from issuance and bore interest at a rate equal to 6% per annum.

On March 19, 2021, we entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. We received a \$10.0 million cash payment from Relief (i.e., a \$14.0 million “Reimbursement Payment” offset by repayment of the \$4.0 million outstanding balance of the Note, plus interest earned through the date of the Collaboration Agreement). Under the terms of the Collaboration Agreement, Relief committed to pay us up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, we retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where we will receive from Relief a 15% royalty on all net sales received in the Relief Territory. We could also receive a total of \$6.0 million in milestone payments based on the first European (EU) marketing approvals of OLPRUVA™ for a UCD and MSUD.

We assessed these agreements in accordance with the authoritative literature and concluded that they meet the definition of a collaborative arrangement per ASC 808. For certain parts of the Collaboration Agreement, we

concluded that Relief represented a customer while for other parts of the Collaboration Agreement Relief did not represent a customer. The units of account of the Collaboration Agreement where Relief does not represent a customer are outside of the scope of ASC 606. We also determined that the development and commercialization services and Relief's right to 60% profit in Acer Territory is within the scope of ASC 730, *Research and Development* ("ASC 730"), with regard to funded research and development arrangements.

We concluded the promised goods and services contained in the Collaboration Agreement represented two distinct units of account consisting of a license in Relief Territory, and a combined promise for the development and commercialization of OLPRUVA™ in Acer Territory and the payment of 60% net profit from that territory (together, the "Services"). The stand-alone selling price was estimated for each distinct unit of account.

We determined that the transaction price at the outset of the Collaboration Agreement would amount to \$25.0 million, including the Option Fee of \$1.0 million, the Reimbursement Payment of \$14.0 million, and the First Development Payment of \$10.0 million. We concluded that, consistent with the evaluation of variable consideration, using the most likely amount approach, the Second Development Payment as well as the milestone payments for EU marketing approvals should be fully constrained until the contingency associated with each payment has been resolved and our NDA is accepted for review by the FDA, and Relief receives EU marketing approval, respectively. The contingency associated with the Second Development Payment was resolved in the fourth quarter of 2021.

Since ASC 808 does not provide recognition and measurement guidance for collaborative arrangements, we applied the principles of ASC 606 for those units of account where Relief is a customer and ASC 730-20 for the funded research and development activities. The license revenue was recognized at the point where we determined control was transferred to the customer. The combined unit of account for the Services will be recognized over the service period through the anticipated date of first commercial sale of the OLPRUVA™ approved product in the U.S. We also determined that the Services would be satisfied over time as measured using actual costs incurred by us toward the identified development and commercialization services agreed to between the parties up to the point of first commercial sale of the OLPRUVA™ product. Research and development expenses and general and administrative expenses, as they relate to activities governed by the Collaboration Agreement, incurred in satisfying the Services unit-of-account will be recognized as contra-expense within their respective categories, consistent with the presentation guidance in ASC 730.

We recognize as a receivable under the Collaboration Agreement consideration, which is deemed unconditional, or when only the passage of time is required before payment of that consideration is due. Amounts receivable under the Collaboration Agreement plus payments received from Relief, net of the amount recorded as license revenue and as offsets to research and development expenses and to general and administrative expenses, are reported as deferred collaboration funding.

At December 31, 2022, the amount of deferred collaboration funding associated with unsatisfied promises under the Collaboration Agreement amounted to \$8.4 million. We have recorded this amount as a current liability, which equates to our estimate of remaining spending under the Collaboration Agreement which we estimate will be recognized within the next 12 months up to the point of the first commercial sale of OLPRUVA™. The non-current liability reported as of December 31, 2021 represented the then current estimated amount that would have been taken against future net profit payments made to Relief should they have occurred. We expect to recognize this deferred collaboration funding as we incur expenses associated with performing the Services up to the date of first commercial sale in Acer Territory and through the end of the effective date of the Collaboration Agreement. At December 31, 2022, deferred collaboration funding was composed of \$35.0 million received from Relief, offset by \$1.3 million recognized as license revenue during the year ended December 31, 2021 and by \$13.9 million recorded as an offset to research and development expenses, and \$11.4 million recorded as an offset to general and administrative expenses subsequent to signing the Collaboration Agreement and through the date of this report.

Goodwill

Goodwill represents the excess of the purchase price (consideration paid plus net liabilities assumed) of an acquired business over the fair value of the underlying net tangible and intangible assets. We evaluate the recoverability of goodwill according to ASC Topic 350, *Intangibles – Goodwill and Other* annually, or more

frequently if events or changes in circumstances indicate that the carrying value of goodwill might be impaired. Factors that may be considered a change in circumstances indicating that the carrying value of our goodwill might be impaired include declines in our stock price, market capitalization, or cash flows. We may opt to perform a qualitative assessment or a quantitative impairment test to determine whether goodwill is impaired. Our goodwill is allocated to a single reporting unit. If we were to determine based on a qualitative assessment that it was more likely than not that the fair value of the reporting unit was less than its carrying value, a quantitative impairment test would then be performed. The quantitative impairment test compares the fair value of the reporting unit with its carrying amount, including goodwill. If the estimated fair value of the reporting unit is less than its carrying amount, a goodwill impairment would be recognized for the difference.

Fair Value of Financial Instruments

ASC Topic 820, Fair Value Measurement (“ASC 820”), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and our own assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of us. Unobservable inputs are inputs that reflect 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.

ASC 820 identifies fair value as the exchange price, or exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As a basis for considering market participant assumptions in fair value measurements, ASC 820 establishes a three-tier fair value hierarchy that distinguishes among the following.

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access.
- Level 2—Valuations based on quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and models for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations based on inputs that are unobservable and significant to the overall fair value measurement.

To the extent that the 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 us 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.

Financial instruments consist of cash equivalents, collaboration receivable, accounts payable, accrued expenses, and debt instruments. These financial instruments are stated at their respective historical carrying amounts, which approximate fair value due to their short-term nature, except for cash equivalents and debt instruments, which were marked to market at the end of each reporting period. See Note 7 to our financial statements for additional information on the fair value of the debt liabilities.

We elected the fair value option for both our Original Term Loan and our Marathon Convertible Notes dated March 14, 2022 (see Note 7 to our financial statements). We adjust both the Original Term Loan and the Marathon Convertible Notes to fair value through the change in fair value of debt in the accompanying statements of operations. Subsequent unrealized gains and losses on items for which the fair value option is elected are reported in earnings.

Debt

Convertible notes are regarded as compound instruments, consisting of a liability component and an equity component. We determined that we are eligible for the fair value option election in connection with the Original Term Loan and the Marathon Convertible Notes as each instrument met the definition of a “recognized financial liability” which is an acceptable financial instrument eligible for the fair value option under ASC 825-10-15-4 and do not meet the definition of any of the financial instruments found within ASC 825-10-15-5 that are not eligible for

the fair value option. At the date of issuance, the fair value for each instrument is derived from the instrument's implied discount rate at inception.

Research and Development

Research and development costs are expensed as incurred and include compensation and related benefits, license fees and outside contracted research and manufacturing consultants. We sometimes make nonrefundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as an expense in the period that we receive the goods or as the services are performed.

Clinical Trial and Preclinical Study Expenses

We make estimates of prepaid and/or accrued expenses as of each balance sheet date in our financial statements based on certain facts and circumstances at that time. Our accrued expenses for preclinical studies and clinical trials are based on estimates of costs incurred for services provided by CROs, manufacturing organizations, and for other trial- and study-related activities. Payments under our agreements with external service providers depend on a number of factors such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, we obtain information from various sources and estimate the level of effort or expense allocated to each period. Adjustments to our research and development expenses may be necessary in future periods as our estimates change. As these activities are generally material to our overall financial statements, subsequent changes in estimates may result in a material change in our accruals. No material changes in estimates were recognized in the years ended December 31, 2022 and 2021. Our accounts payable and accrued expenses include costs associated with preclinical or clinical studies of \$0.9 million and \$0.2 million at December 31, 2022 and 2021, respectively.

Results of Operations

Comparison of the years ended December 31, 2022 and 2021

The following table summarizes our results of operations for the years ended December 31, 2022 and 2021:

	Years Ended December 31,		\$ Change	% Change
	2022	2021		
Revenue	\$ —	\$ 1,260,000	\$ (1,260,000)	N/A
Operating expenses:				
Research and development (net of collaboration funding of \$7,825,263 and \$6,055,295 in the years ended December 2022 and 2021, respectively)	11,924,837	6,508,055	5,416,782	83%
General and administrative (net of collaboration funding of \$8,248,813 and \$3,197,659 in the years ended December 2022 and 2021, respectively)	12,689,422	10,700,334	1,989,088	19%
Loss from operations	(24,614,259)	(15,948,389)	(8,665,870)	54%
Total other income (expense), net	(1,623,056)	574,396	(2,197,452)	(383)%
Net loss	<u>\$ (26,237,315)</u>	<u>\$ (15,373,993)</u>	<u>\$ (10,863,322)</u>	71%

Revenue

We recognized revenue of \$1.3 million during the year ended December 31, 2021 related to the license of intellectual property as part of the Collaboration Agreement with Relief.

Research and Development Expenses

Research and development expenses were \$11.9 million, net of collaboration funding of \$7.8 million, for the year ended December 31, 2022, as compared to \$6.5 million, net of collaboration funding of \$6.1 million, for the year ended December 31, 2021. This increase of \$5.4 million was primarily due to increases in employee-related expenses including a bonus accrual and expenses related to clinical studies, partially offset by the increase in recognition of contra-expense from the collaboration funding from the Collaboration Agreement with Relief. Research and development expenses for the year ended December 31, 2022 were comprised of \$8.2 million related to OLPRUVA™, offset by \$7.8 million of collaboration funding; \$5.9 million related to ACER-801; \$4.0 million related to EDSIVO™; \$0.2 million related to ACER-2820; and \$1.4 million related to other development activities.

General and Administrative Expenses

General and administrative expenses were \$12.7 million, net of collaboration funding of \$8.2 million, for the year ended December 31, 2022, as compared to \$10.7 million, net of collaboration funding of \$3.2 million, for the year ended December 31, 2021. This increase of \$2.0 million was primarily due to increases in precommercial activities, employee-related expenses including a bonus accrual, professional services, and information technology, partially offset by the increase in the recognition of contra-expense from the collaboration funding from the Collaboration Agreement with Relief.

Other Income (Expense), Net

Other expense, net of \$1.6 million during the year ended December 31, 2022 was primarily attributable to debt issuance cost, partially offset by changes in the fair value of debt instruments. Other income, net of \$0.6 million during the year ended December 31, 2021 was primarily attributable to a gain on extinguishment of debt related to forgiveness of a PPP loan and to foreign currency gain.

Liquidity and Capital Resources

We have never been profitable and have incurred operating losses in each year since inception. From inception to December 31, 2022, we have raised net cash proceeds of \$115.5 million, primarily from common stock offerings, private placements of convertible preferred stock, debt instruments, and convertible debt instruments. In addition, from inception to December 31, 2022, we have raised cash proceeds of \$35.0 million from collaboration agreements. As of December 31, 2022, we had \$2.3 million in cash and cash equivalents and current liabilities aggregating to \$19.0 million, which include \$8.4 million associated with deferred collaboration funding. Our net loss for the years ended December 31, 2022 and 2021, was \$26.2 million and \$15.4 million, respectively. As of December 31, 2022, we had an accumulated deficit of \$140.7 million. Substantially all of our operating losses resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations.

The following table summarizes our cash flows for the years ended December 31, 2022 and 2021:

	Years Ended December 31,	
	2022	2021
Net cash (used in) provided by:		
Operating activities	\$ (30,251,898)	\$ (134,909)
Investing activities	(171,170)	(54,944)
Financing activities	20,041,524	7,139,047
Net (decrease) increase in cash and cash equivalents	\$ (10,381,544)	\$ 6,949,194
Cash and cash equivalents, beginning of the year	12,710,762	5,761,568
Cash and cash equivalents, end of the year	\$ 2,329,218	\$ 12,710,762

Operating Activities

Net cash used in operating activities was \$30.3 million for the year ended December 31, 2022, as compared to \$0.1 million for the year ended December 31, 2021. The increase in cash used in operations of \$30.2 million was primarily the result of an increase in net loss after adjusting for non-cash changes in the fair value of debt and reductions in collaboration funding related to cash received from Relief pursuant to the Agreements net of amounts recognized as contra-expense. Additionally, these increases were partially offset by a decrease in accounts receivable and increases in accounts payable and accrued expenses. During the year ended December 31, 2021, we recorded in other current liabilities a \$9.2 million liability related to the securities class action and stockholder derivative actions settlements and legal costs, for which we also recorded in other current assets an asset of an equal amount representing the expected recovery from our insurance carriers. During the year ended December 31, 2022, we reduced the value of this liability and this asset each by \$9.2 million as settlement was made by our insurance carriers. The increase in the net loss during 2022 was a result of increased precommercial spend associated with the anticipated approval of OLPRUVA™, as well as increased clinical trial related expenses for osanetant and EDSIVO™.

Investing Activities

Cash used in investing activities during the years ended December 31, 2022 and 2021 was related to the purchase of property and equipment.

Financing Activities

Net cash provided by financing activities was \$20.0 million for the year ended December 31, 2022, as compared to \$7.1 million for the year ended December 31, 2021. Net cash provided by financing activities during the year ended December 31, 2022 consisted primarily of \$7.4 million net proceeds from the issuance of common stock through our ATM and equity line agreements and \$1.5 million proceeds from the issuance of common stock through a private placement; \$6.0 million net proceeds received from the Original Term Loan; \$5.5 million net proceeds received from the Marathon Convertible Notes and \$0.3 million received from the issuance of the First SWK Warrant, partially offset by issuance costs of \$0.7 million related to these debt and convertible debt instruments. Net cash provided by financing activities during the year ended December 31, 2021 pertained to the \$4.0 million received from the secured loan from Relief, which was settled net against the Reimbursement Payment received from Relief in connection with the Collaboration Agreement, as well as to \$3.1 million proceeds from the issuance of common stock, net of issuance costs, comprised of \$2.6 million proceeds from our ATM facility and \$0.5 million proceeds from our equity line facility entered into with Lincoln Park.

Future Capital Requirements

We have not generated any revenue from product sales. We do not expect to generate any revenue from product sales unless and until we successfully commercialize OLPRUVA™ and/or unless and until we obtain regulatory approval for and commercialize any of our other product candidates. At the same time, we expect to continue to incur significant expenses in connection with our ongoing development and manufacturing activities, particularly as we continue the research, development, manufacture and clinical trials of, and seek regulatory approval for, our product candidates. In addition, subject to obtaining regulatory approval of any of our product candidates and thereafter successfully commercializing any such product candidates, we anticipate that we will need substantial additional funding in connection with our continuing operations.

As of December 31, 2022, we had \$2.3 million in cash and cash equivalents and current liabilities of \$19.0 million, which include \$8.4 million associated with deferred collaboration funding. Our cash and cash equivalents available at December 31, 2022, together with the proceeds from the Second Term Loan of \$7.0 million which funded on January 31, 2023, net proceeds from our ATM facility subsequent to December 31, 2022 totaling \$4.0 million from the sale of 1,462,254 shares for gross aggregate proceeds of \$4.1 million and an average per share price of \$2.81 less offering costs of \$0.1 million, and \$2.7 million of gross proceeds from a sale of securities (including 2,335,000 shares of common stock and pre-funded warrants to purchase up to 585,306 shares of common stock

pursuant to a registered direct offering as well as warrants to purchase up to 2,920,306 shares of common stock in a concurrent private placement) which closed on March 24, 2023 (see Note 12 to our financial statements) (the “March 2023 Offering”), are expected to be sufficient to fund our anticipated operating and capital requirements into the middle of the second quarter of 2023. There is substantial doubt about our ability to continue as a going concern. Please refer to the discussion above titled “Going Concern”.

On November 29, 2022, we entered into a securities purchase agreement for the sale and issuance of an aggregate of 1,229,508 shares of our common stock, for an aggregate purchase price of \$1.5 million, in a private placement transaction with our President and Chief Executive Officer and a member of our Board of Directors and with the Chairman of our Board of Directors at a price per share of \$1.22. The shares of common stock issued in the private placement constitute “restricted securities” under the federal securities laws and are subject to a minimum six-month holding period. The proceeds from the private placement will be used by us for working capital and general corporate purposes.

On March 4, 2022, we entered into the SWK Credit Agreement with the lenders party thereto and, as the agent, sole lead arranger and sole bookrunner, which provided for a senior secured term loan facility in an aggregate amount of \$6.5 million in a single borrowing (i.e., the Original Term Loan). The Original Term Loan funding closed on March 14, 2022. The proceeds of the Original Term Loan were used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement and for other working capital and general corporate purposes. On August 19, 2022, we entered into the First Amendment which extended the date through which we have the option to capitalize interest on the SWK Credit Agreement and which revised our minimum cash requirement under the Original Term Loan. On January 30, 2023, we entered into the Second Amendment. In addition to other provisions, the Second Amendment provides for an additional senior secured term loan to be made to us in an aggregate amount of \$7.0 million in a single borrowing which funded on January 31, 2023 (i.e., the Second Term Loan).

The SWK Loans bear interest at an annual rate of the sum of (i) 3-month SOFR, subject to a 1% floor, plus (ii) a margin of 11%, with such interest payable quarterly in arrears. In the event of default, the interest rate will increase by 3% per annum over the contract rate effective at the time of default but shall not be higher than the maximum rate permitted to be charged by applicable laws. We have the option to capitalize such interest commencing on the date on which the Original Term Loan was funded and continuing until May 15, 2023. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women, the principal amount of the SWK Loans amortizes at a monthly rate of \$0.6 million starting April 15, 2023, until we have issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net proceeds from the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly. The final maturity date of the SWK Loans is March 4, 2024. We have the option to prepay the SWK Loans in whole or in part. Upon the repayment of the Original Term Loan (whether voluntary or at scheduled maturity), we must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid to SWK under the SWK Credit Agreement on or prior to the prepayment date) equal to 1.5 times the outstanding principal amount of the Original Term Loan, plus any and all payment-in-kind interest amounts. Upon the repayment of the Second Term Loan (whether voluntary or at scheduled maturity), we must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid in cash to SWK under the SWK Credit Agreement with respect to the Second Term Loan) equal to the outstanding principal amount of the Second Term Loan (inclusive of payment-in-kind interest amounts) multiplied by: (i) if the repayment occurs on or before April 15, 2023, 1.18, (ii) if the repayment occurs on or after April 16, 2023 but prior to May 16, 2023, 1.28667, (iii) if the repayment occurs on or after May 16, 2023 but prior to June 16, 2023, 1.39334, and (iv) if the repayment occurs on or after July 16, 2023, 1.5. Due to topline results announced in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, we are required to maintain for purposes of the SWK Loans unencumbered liquid assets of not less than the lesser of (x) the outstanding principal amount of the SWK Loans or (y) \$3.0 million (as opposed to \$1.5 million for clause (y) prior to the announcement of such topline results).

The SWK Loans are secured by a first priority lien on all of our assets and any of our future subsidiaries pursuant to the SWK Security Agreement which contains customary representations and warranties and affirmative and negative covenants. We paid to SWK \$0.1 million in origination fees on the date on which the Original Term Loan was funded.

In connection with the execution of the SWK Credit Agreement, we issued the First SWK Warrant to purchase 150,000 shares of our common stock at an exercise price of \$2.46 per share. In connection with the execution of the First Amendment, we issued to the Second SWK Warrant to purchase 100,000 shares of our common stock at an exercise price of \$1.51 per share. In connection with the execution of the Second Amendment, we issued to SWK the Third SWK Warrant to purchase 250,000 shares of our common stock at an exercise price of \$2.39 per share. SWK may exercise the SWK Warrants in accordance with the terms thereof for all or any part of such shares of common stock from the date on which the Original Term Loan was funded or such SWK Warrant was issued, as applicable, until and including March 4, 2029.

On March 4, 2022, we also entered into the Marathon Convertible Note Purchase Agreement with the Holders pursuant to which we issued and sold to the Holders the Marathon Convertible Notes in an aggregate amount of \$6.0 million. The Convertible Note Financing closed on March 14, 2022. The proceeds of the Convertible Note Financing were used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement and for other working capital and general corporate purposes. On January 30, 2023, we entered into the Marathon Amendment Agreement with Marathon and Marathon Fund with respect to the Marathon Convertible Notes.

The Marathon Convertible Notes bear interest at an annual rate of 6.5%, with such interest payable quarterly; provided, however, that each of the Holders have agreed to defer payment by us of accrued and unpaid interest on their respective Marathon Convertible Note existing on the date of the Marathon Amendment Agreement through March 31, 2023, with such deferred interest, together with any accrued and unpaid interest on each Marathon Convertible Note incurred after March 31, 2023, to be due and payable in cash by us on April 15, 2023. Subject to the restrictions set forth in a subordination agreement among each of the Holders and SWK, as agent and lender, we are required to repurchase each Marathon Convertible Note, on or before the fifth (5th) business day (but with five (5) business days' notice) following the earlier of June 15, 2023 or our receipt of gross proceeds of at least \$40.0 million from the issuance or sale of equity, debt and/or hybrid securities, loans or other financing on a cumulative basis since January 1, 2023 (excluding the Second Term Loan), at a price equal to 200% (i.e., the Buy-Out Percentage) of the outstanding principal amount of such Marathon Convertible Note, together with any accrued but unpaid interest thereon to the date of such repurchase; provided, that if we are prohibited from effectuating such repurchases pursuant to the subordination agreement with SWK, we are required to cause the repurchase to occur on or before the fifth (5th) business day following the earlier of such prohibition being no longer applicable or the payment in full of all senior indebtedness described in such subordination agreement, but with five (5) business days' notice; and provided, further, that if such repurchase has not occurred by April 15, 2023, the Buy-Out Percentage shall be increased by 2500 basis points for each 90-day period after April 15, 2023, pro-rated for the actual number of days elapsed in the 90-day period before repurchase actually occurs (for example, if the repurchase occurs on May 30, 2023, the Buy-Out Percentage shall be increased to 212.5%). Each of the Holders also has the right to convert all or any portion of the outstanding principal amount plus any accrued but unpaid interest under the Marathon Convertible Note held by such Holder into shares of common stock at a conversion price of \$2.50 per share, subject to adjustment. Each Holder has certain rights with respect to the registration by us for resale of the shares of common stock issuable upon conversion of the Marathon Convertible Note held by such Holder which are forth in the Marathon Convertible Note Purchase Agreement. Any outstanding principal, together with all accrued and unpaid interest, will be payable on the earlier of the third anniversary of the date of issuance, or upon a change of control of us.

Pursuant to the Marathon Convertible Note Purchase Agreement, the Marathon Convertible Notes are secured by a lien on collateral representing substantially all of our assets, although such security interest is subordinated to our obligations under the SWK Credit Agreement.

On March 4, 2022, we also entered into the Marathon Credit Agreement with the lenders party thereto and Marathon, as the agent, sole lead arranger and sole bookrunner, which provided for a senior secured term loan facility in an aggregate amount of up to \$42.5 million in a single borrowing (i.e., the Term Loan). The Term Loan

was available to be borrowed only following full FDA approval for marketing of ACER-001 and until December 31, 2022. We received approval for our NDA for ACER-001 on December 22, 2022, and we and Marathon agreed to an Extension Agreement with respect to the Term Loan on December 30, 2022, which extended the commitment date for funding the Term Loan to January 16, 2023. We elected to terminate the Marathon Credit Agreement by entering into a Termination Agreement on January 30, 2023, which terminated the Credit Agreement and an associated Royalty Agreement.

On March 19, 2021, we entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. We received a \$10.0 million cash payment from Relief (i.e., a \$14.0 million “Reimbursement Payment,” offset by repayment of the \$4.0 million outstanding balance of the Note plus interest earned through the date of the Collaboration Agreement). Under the terms of the Collaboration Agreement, Relief committed to pay us up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, we retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where we will receive from Relief a 15% royalty on all net sales received in the Relief Territory. We could also receive a total of \$6.0 million in milestone payments based on the first European marketing approvals of OLPRUVA™ for a UCD and MSUD. In connection with the cancellation of the \$4.0 million promissory note (the “Note”) executed by us in favor of Relief on January 25, 2021, Relief released its security interest in all of our assets pursuant to the Note.

On April 30, 2020, we entered into a \$15.0 million equity line purchase agreement and registration rights agreement with Lincoln Park Capital Fund, LLC (“Lincoln Park”) pursuant to which we had the right to sell to Lincoln Park an aggregate of up to \$15.0 million in shares of our common stock, subject to certain conditions and limitations. Under the terms and subject to the conditions of the purchase agreement, Lincoln Park was obligated to purchase up to an aggregate of \$15.0 million in shares of common stock (subject to certain limitations) from time to time over a 36-month period commencing on June 8, 2020. We were able to direct Lincoln Park, at our sole discretion and subject to certain conditions, to purchase up to 50,000 shares of common stock in regular purchases, increasing to amounts of up to 100,000 shares depending upon the closing sale price of our common stock. In addition, we were able to direct Lincoln Park to purchase additional amounts as accelerated purchases or as additional accelerated purchases. The purchase price of shares of common stock was based upon the market price of our common stock preceding the time of sale as computed under purchase agreement. However, there could be no assurance that we would have been able to receive the entire obligation amount from Lincoln Park because the purchase agreement contains limitations, restrictions, requirements, events of default and other provisions that could limit our ability to cause Lincoln Park to buy common stock from us. During the year ended December 31, 2021, we sold 200,000 shares of common stock under our purchase agreement with Lincoln Park at a weighted average gross sale price of \$2.47 per share, resulting in proceeds of \$0.5 million. During the year ended December 31, 2022, we sold an additional 772,057 shares of common stock under the purchase agreement at a weighted average sale price of \$1.42 per share, resulting in additional proceeds of \$1.1 million. The Lincoln Park facility was completed on December 30, 2022.

On March 18, 2020, we entered into an amended and restated sales agreement with JonesTrading Institutional Services LLC (“JonesTrading”) and Roth Capital Partners, LLC (“Roth Capital”). This agreement provides a facility for the offer and sale of shares of common stock from time to time depending upon market demand, in transactions deemed to be an “at-the-market” (“ATM”) offering. We will need to keep current our shelf registration statement and the offering prospectus relating to the ATM facility, in addition to providing certain periodic deliverables under the sales agreement, in order to use such facility. Due to the SEC’s “baby shelf rules,” which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company’s public float in a 12-month period, we are currently only able to issue a limited number of shares which aggregate no more than one-third of our public float using our shelf registration statement. From May 19, 2020 through December 31, 2021, we sold an aggregate of 2,716,064 shares of common stock at an average

gross sale price of \$3.6794 per share, for gross proceeds of \$10.0 million. Proceeds, net of \$0.5 million of fees and offering costs were \$9.5 million. During the year ended December 31, 2022, we sold 3,312,471 additional shares of common stock through our ATM facility at an average gross sale price of \$1.9749 per share, for gross proceeds of \$6.5 million. Proceeds, net of \$0.2 million in fees and offering costs, were \$6.3 million. As of December 31, 2022, we had no commitments for any additional financing, except for the ATM facility and the Marathon Credit Agreement for the Term Loan (defined below), which was subsequently terminated on January 30, 2023. In connection with the March 2023 Offering, we suspended our ATM facility and entered into a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023.

Our future capital requirements are difficult to forecast and will depend on many factors, including but not limited to:

- any continued development and potential commercialization of OLPRUVA™
- any continued development of EDSIVO™, including pursuant to the DiSCOVER pivotal clinical trial
- any continued development of ACER-801, including the initiation of one or more clinical trials
- our ability to obtain adequate levels of financing to meet our operating plan
- the costs associated with filing, outcome, and timing of regulatory approvals
- the terms and timing of any strategic alliance, licensing and other arrangements that we may establish
- the cost and timing of hiring any new employees to support our business operations
- the costs and timing of having clinical supplies of our product candidates manufactured
- the initiation and progress of ongoing preclinical studies and clinical trials for our product candidates
- the costs involved in patent filing, prosecution, and enforcement
- the number of programs we pursue
- any development of ACER-2820 we may choose to pursue (although any such development will depend upon the availability of non-dilutive financing)

We will continue to require substantial additional capital to continue our clinical development and pursuit of regulatory approval activities. Accordingly, we will need to raise substantial additional capital to continue to fund our operations. The amount and timing of our future funding requirements will depend on many factors, including the pace and results of our development, regulatory conditions and requirements, and commercialization efforts. Failure to raise capital as and when needed, on favorable terms or at all, would have a negative impact on our financial condition and our ability to develop our product candidates, pursue regulatory approvals, potentially commercialize (if approved) our product candidates, and operate our business as planned.

We expect to incur significant expenses and operating losses for at least the foreseeable future as we initiate and continue the clinical development of, seek regulatory approval for, and potentially commercialize (if approved) our product candidates. In addition, operating as a publicly-traded company involves upgrading financial information systems and incurring costs associated with operating as a public company. We expect that our operating losses will fluctuate significantly from quarter-to-quarter and year-to-year due to the timing of clinical development programs, efforts to achieve regulatory approval, and planning for potential commercialization (if approved) of our product candidates.

Until we can generate a sufficient amount of product sales revenue to finance our cash requirements, which would require us to obtain regulatory approval for and successfully commercialize one or more of our product candidates, we expect to finance our future cash needs primarily through the issuance of additional equity and potentially through borrowing, non-dilutive funding, and strategic alliances. As of December 31, 2022, we did not maintain any lines of credit or have any sources of debt or equity capital committed for funding other than our ATM

facility and the Marathon Credit Agreement for the Term Loan (defined below), which was subsequently terminated on January 30, 2023.

We continue to explore potential opportunities and alternatives to obtain the additional resources that will be necessary to support our ongoing operations beyond the second quarter of 2023, including raising additional capital through either private or public equity or debt financing, or additional program collaborations or non-dilutive funding, as well as using our ATM facility and/or our equity line facility, although we suspended our ATM facility in connection with the March 2023 Offering and entered into a related restriction prohibiting us from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of our common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023. To the extent that we raise additional capital through the issuance of additional equity or convertible debt 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 the rights of existing stockholders. 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 marketing and distribution arrangements or other 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.

The Nasdaq Capital Market's continued listing standards for our common stock require, among other things, that we maintain either (i) stockholders' equity of \$2.5 million, (ii) market value of listed securities of \$35 million or (iii) net income from continuing operations of \$500,000 in the most recently completed fiscal year or in two of the last three most recently completed fiscal years. On May 31, 2022, we received a letter from the listing qualifications department staff of Nasdaq indicating that for the last 30 consecutive business days our minimum Market Value of Listed Securities ("MVLS") was below the \$35 million required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq listing rule 5550(b)(2). Our stockholder's equity and net income from continuing operations were also below the alternate listing standards levels at that time. In accordance with Nasdaq listing rules, we had 180 calendar days, or until November 28, 2022, to regain compliance. On December 29, 2022, the Nasdaq Stock Market LLC formally notified us that we had regained compliance for continued listing on the Nasdaq Capital Market. In addition, pursuant to Nasdaq Listing Rules, we are required to maintain a minimum bid price of \$1.00 per share for continued listing on Nasdaq. Following the announcement of topline results in March 2023 from our Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women, our stock has traded below the required minimum bid price for continued listing on Nasdaq. There can be no assurance that we will be able to maintain compliance with Nasdaq listing standards. Our failure to meet or to continue to meet these requirements could result in the Company's common stock being delisted from the Nasdaq Capital Market. If our common stock were delisted from the Nasdaq Capital Market, among other things, this could result in a number of negative implications, including reduced market price and liquidity of our common stock as a result of the loss of market efficiencies associated with the Nasdaq, the loss of federal preemption of state securities laws, as well as the potential loss of confidence by suppliers, partners, employees and institutional investor interest, fewer business development opportunities, greater difficulty in obtaining financing and breaches of or events of default under certain contractual obligations (including an event of default under the loan agreement for the Marathon Convertible Notes).

If we are unable to raise additional funds through public or private equity or debt financings or other sources, such as non-dilutive funding or strategic collaborations, when needed, we may be required to delay, limit, reduce or terminate our product development or pursuit of regulatory approval efforts or provide rights to develop and market product candidates to third parties that we would otherwise prefer to develop and, if applicable, market ourselves. Further, if we are unable to obtain additional funding to support our current or proposed activities and operations, we may not be able to continue our operations as currently anticipated, which may require us to suspend or terminate any ongoing development activities, modify our business plan, curtail various aspects of our operations, cease operations, or seek relief under applicable bankruptcy laws. In such event, our stockholders may lose a substantial portion or even all of their investment.

Contractual Commitments

License Agreements

In April 2014, we obtained exclusive rights to patents and certain other intellectual property relating to OLPRUVA™ for the treatment of inborn errors of branched-chain amino acid metabolism, including MSUD, and preclinical and clinical data, through an exclusive license agreement with Baylor College of Medicine (“BCM”). Under the terms of the agreement, as amended, we have worldwide exclusive rights to develop, manufacture, use, sell and import products incorporating the licensed intellectual property. The license agreement requires us to make upfront and annual payments to BCM, reimburse certain of BCM’s legal costs, make payments upon achievement of defined milestones, and pay low single-digit percent royalties on net sales of any developed product over the royalty term.

In June 2016, we entered into an agreement with Aventis Pharma SA (now Sanofi) granting us the exclusive access and exclusive right to use the data included in the marketing authorization application dossier filed with and approved by the MHRA in 1986 for the treatment of mild to moderate hypertension pursuant to the UK regulatory approval procedure, for the sole purpose of allowing us to further develop, manufacture, register and commercialize celiprolol in the U.S. and Brazil for the treatment of EDS, Marfan syndrome and Loeys-Dietz syndrome. We have paid in full for the exclusive access and right to use the data. Subsequently we amended our agreement with Sanofi to provide the same rights to data access and use for potential marketing approval in all of North and South America.

In August 2016, we entered into an agreement with AP-HP granting us the exclusive worldwide rights to access and use data from a multicenter, prospective, randomized, open trial related to the use of celiprolol for the treatment of vEDS. We utilized this clinical data to support an NDA filing for EDSIVO™ for the treatment of vEDS. The agreement requires us to make certain upfront payments to AP-HP, reimburse certain of AP-HP’s costs, make payments upon achievement of defined milestones and pay low single-digit percent royalties on net sales of celiprolol over the royalty term.

In September 2018, we entered into an additional agreement with AP-HP to acquire the exclusive worldwide intellectual property rights to three European patent applications relating to certain uses of celiprolol including (i) the optimal dose of celiprolol in treating vascular Ehlers-Danlos syndrome (“vEDS”) patients, (ii) the use of celiprolol during pregnancy, and (iii) the use of celiprolol to treat kyphoscoliotic Ehlers-Danlos syndrome (type VI). Pursuant to the agreement, we will reimburse AP-HP for certain costs and will pay annual maintenance fee payments. Subject to a minimum royalty amount, we will also pay royalty payments on annual net sales of celiprolol during the royalty term in the low single digit percent range, depending upon whether there is a valid claim of a licensed patent. Under the agreement, we will control and pay the costs of ongoing patent prosecution and maintenance for the licensed applications. We subsequently filed three U.S. patent applications on this subject matter in October 2018. We may choose to limit our pursuit of patent applications to specific territories, in which case AP-HP would have the right to revise our territorial license rights accordingly.

In December 2018, we entered into an exclusive license agreement with Sanofi granting us worldwide rights to ACER-801, a clinical-stage, selective, non-peptide tachykinin NK3 receptor antagonist. The agreement requires us to make certain upfront payments to Sanofi, make payments upon achievement of defined development and sales milestones and pay royalties on net sales of ACER-801 over the royalty term. We plan to initially pursue development of ACER-801 as a potential treatment for iVMS.

Collaboration Agreement

On March 19, 2021, we entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. The Collaboration Agreement is the culmination of the Option Agreement previously entered into between us and Relief on January 25, 2021, which provided Relief with an exclusive period of time up to June 30, 2021 for the parties to enter into a mutually acceptable definitive agreement with respect to the potential collaboration and license arrangements. In consideration for the grant of the exclusivity option, (i) we received from Relief an upfront non-refundable payment of \$1.0 million, (ii) Relief provided to us a 12-month secured loan in the principal amount of \$4.0 million with interest at a rate equal to 6% per annum, as evidenced by a promissory note we issued to Relief, and (iii) we granted Relief a security interest in all of our assets to secure performance of the promissory note, as evidenced by a security agreement. Upon signing the Collaboration

Agreement, we received a \$10.0 million cash payment from Relief (i.e., a \$14.0 million “Reimbursement Payment,” offset by repayment of the \$4.0 million outstanding balance of the Note plus interest earned through the date of the Collaboration Agreement). Under the terms of the Collaboration Agreement, Relief committed to pay us Development Payments of up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, we received from Relief the \$10.0 million First Development Payment. We were contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, we entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. We received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, we retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where we will receive from Relief a 15% royalty on all net sales received in the Relief Territory. We could also receive a total of \$6.0 million in milestone payments based on the first European marketing approvals of OLPRUVA™ for a UCD and MSUD. In connection with cancellation of the \$4.0 million promissory note executed by us in favor of Relief on January 25, 2021, Relief released its security interest in all of our assets pursuant to the Promissory Note.

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

Not applicable.

Item 8. Financial Statements and Supplementary Data.

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Report of Independent Registered Public Accounting Firm

Shareholders and Board of Directors
Acer Therapeutics Inc.
Newton, Massachusetts

Opinion on the Financial Statements

We have audited the accompanying balance sheets of Acer Therapeutics Inc. (the “Company”) as of December 31, 2022 and 2021, the related statements of operations, changes in stockholders’ (deficit) equity, and cash flows for each of the years then ended, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

Going Concern Uncertainty

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the financial statements, the Company has suffered recurring losses from operations, negative cash flows from operations, has a net working capital deficiency, has a net capital deficiency, and has minimum unencumbered liquid assets balance requirements under their existing SWK Credit Agreement, that raises substantial doubt about its ability to continue as a going concern. Management’s plans in regard to these matters are also described in Note 1. The 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 financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

Accounting for Complex Financial Instruments

As described in Notes 1, 2, 6 and 7 to the financial statements, in March 2022 the Company entered into the SWK Credit Agreement, which provided for a senior secured term loan facility in an aggregate amount of \$6.5 million in a single borrowing (the “Original Term Loan”). In connection with the execution of the SWK Credit Agreement, the Company issued a warrant (the “First SWK Warrant”) to purchase 150,000 shares of the Company’s common stock at an exercise price of \$2.46 per share. In March 2022 the Company also entered into the Marathon Convertible Note Purchase Agreement with two parties pursuant to which the Company issued and sold convertible notes in an aggregate amount of \$6.0 million (the “Marathon Convertible Notes”).

We identified the evaluation of accounting for the Original Term Loan, the First SWK Warrant and the Marathon Convertible Notes as a critical audit matter. The principal considerations for our determination were: (i) the evaluation as to whether the Original Term Loan and the Marathon Convertible Notes were within the scope of ASC 480, *Distinguishing Liabilities from Equity*, or not, and if they were eligible for the election of the fair value option under ASC 825, *Financial Instruments*, and (ii) the evaluation of financial statement classification related to the First SWK Warrant. Auditing these elements involved especially complex auditor judgment due to the terms of the applicable agreements and the audit effort required to address these matters, including the extent of specialized skills and knowledge needed.

The primary procedures we performed to address this critical audit matter included:

- Reviewing and analyzing: (i) the terms of the agreements associated with each arrangement, (ii) the completeness and accuracy of the Company’s technical accounting analysis, and (iii) the application of the relevant accounting literature.
- Utilizing personnel with specialized knowledge and skills in technical accounting to assist in: (i) evaluating relevant terms of each arrangement in relation to the appropriate accounting literature, and (ii) assessing the appropriateness of conclusions reached by the Company.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2019.

Boston, Massachusetts

March 27, 2023

ACER THERAPEUTICS INC.
BALANCE SHEETS
AS OF DECEMBER 31, 2022 AND 2021

	2022	2021
Assets		
Current assets:		
Cash and cash equivalents	\$ 2,329,218	\$ 12,710,762
Collaboration receivable	—	5,000,000
Prepaid expenses	759,292	1,094,229
Deferred financing costs	408,000	—
Other current assets	20,188	9,283,625
Total current assets	3,516,698	28,088,616
Property and equipment, net	214,578	114,112
Other assets:		
Goodwill	7,647,267	7,647,267
Other non-current assets	245,683	406,956
Total assets	\$ 11,624,226	\$ 36,256,951
Liabilities and Stockholders' (Deficit) Equity		
Current liabilities:		
Accounts payable	\$ 3,813,280	\$ 1,405,734
Accrued expenses	3,657,394	2,428,193
Deferred collaboration funding, current	8,412,971	15,825,938
Other current liabilities	741,425	9,450,085
Original Term Loan payable, current, at fair value	2,326,630	—
Total current liabilities	18,951,700	29,109,950
Deferred collaboration funding, non-current	—	8,661,109
Original Term Loan payable, non-current, at fair value	3,240,601	—
Convertible note payable, at fair value	6,047,532	—
Other non-current liabilities	145,665	209,497
Total liabilities	28,385,498	37,980,556
Commitments and Contingencies (Note 8)		
Stockholders' (deficit) equity:		
Preferred stock, \$0.0001 par value; authorized 10,000,000 shares; none issued and outstanding	—	—
Common stock, \$0.0001 par value; authorized 150,000,000 shares; 19,624,280 and 14,310,244 shares issued and outstanding at December 31, 2022 and 2021, respectively	1,962	1,431
Additional paid-in capital	123,984,035	112,784,918
Accumulated deficit	(140,747,269)	(114,509,954)
Total stockholders' deficit	(16,761,272)	(1,723,605)
Total liabilities and stockholders' deficit	\$ 11,624,226	\$ 36,256,951

The accompanying notes are an integral part of these financial statements.

ACER THERAPEUTICS INC.
STATEMENTS OF OPERATIONS
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

	<u>2022</u>	<u>2021</u>
Revenue	\$ —	\$ 1,260,000
Operating expenses:		
Research and development (net of collaboration funding of \$7,825,263 and \$6,055,295 in the years ended December 2022 and 2021, respectively)	11,924,837	6,508,055
General and administrative (net of collaboration funding of \$8,248,813 and \$3,197,659 in the years ended December 2022 and 2021, respectively)	12,689,422	10,700,334
Total operating expenses	<u>24,614,259</u>	<u>17,208,389</u>
Loss from operations	(24,614,259)	(15,948,389)
Other income (expense), net:		
Costs of debt issuance	(1,720,094)	—
Changes in fair value of debt instruments gain (loss)	245,138	—
Interest and other income (expense), net	(101,432)	519,639
Foreign currency transaction (loss) gain	<u>(46,668)</u>	<u>54,757</u>
Total other income (expense), net	<u>(1,623,056)</u>	<u>574,396</u>
Net loss	<u>\$ (26,237,315)</u>	<u>\$ (15,373,993)</u>
Net loss per share - basic	<u>\$ (1.66)</u>	<u>\$ (1.08)</u>
Weighted average common shares outstanding - basic	<u>15,767,152</u>	<u>14,268,245</u>
Net loss per share - diluted	<u>\$ (1.66)</u>	<u>\$ (1.08)</u>
Weighted average common shares outstanding - diluted	<u>15,767,152</u>	<u>14,268,245</u>

The accompanying notes are an integral part of these financial statements.

ACER THERAPEUTICS INC.
STATEMENTS OF CHANGES IN
STOCKHOLDERS' (DEFICIT) EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

	<u>Stockholders' (Deficit) Equity</u>				Total Stockholders' (Deficit) Equity
	Common stock		Additional Paid-in Capital	Accumulated Deficit	
	<u>Shares</u>	<u>Amount</u>			
Balance as of December 31, 2020	13,233,137	\$ 1,324	\$ 107,358,971	\$ (99,135,961)	\$ 8,224,334
Issuance of common stock, net of issuance costs	1,077,107	107	3,138,940	—	3,139,047
Stock-based compensation	—	—	2,287,007	—	2,287,007
Net loss	—	—	—	(15,373,993)	(15,373,993)
Balance as of December 31, 2021	14,310,244	\$ 1,431	\$ 112,784,918	\$ (114,509,954)	\$ (1,723,605)
Issuance of common stock, net of issuance costs	5,314,036	531	8,909,187	—	8,909,718
Proceeds allocated to First SWK Warrant	—	—	327,031	—	327,031
Value of Second SWK Warrant	—	—	122,400	—	122,400
Stock-based compensation	—	—	1,840,499	—	1,840,499
Net loss	—	—	—	(26,237,315)	(26,237,315)
Balance as of December 31, 2022	<u>19,624,280</u>	<u>\$ 1,962</u>	<u>\$ 123,984,035</u>	<u>\$ (140,747,269)</u>	<u>\$ (16,761,272)</u>

The accompanying notes are an integral part of these financial statements.

ACER THERAPEUTICS INC.
STATEMENTS OF CASH FLOWS
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

	<u>2022</u>	<u>2021</u>
Cash flows from operating activities:		
Net loss	\$ (26,237,315)	\$ (15,373,993)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	1,840,499	2,287,007
Depreciation	66,035	70,913
Gain on extinguishment of debt	—	(568,909)
Non-cash changes in fair value of debt, (gain) loss	(245,138)	—
Debt issuance costs recognized as expense	1,720,094	—
Loss on disposal of property and equipment, net	4,669	—
Changes in operating assets and liabilities		
Collaboration receivable	5,000,000	(5,000,000)
Prepaid expenses	334,937	(414,767)
Other current assets	9,280,463	(9,265,745)
Accounts payable	2,407,546	(266,375)
Accrued expenses	916,133	(1,352,908)
Deferred collaboration funding	(16,074,076)	20,487,047
Other current liabilities	(9,265,745)	9,262,821
Net cash used in operating activities	<u>(30,251,898)</u>	<u>(134,909)</u>
Cash flows from investing activities:		
Purchase of property and equipment	(171,170)	(54,944)
Net cash used in investing activities	<u>(171,170)</u>	<u>(54,944)</u>
Cash flows from financing activities:		
Proceeds from issuance of common stock, net of issuance costs	8,909,718	3,139,047
Receipt of funds from Relief secured loan	—	4,000,000
Proceeds from Original Term Loan, net of warrant allocation and lender fees	6,013,148	—
Proceeds from Marathon Convertible Notes, net of lender fees	5,516,556	—
Proceeds allocated to First SWK Warrant based on valuation	327,031	—
Payment of debt and convertible debt issuance costs	(724,929)	—
Net cash provided by financing activities	<u>20,041,524</u>	<u>7,139,047</u>
Net (decrease) increase in cash and cash equivalents	<u>(10,381,544)</u>	<u>6,949,194</u>
Cash and cash equivalents, beginning of the year	12,710,762	5,761,568
Cash and cash equivalents, end of the year	<u>\$ 2,329,218</u>	<u>\$ 12,710,762</u>
Supplemental cash flow information:		
Cash paid for interest	\$ 136,500	\$ —
Non-cash financing activities:		
Non-cash repayment of secured loan	\$ —	\$ 4,000,000
Extinguishment of debt	\$ —	\$ 568,909
Issuance of Second SWK Warrant	\$ 122,400	\$ —

The accompanying notes are an integral part of these financial statements.

ACER THERAPEUTICS INC.
NOTES TO FINANCIAL STATEMENTS
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

1. NATURE OF OPERATIONS AND BASIS OF PRESENTATION

Business

Acer Therapeutics Inc., a Delaware corporation (the “Company”), is a pharmaceutical company focused on the acquisition, development, and commercialization of therapies for serious rare and life-threatening diseases with significant unmet medical needs. The Company identifies and develops treatments where science can be applied in new ways for use in diseases with high unmet need.

In the U.S., OLPRUVA™ (sodium phenylbutyrate) for oral suspension is approved for the treatment of urea cycle disorders (“UCDs”) involving deficiencies of carbamylphosphate synthetase (“CPS”), ornithine transcarbamylase (“OTC”), or argininosuccinic acid synthetase (“AS”). The Company is also advancing a pipeline of investigational product candidates, including EDSIVO™ (celiprolol) for the treatment of vascular Ehlers-Danlos syndrome (“vEDS”) in patients with a confirmed type III collagen (COL3A1) mutation, and ACER-801 (osanetant) for the treatment of vasomotor symptoms (“VMS”), post-traumatic stress disorder (“PTSD”), and prostate cancer. We also intend to explore additional lifecycle opportunities for OLPRUVA™ (sodium phenylbutyrate) in various disorders where proof of concept data exists, subject to additional capital.

Since its inception, the Company has devoted substantially all of its efforts to business planning, research and development, recruiting management and technical staff, acquiring operating assets, and raising capital. The Company has received revenue and collaboration funding related to the collaboration and license agreement (the “Collaboration Agreement”) with Relief Therapeutics Holding AG (“Relief”) as described below but has not generated any product revenue from sales to date and may never generate any product revenue from sales in the future.

Liquidity

The Company had an accumulated deficit of \$140.7 million and cash and cash equivalents of \$2.3 million as of December 31, 2022. Net cash used in operating activities was \$30.3 million and \$0.1 million for the years ended December 31, 2022 and 2021, respectively.

On November 9, 2018, the Company entered into a sales agreement with Roth Capital Partners, LLC, and on March 18, 2020, an amended and restated sales agreement was entered into with JonesTrading Institutional Services LLC and Roth Capital Partners, LLC. The agreement provides a facility for the offer and sale of shares of common stock from time to time having an aggregate offering price of up to \$50.0 million depending upon market demand, in transactions deemed to be an at-the-market (“ATM”) offering. The Company has no obligation to sell any shares of common stock pursuant to the agreement and may at any time suspend sales pursuant to the agreement. Each party may terminate the agreement at any time without liability. During the year ended December 31, 2022, the Company sold 3,312,471 shares of common stock through its ATM facility at a gross sale price of \$1.9749 per share, for proceeds of \$6.5 million. Proceeds, net of \$0.2 million of fees and offering costs, were \$6.3 million. As of December 31, 2022, \$33.5 million remained available under the Company’s ATM facility, subject to various limitations. Subsequent to December 31, 2022, the Company sold an aggregate of 1,462,254 shares of common stock under its ATM facility at an average gross sale price of \$2.81 per share, resulting in gross proceeds of \$4.1 million. Proceeds, net of \$0.1 million of offering costs, were \$4.0 million. In connection with the March 2023 Offering (defined below), the Company suspended the ATM facility and entered into a related restriction prohibiting the Company from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of common stock or securities convertible or exercisable into common stock, subject to certain exceptions, until April 24, 2023.

On April 30, 2020, the Company entered into an equity line purchase agreement and registration rights agreement pursuant to which Lincoln Park committed to purchase up to \$15.0 million of the Company’s common

stock. Under the terms and subject to the conditions of the purchase agreement, the Company had the right, but not the obligation, to sell to Lincoln Park, and Lincoln Park was obligated to purchase up to \$15.0 million of the Company's common stock, subject to various limitations. Such sales of common stock by the Company were subject to certain limitations, and occurred from time to time, at the Company's sole discretion, over the 36-month period commencing on June 8, 2020. The number of shares the Company was able to sell to Lincoln Park on any single business day in a regular purchase was 50,000, but that amount was able to be increased up to 100,000 shares, depending upon the market price of the Company's common stock at the time of sale and subject to a maximum limit of \$1.0 million per regular purchase. The purchase price per share for each such regular purchase was based on prevailing market prices of the Company's common stock immediately preceding the time of sale as computed under the purchase agreement. In addition to regular purchases, the Company was also able to direct Lincoln Park to purchase other amounts as accelerated purchases or as additional accelerated purchases if the closing sale price of the common stock exceeded certain threshold prices as set forth in the purchase agreement. During the year ended December 31, 2021, the Company sold 200,000 shares of common stock under its purchase agreement with Lincoln Park at a weighted average gross sale price of \$2.47 per share, resulting in gross proceeds of \$0.5 million. During the year ended December 31, 2022, the Company sold 772,057 shares of common stock under its purchase agreement with Lincoln Park at a weighted average gross sale price of \$1.42 per share, resulting in proceeds of \$1.1 million. The Lincoln Park facility was completed on December 30, 2022.

On January 25, 2021, the Company entered into an option agreement (the "Option Agreement") with Relief, pursuant to which the Company granted Relief an exclusive option (the "Exclusivity Option") to pursue a potential collaboration and license arrangement with the Company for the development, regulatory approval and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including UCDs and MSUD. The Option Agreement provided a period of time up to June 30, 2021, for the parties to perform additional due diligence and to work toward negotiation and execution of a definitive agreement with respect to the potential collaboration for ACER-001. In consideration for the grant of the Exclusivity Option, (i) the Company received from Relief an upfront nonrefundable payment of \$1.0 million, (ii) Relief provided to the Company a 12-month secured loan in the principal amount of \$4.0 million, as evidenced by a Promissory Note (the "Note") the Company issued to Relief, and (iii) the Company granted Relief a security interest in all of its assets to secure performance of the Note, as evidenced by a Security Agreement (the "Security Agreement"). The Note was repayable in one lump sum within 12 months from issuance and bore interest at a rate equal to 6% per annum.

On March 19, 2021, the Company entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. The Company received a \$10.0 million cash payment from Relief (consisting of a \$14.0 million "Reimbursement Payment" from Relief to the Company offset by payment of the \$4.0 million outstanding balance of the Note plus interest earned through the date of the Collaboration Agreement) and Relief released its security interest in all of the Company's assets, pursuant to the Promissory Note. Under the terms of the Collaboration Agreement, Relief committed to pay the Company up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications (the "Development Payments"). During the three months ended June 30, 2021, the Company received from Relief the \$10.0 million First Development Payment. The Company was contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA's acceptance of a New Drug Application ("NDA") for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, the Company entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. The Company received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, the Company retained development and commercialization rights in the U.S., Canada, Brazil, Turkey, and Japan ("Acer Territory"). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world ("Relief Territory"), where the Company will receive from Relief a 15% royalty on all net sales received in the Relief Territory. The Company could also receive a total of \$6.0 million in milestone payments based on the first European marketing approvals of OLPRUVA™ for a UCD and MSUD. The terms of the Collaboration Agreement and Option Agreement are further described below in the Revenue Recognition and Accounting for Collaboration Agreements section of Note 2, Significant Accounting Policies.

On March 4, 2022, the Company entered into a Credit Agreement (the "SWK Credit Agreement") with the lenders party thereto and SWK Funding LLC ("SWK"), as the agent, sole lead arranger and sole bookrunner, which

provided for a senior secured term loan facility in an aggregate amount of \$6.5 million in a single borrowing (the “Original Term Loan”). The Original Term Loan funding closed on March 14, 2022. The proceeds of the Original Term Loan were used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement (as defined and described below) and the Marathon Credit Agreement (as defined and described below) and for other working capital and general corporate purposes. On August 19, 2022, the Company entered into an amendment (the “First Amendment”) to the SWK Credit Agreement, which extended the date through which the Company has the option to capitalize interest on the SWK Credit Agreement and which revised the Company’s minimum cash requirement under the Original Term Loan. On January 30, 2023, the Company entered into a Second Amendment (the “Second Amendment”) to the SWK Credit Agreement. In addition to other provisions, the Second Amendment provides for an additional senior secured term loan to be made to the Company in an aggregate amount of \$7.0 million in a single borrowing which funded on January 31, 2023 (the “Second Term Loan”, and together with the Original Term Loan, the “SWK Loans”).

The SWK Loans made under the SWK Credit Agreement as amended by the Second Amendment (the “Current SWK Credit Agreement”) bear interest at an annual rate of the sum of (i) 3-month SOFR, subject to a 1% floor, plus (ii) a margin of 11%, with such interest payable quarterly in arrears. In the event of default, the interest rate will increase by 3% per annum over the contract rate effective at the time of default but shall not be higher than the maximum rate permitted to be charged by applicable laws. The Company has the option to capitalize such interest commencing on the date on which the Original Term Loan was funded and continuing until May 15, 2023. Due to topline results announced in March 2023 from the Company’s Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women, the principal amount of the SWK Loans amortizes at a monthly rate of \$0.6 million starting April 15, 2023, until the Company has issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net proceeds from the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly. The final maturity date of the SWK Loans is March 4, 2024. The Company has the option to prepay the SWK Loans in whole or in part. Upon the repayment of the Original Term Loan (whether voluntary or at scheduled maturity), the Company must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid to SWK under the SWK Credit Agreement on or prior to the prepayment date) equal to 1.5 times the outstanding principal amount of the Original Term Loan, plus any and all payment-in-kind interest amounts. Upon the repayment of the Second Term Loan (whether voluntary or at scheduled maturity), the Company must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid in cash to SWK under the SWK Credit Agreement with respect to the Second Term Loan) equal to the outstanding principal amount of the Second Term Loan (inclusive of payment-in-kind interest amounts) multiplied by: (i) if the repayment occurs on or before April 15, 2023, 1.18, (ii) if the repayment occurs on or after April 16, 2023 but prior to May 16, 2023, 1.28667, (iii) if the repayment occurs on or after May 16, 2023 but prior to June 16, 2023, 1.39334, and (iv) if the repayment occurs on or after July 16, 2023, 1.5. Due to topline results announced in March 2023 from the Company’s Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, the Company is required to maintain for purposes of the SWK Loans unencumbered liquid assets of not less than the lesser of (x) the outstanding principal amount of the SWK Loans or (y) \$3.0 million (as opposed to \$1.5 million for clause (y) prior to the announcement of such topline results).

The SWK Loans are secured by a first priority lien on all assets of the Company and any of its future subsidiaries pursuant to a Guarantee and Collateral Agreement entered into on March 4, 2022, between the Company and SWK, as agent (the “SWK Security Agreement”). The SWK Credit Agreement contains customary representations and warranties and affirmative and negative covenants. The Company paid to SWK \$0.1 million in origination fees on the date on which the Original Term Loan was funded.

In connection with the execution of the SWK Credit Agreement, the Company issued a warrant (the “First SWK Warrant”) to purchase 150,000 shares of the Company’s common stock at an exercise price of \$2.46 per share. In connection with the execution of the First Amendment, the Company issued to SWK an additional warrant to purchase 100,000 shares of the Company’s common stock at an exercise price of \$1.51 per share (such warrant, the “Second SWK Warrant”). In connection with the execution of the Second Amendment, the Company issued to SWK an additional warrant to purchase 250,000 shares of the Company’s common stock at an exercise price of \$2.39 per

share (such warrant, the “Third SWK Warrant” and, together with the First SWK Warrant and Second SWK Warrant, the “SWK Warrants”). SWK may exercise the SWK Warrants in accordance with the terms thereof for all or any part of such shares of common stock from the date on which the Original Term Loan was funded or such SWK Warrant was issued, as applicable, until and including March 4, 2029.

On March 4, 2022, the Company also entered into a Marathon Convertible Note Purchase Agreement with MAM Aardvark, LLC (“Marathon”) and Marathon Healthcare Finance Fund, L.P. (“Marathon Fund” and together with “Marathon” each a “Holder” and collectively the “Holders”) (the “Marathon Convertible Note Purchase Agreement”) pursuant to which the Company issued and sold to the Holders secured convertible notes (the “Marathon Convertible Notes”) in an aggregate amount of up to \$6.0 million (the “Convertible Note Financing”). The Convertible Note Financing closed on March 14, 2022. The proceeds of the Convertible Note Financing are being used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement and for other working capital and general corporate purposes. On January 30, 2023, the Company entered into an Amendment Agreement (the “Marathon Amendment Agreement”) with Marathon and Marathon Fund with respect to the Marathon Convertible Notes.

The Marathon Convertible Notes bear interest at an annual rate of 6.5%, with such interest payable quarterly; provided, however, that each of the Holders have agreed to defer payment by the Company of accrued and unpaid interest on their respective Marathon Convertible Note existing on the date of the Marathon Amendment Agreement through March 31, 2023, with such deferred interest, together with any accrued and unpaid interest on each Marathon Convertible Note incurred after March 31, 2023, to be due and payable in cash by the Company on April 15, 2023. Subject to the restrictions set forth in a subordination agreement among each of the Holders and SWK, as agent and lender, the Company is required to repurchase each Marathon Convertible Note, on or before the fifth (5th) business day (but with five (5) business days’ notice) following the earlier of June 15, 2023 or the Company’s receipt of gross proceeds of at least \$40.0 million from the issuance or sale of equity, debt and/or hybrid securities, loans or other financing on a cumulative basis since January 1, 2023 (excluding the Second Term Loan), at a price equal to 200% (the “Buy-Out Percentage”) of the outstanding principal amount of such Marathon Convertible Note, together with any accrued but unpaid interest thereon to the date of such repurchase; provided, that if the Company is prohibited from effectuating such repurchases pursuant to a subordination agreement with SWK, the Company shall cause the repurchase to occur on or before the fifth (5th) business day following the earlier of such prohibition being no longer applicable or the payment in full of all senior indebtedness described in such subordination agreement, but with five (5) business days’ notice; and provided, further, that if such repurchase has not occurred by April 15, 2023, the Buy-Out Percentage shall be increased by 2500 basis points for each 90-day period after April 15, 2023, pro-rated for the actual number of days elapsed in the 90-day period before repurchase actually occurs (for example, if the repurchase occurs on May 30, 2023, the Buy-Out Percentage shall be increased to 212.5%). Each of the Holders also has the right to convert all or any portion of the outstanding principal amount plus any accrued but unpaid interest under the Marathon Convertible Note held by such Holder into shares of common stock at a conversion price of \$2.50 per share, subject to adjustment. Each Holder has certain rights with respect to the registration by the Company for resale of the shares of common stock issuable upon conversion of the Marathon Convertible Note held by such Holder which are forth in the Marathon Convertible Note Purchase Agreement. Any outstanding principal, together with all accrued and unpaid interest, will be payable on the earlier of the third anniversary of the date of issuance, or upon a change of control of the Company.

Pursuant to the Marathon Convertible Note Purchase Agreement, the Marathon Convertible Notes are secured by a lien on collateral representing substantially all assets of the Company, although such security interest is subordinated to the Company’s obligations under the SWK Credit Agreement.

On March 4, 2022, the Company also entered into a Credit Agreement (the “Marathon Credit Agreement”) with the lenders party thereto and Marathon, as the agent, sole lead arranger and sole bookrunner, which provided for a senior secured term loan facility in an aggregate amount of up to \$42.5 million in a single borrowing (the “Term Loan”). The Term Loan was available to be borrowed only following full FDA approval for marketing of OLPRUVA™ and until December 31, 2022. The Company received approval for its NDA for OLPRUVA™ on December 22, 2022, and the Company and Marathon agreed to an Extension Agreement with respect to the Term Loan on December 30, 2022, which extended the commitment date for funding the Term Loan to January 16, 2023.

The Company, subsequent to December 31, 2022, elected to terminate the Marathon Credit Agreement by

entering into a Termination Agreement on January 30, 2023, which terminated the Credit Agreement and the associated Royalty Agreement. See Note 12, Subsequent Events for further discussion of the status of the Marathon Convertible Notes, and the Marathon Credit Agreement.

The Nasdaq Capital Market's continued listing standards for the Company's common stock require, among other things, that the Company maintain either (i) stockholders' equity of \$2.5 million, (ii) market value of listed securities of \$35 million or (iii) net income from continuing operations of \$500,000 in the most recently completed fiscal year or in two of the last three most recently completed fiscal years. On May 31, 2022, the Company received a letter from the listing qualifications department staff of Nasdaq indicating that for the last 30 consecutive business days the Company's minimum Market Value of Listed Securities ("MVLS") was below the \$35 million required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq listing rule 5550(b)(2). The Company's stockholder's equity and net income from continuing operations were also below the alternate listing standards levels at that time. In accordance with Nasdaq listing rules, the Company had 180 calendar days, or until November 28, 2022, to regain compliance. On December 29, 2022 the Nasdaq Stock Market LLC formally notified the Company that the Company had regained compliance for continued listing on the Nasdaq Capital Market. In addition, pursuant to Nasdaq Listing Rules, the Company is required to maintain a minimum bid price of \$1.00 per share for continued listing on Nasdaq. Following the announcement of topline results in March 2023 from the Company's Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women, the Company's stock has traded below the required minimum bid price for continued listing on Nasdaq. There can be no assurance that the Company will be able to maintain compliance with Nasdaq listing standards. The Company's failure to meet or to continue to meet these requirements could result in the Company's common stock being delisted from the Nasdaq Capital Market. If the Company's common stock were delisted from the Nasdaq Capital Market, among other things, this could result in a number of negative implications, including reduced market price and liquidity of the Company's common stock as a result of the loss of market efficiencies associated with the Nasdaq, the loss of federal preemption of state securities laws, as well as the potential loss of confidence by suppliers, partners, employees and institutional investor interest, fewer business development opportunities, greater difficulty in obtaining financing and breaches of or events of default under certain contractual obligations (including an event of default under the loan agreement for the Marathon Convertible Notes).

Management expects to continue to finance operations through the issuance of additional equity or debt securities, non-dilutive funding, and/or through strategic collaborations. Any transactions which occur may contain covenants that restrict the ability of management to operate the business and any securities issued may have rights, preferences, or privileges senior to the Company's common stock and may dilute the ownership of current stockholders of the Company. The Company's cash and cash equivalents available at December 31, 2022, together with the proceeds from the Second Term Loan of \$7.0 million which funded on January 31, 2023, net proceeds from its ATM facility subsequent to December 31, 2022, totaling \$4.0 million from the sale of 1,462,254 shares for gross aggregate proceeds of \$4.1 million and an average per share price of \$2.81 less offering costs of \$0.1 million, and \$2.7 million of gross proceeds from a sale of securities (including 2,335,000 shares of common stock and pre-funded warrants to purchase up to 585,306 shares of common stock pursuant to a registered direct offering as well as warrants to purchase up to 2,920,306 shares of common stock in a concurrent private placement) which closed on March 24, 2023 (the "March 2023 Offering"), are expected to be sufficient to fund its anticipated operating and capital requirements into the middle of the second quarter of 2023.

Going Concern

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the U.S. ("GAAP"), which contemplate continuation of the Company as a going concern. The Company has suffered recurring losses from operations, negative cash flows from operations, has a net working capital deficiency, has a net capital deficiency, and has minimum unencumbered liquid assets requirements under its SWK Credit Agreement. While the Company has received approval for its OLPRUVA™ product, it has yet to launch the product and establish a source of commercial product revenues and, as such, has been dependent on funding operations through the sale of equity securities, through a collaboration agreement, and through debt instruments. Since inception, the Company has experienced significant losses and incurred negative cash flows from

operations. The Company has spent, and expects to continue to spend, a substantial amount of funds in connection with implementing its business strategy, including its planned product development efforts and potential precommercial activities.

As of December 31, 2022, the Company had cash and cash equivalents of \$2.3 million and current liabilities of \$19.0 million, which include \$8.4 million associated with deferred collaboration funding (see Revenue Recognition and Accounting for Collaboration Agreements below in Note 2, Significant Accounting Policies). The Company's cash and cash equivalents available at December 31, 2022, together with the proceeds from the Second Term Loan of \$7.0 million which funded on January 31, 2023, net proceeds from its ATM facility subsequent to December 31, 2022, totaling \$4.0 million from the sale of 1,462,254 shares for gross aggregate proceeds of \$4.1 million and an average per share price of \$2.81 less offering costs of \$0.1 million, and \$2.7 million of gross proceeds from the registered direct offering closed on March 24, 2023, are expected to be sufficient to fund the Company's anticipated operating and capital requirements into the middle of the second quarter of 2023.

The Company will need to raise additional capital to fund continued operations beyond the middle of the second quarter of 2023. The Company may not be successful in its efforts to raise additional funds or achieve profitable operations. The Company continues to explore potential opportunities and alternatives to obtain the additional resources that will be necessary to support its ongoing operations beyond the middle of the second quarter of 2023, including raising additional capital through either private or public equity or debt financing, or additional program collaborations or non-dilutive funding, as well as using its ATM facility which has \$29.4 million available as of March 24, 2023, although the Company suspended its ATM facility in connection with the March 2023 Offering and entered into a related restriction prohibiting the Company from entering into any agreement to issue or announcing the issuance or proposed issuance of any shares of common stock or securities convertible or exercisable into our common stock, subject to certain exceptions, until April 24, 2023. (See At-the-Market Facility and Common Stock Purchase Agreement in Note 9 as well as Note 12.) Due to the SEC's "baby shelf rules," which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company's public float in a 12-month period, the Company is only able to issue a limited number of shares under its ATM facility. From May 19, 2020 through March 24, 2023, the Company has raised gross proceeds of \$20.6 million from the ATM facility and gross proceeds of \$4.0 million from the agreement with Lincoln Park, which equity line facility was completed on December 30, 2022.

If the Company is unable to obtain additional funding to support its current or proposed activities and operations, it may not be able to continue its operations as currently anticipated, which may require it to suspend or terminate any ongoing development activities, modify its business plan, curtail various aspects of its operations, cease operations, or seek relief under applicable bankruptcy laws. In such event, the Company's stockholders may lose a substantial portion or even all of their investment.

These factors individually and collectively raise substantial doubt about the Company's ability to continue as a going concern for at least 12 months from the date these financial statements are available, or March 27, 2023. The accompanying financial statements do not include any adjustments or classifications that may result from the possible inability of the Company to continue as a going concern.

Basis of Presentation

Any reference in these notes to applicable guidance is meant to refer to the authoritative accounting principles generally accepted in the U.S., as found in the Accounting Standards Codification ("ASC") and Accounting Standards Update ("ASU") of the Financial Accounting Standards Board ("FASB").

2. SIGNIFICANT ACCOUNTING POLICIES

The preparation of these financial statements and related disclosures is in conformity with GAAP. A summary of the significant accounting policies followed by the Company in the preparation of the accompanying financial statements follows:

Use of Estimates

The Company's accounting principles require management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of assets and liabilities at the date of the financial statements and reported amounts of revenues and expenses during the reporting period. From time to time, estimates having relatively higher significance include determination of stand-alone selling price and variable consideration estimates for purposes of measuring collaboration funding, revenue recognition, deferred collaboration funding, stock-based compensation, inputs to fair value for debt, contract manufacturing and clinical trial accruals, and income taxes. Actual results could differ from those estimates and changes in estimates may occur.

Revenue Recognition and Accounting for Collaboration Agreements

The Company's revenue and collaboration funding are generated from a single collaboration agreement which included the sale of a license of intellectual property. The Company analyzes its collaboration agreements to assess whether they are within the scope of ASC Topic 808, *Collaborative Arrangements*, ("ASC 808") to determine whether such arrangements involve joint operating activities performed by parties that are both active participants in the activities and exposed to significant risks and rewards that are dependent on the commercial success of such activities. To the extent the arrangement is within the scope of ASC 808, the Company assesses whether aspects of the arrangement between the Company and the collaboration partner are within the scope of other accounting literature. If the Company concludes that some or all aspects of the arrangement represent a transaction with a customer, the Company accounts for those aspects of the arrangement within the scope of ASC Topic 606, *Revenue from Contracts with Customers* ("ASC 606"). If the Company concludes that some or all aspects of the arrangement are within the scope of ASC 808 and do not represent a transaction with a customer, the Company recognizes the Company's share of the allocation of the shared costs incurred with respect to the jointly conducted activities as a component of the related expense in the period incurred. Pursuant to ASC 606, a customer is a party that has contracted with an entity to obtain goods or services that are an output of the entity's ordinary activities in exchange for consideration. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. If the Company concludes a counter-party to a transaction is not a customer or otherwise not within the scope of ASC 606 or ASC 808, the Company considers the guidance in other accounting literature as applicable or by analogy to account for such transaction.

The Company determines the units of account within the collaborative arrangement utilizing the guidance in ASC 606 to determine which promised goods or services are distinct. In order for a promised good or service to be considered "distinct" under ASC 606, the customer can benefit from the good or service either on its own or together with other resources that are readily available to the customer (i.e., the good or service is capable of being distinct), and the entity's promise to transfer the good or service to the customer is separately identifiable from other promises in the contract (i.e., the promise to transfer the good or service is distinct within the context of the contract).

For any units of account that fall within the scope of ASC 606, where the other party is a customer, the Company evaluates the separate performance obligation(s) under each contract, determines the transaction price, allocates the transaction price to each performance obligation considering the estimated stand-alone selling prices of the services and recognizes revenue upon the satisfaction of such obligations at a point in time or over time dependent on the satisfaction of one of the following criteria: (1) the customer simultaneously receives and consumes the economic benefits provided by the vendor's performance; (2) the vendor creates or enhances an asset controlled by the customer; and (3) the vendor's performance does not create an asset for which the vendor has an alternative use and the vendor has an enforceable right to payment for performance completed to date.

Variable consideration is included in the transaction price only to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

Revenue for a sales-based or usage-based royalty promised in exchange for a license of intellectual property is recognized only when (or as) the later of the following events occurs: (i) the subsequent sale or usage occurs; or (ii)

the performance obligation to which some or all of the sales-based or usage-based royalty has been allocated has been satisfied (or partially satisfied).

On January 25, 2021, the Company entered into the Option Agreement with Relief pursuant to which the Company granted Relief the Exclusivity Option to pursue a potential collaboration and license arrangement with the Company for the development, regulatory approval and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including UCDs and MSUD. The Option Agreement provided a period of time up to June 30, 2021 for the parties to perform additional due diligence and to work toward negotiation and execution of a definitive agreement with respect to the potential collaboration for ACER-001. In consideration for the grant of the Exclusivity Option, (i) the Company received from Relief an upfront nonrefundable payment of \$1.0 million, (ii) Relief provided to the Company a 12-month secured loan in the principal amount of \$4.0 million, as evidenced by the Note issued by the Company to Relief, and (iii) the Company granted to Relief a security interest in all of its assets to secure performance of the Note, as evidenced by the Security Agreement. The Note was repayable in one lump sum within 12 months from issuance and bore interest at a rate equal to 6% per annum.

On March 19, 2021, the Company entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. The Company received a \$10.0 million cash payment from Relief (consisting of a \$14.0 million “Reimbursement Payment” from Relief to the Company, offset by repayment of the \$4.0 million outstanding balance of the Note, plus interest earned through the date of the Collaboration Agreement), and Relief released its security interest in all of the Company’s assets pursuant to the Promissory Note. Under the terms of the Collaboration Agreement, Relief committed to pay the Company up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, the Company received from Relief the \$10.0 million First Development Payment. The Company was contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, the Company entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. The Company received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, the Company retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where the Company will receive from Relief a 15% royalty on all net sales received in the Relief Territory. The Company could also receive a total of \$6.0 million in milestone payments based on the first European (EU) marketing approvals for a UCD and MSUD.

The Company assessed these agreements in accordance with the authoritative literature and concluded that they meet the definition of a collaborative arrangement per ASC 808. For certain parts of the Collaboration Agreement, the Company concluded that Relief represented a customer while, for other parts of the Collaboration Agreement, Relief did not represent a customer. The units of account of the Collaboration Agreement where Relief does not represent a customer are outside of the scope of ASC 606. The Company also determined that the development and commercialization services and Relief’s right to 60% profit in the Acer Territory is within the scope of ASC Topic 730, *Research and Development* (“ASC 730”), with regard to funded research and development arrangements.

The Company concluded the promised goods and services contained in the Collaboration Agreement, represented two distinct units of account consisting of a license in the Relief Territory, and a combined promise for the development and commercialization of OLPRUVA™ in the Acer Territory and the payment of 60% net profit from that territory (together, the “Services”). The stand-alone selling price was estimated for each distinct unit of account utilizing an estimate of discounted cashflows associated with each.

The Company determined that the transaction price at the outset of the Collaboration Agreement was \$25.0 million, including the Option Fee of \$1.0 million, the Reimbursement Payment of \$14.0 million, and the First Development Payment of \$10.0 million. The Company concluded that consistent with the evaluation of variable consideration, using the most likely amount approach, the Second Development Payment as well as the milestone payments for EU marketing approvals, should be fully constrained until the contingency associated with each payment has been resolved and the Company’s NDA is accepted for review by the FDA, and Relief receives EU

marketing approval, respectively. The contingency associated with the Second Development Payment was resolved in the fourth quarter of 2021.

Since ASC 808 does not provide recognition and measurement guidance for collaborative arrangements, the Company applied the principles of ASC 606 for those units of account where Relief is a customer and ASC 730-20 for the funded research and development activities. The license revenue was recognized at the point where the Company determined control was transferred to the customer. The combined unit of account for the Services associated with the allocation of the initial transaction price will be recognized over the service period through the anticipated date of first commercial sale of the OLPRUVA™ approved product in the U.S. The Company also determined that the Services associated with the allocation of the initial transaction price would be satisfied over time as measured using actual costs as incurred by the Company toward the identified development and commercialization services agreed to between the parties up to the point of first commercial sale of the OLPRUVA™ product. Research and development expenses and general and administrative expenses, as they relate to activities governed by the Collaboration Agreement, incurred in satisfying the Services unit-of-account will be recognized as contra-expense within their respective categories, consistent with the presentation guidance in ASC Topic 730.

The Company recognizes a receivable under the Collaboration Agreement when the consideration to be received is deemed unconditional, or when only the passage of time is required before payment of that consideration is due. Amounts receivable under the Collaboration Agreement plus payments received from Relief, net of the amounts recorded as license revenue and as offsets to research and development expenses and to general and administrative expenses, are reported as deferred collaboration funding.

At December 31, 2022, the amount of deferred collaboration funding associated with unsatisfied promises under the Collaboration Agreement amounted to \$8.4 million. The Company has recorded \$8.4 million as a current liability, which equates to the Company's estimate of remaining spending under the Collaboration Agreement and which the Company estimates will be recognized within the next 12 months up to the point of the first commercial sale of OLPRUVA™. The non-current liability reported as of December 31, 2021 represented the then current estimated amount that would have been taken against future net profit payments made to Relief should they have occurred. The Company expects to recognize this deferred collaboration funding as it incurs expenses associated with performing the Services up to the date of first commercial sale in the Acer Territory and through the end of the effective date of the Collaboration Agreement. At December 31, 2022, deferred collaboration funding was composed of \$35.0 million received from Relief, offset by \$1.3 million recognized as license revenue during the year ended December 31, 2021 and \$13.9 million recorded as an offset to research and development expenses and \$11.4 million recorded as an offset to general and administrative expenses subsequent to signing the Collaboration Agreement and through the date of this report.

Cash and Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less at the date of purchase to be cash equivalents. Financial instruments that potentially subject the Company to concentration of credit risk consist principally of cash deposits. Accounts at each institution are insured by the Federal Deposit Insurance Corporation ("FDIC") up to \$250,000. At December 31, 2022 and 2021, the Company had \$2.1 million and \$12.5 million, respectively, in excess of the FDIC insured limit.

Under the Original Term Loan as amended, the Company's minimum cash requirement was such that its unencumbered liquid assets must not be less than the lesser of (a) the outstanding principal amount of the Original Term Loan, or (b) \$1.5 million; provided, however, that due to topline results announced in March 2023 from the Company's Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, required amount pursuant to the foregoing clause (b) is increased to \$3.0 million.

The Company recognized a \$4.0 million non-cash reduction in a secured loan from Relief during the year ended December 31, 2021, since the Reimbursement Payment from Relief was received net of the amount of principal and interest due in connection with the secured loan.

Fair Value of Financial Instruments

ASC Topic 820, Fair Value Measurement (“ASC 820”), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and the Company’s own assumptions (unobservable inputs). 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 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.

ASC 820 identifies fair value as the exchange price, or exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. As a basis for considering market participant assumptions in fair value measurements, ASC 820 establishes a three-tier fair value hierarchy that distinguishes among the following:

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access.
- Level 2—Valuations based on quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and models for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations based on inputs that are unobservable and significant to the overall fair value measurement.

To the extent that the 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.

Financial instruments consist of cash equivalents, collaboration receivable, accounts payable, accrued expenses, and debt instruments. These financial instruments are stated at their respective historical carrying amounts, which approximate fair value due to their short-term nature, except for cash equivalents and debt instruments, which were marked to market at the end of each reporting period. See Note 7 for additional information on the fair value of the debt liabilities.

The Company elected the fair value option for both its Original Term Loan and its Marathon Convertible Notes dated March 14, 2022 (see Note 7). The Company adjusts both the Original Term Loan and the Marathon Convertible Notes to fair value through the change in fair value of debt in the accompanying statements of operations. Subsequent unrealized gains and losses on items for which the fair value option is elected are reported in the accompanying statements of operations.

Debt

Convertible notes are regarded as compound instruments, consisting of a liability component and an equity component. The Company determined that it is eligible for the fair value option election in connection with the Original Term Loan and the Marathon Convertible Notes. Each instrument met the definition of a “recognized financial liability” which is an acceptable financial instrument eligible for the fair value option under ASC 825-10-15-4 and do not meet the definition of any of the financial instruments found within ASC 825-10-15-5 that are not eligible for the fair value option. At the date of issuance, the fair value for each instrument is derived from the instrument’s implied discount rate at inception.

Research and Development Expenses

Research and development costs are expensed as incurred and include compensation and related benefits, license fees, and third-party contracted research and manufacturing consultants. The Company sometimes makes nonrefundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as an expense in the period that the goods are received or that the services are performed. From time to time, in connection with the Collaboration Agreement with Relief, the Company may recognize “contra-expense” for the research and development activities which were funded by the Collaboration Agreement. These contra-expense amounts are disclosed parenthetically on the face of the financial statements.

General and Administrative Expenses

General and administrative expenses consist primarily of employee-related expenses, including salaries, benefits, and stock-based compensation; precommercial costs; and professional fees for legal, business consulting, auditing, and tax services. The Company expects that general and administrative expenses will be substantial in the future. From time to time, in connection with the Collaboration Agreement with Relief, the Company may recognize “contra-expense” for the general and administrative activities which were funded by the Collaboration Agreement. These contra-expense amounts are disclosed parenthetically on the face of the financial statements.

Clinical Trial and Preclinical Study Expenses

The Company makes estimates of prepaid and/or accrued expenses as of each balance sheet date in its financial statements based on certain facts and circumstances at that time. The Company’s accrued expenses for preclinical studies and clinical trials are based on estimates of costs incurred for services provided by contract research organizations (“CROs”), manufacturing organizations, and for other trial- and study-related activities. Payments under the Company’s agreements with external service providers depend on a number of factors such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, the Company obtains information from various sources and estimates the level of effort or expense allocated to each period. Adjustments to research and development expenses may be necessary in future periods as the Company’s estimates change. As these activities are generally material to the Company’s financial statements, subsequent changes in estimates may result in a material change in the Company’s accruals. No material changes in estimates were recognized in either of the years ended December 31, 2022 and 2021. Accounts payable and accrued expenses include costs associated with preclinical or clinical studies of \$0.9 million and \$0.2 million at December 31, 2022 and 2021, respectively.

Stock-Based Compensation

The Company records stock-based payments at fair value. The measurement date for compensation expense related to awards is generally the date of the grant. The fair value of awards is recognized as an expense in the statement of operations over the requisite service period, which is generally the vesting period. The Company utilizes the simplified method to estimate the expected term of options until such time that it has adequate option granting and exercise history to refine this estimate. The fair value of options is calculated using the Black-Scholes option pricing model. This option valuation model requires the use of assumptions including, among others, the volatility of stock price, the expected term of the option, and the risk-free interest rate. A limited number of option grants are periodically made to non-employee contractors.

The following assumptions were used to estimate the fair value of stock options granted during the years ended December 31, 2022 and 2021 using the Black-Scholes option pricing model:

	<u>2022</u>	<u>2021</u>
Risk-free interest rate	1.18% - 2.95%	0.37% - 0.84%
Expected life (years)	6.25	6.25
Expected volatility	112.0% - 115.0%	92.4%
Dividend rate	0%	0%

Due to its limited operating history and a limited trading history of its common stock in relation to the life of its standard option grants, the Company estimates the volatility of its stock in consideration of a number of factors including the Company's available stock price history and the stock price volatility of comparable public companies. The expected term of a stock option granted to employees and directors (including non-employee directors) is based on the average of the contractual term (generally ten years) and the vesting period. The assumed dividend yield is based upon the Company's expectation of not paying dividends in the foreseeable future. The Company recognizes forfeitures related to employee stock-based awards as they occur. The risk-free rate for periods within the expected life of the option is based upon the U.S. Treasury yield curve in effect at the time of grant. Option awards are granted at an exercise price equal to the closing market price of the Company's common stock on the Nasdaq Capital Market on the date of grant.

Goodwill

Goodwill represents the excess of the purchase price (consideration paid plus net liabilities assumed) of an acquired business over the fair value of the underlying net tangible and intangible assets. The Company's goodwill is allocated to the Company's single reporting unit. The Company evaluates the recoverability of goodwill according to ASC Topic 350, *Intangibles – Goodwill and Other* annually, or more frequently if events or changes in circumstances indicate that the carrying value of goodwill might be impaired. The Company may opt to perform a qualitative assessment or a quantitative impairment test to determine whether goodwill is impaired. If the Company were to determine based on a qualitative assessment that it was more likely than not that the fair value of the reporting unit was less than its carrying value, a quantitative impairment test would then be performed. The quantitative impairment test compares the fair value of the reporting unit with its carrying amount, including goodwill. If the estimated fair value of the reporting unit is less than its carrying amount, a goodwill impairment would be recognized for the difference. The Company performed a qualitative analysis of goodwill as of June 21, 2022 as it considered the Complete Response Letter received from the FDA in June 2022 with respect to the Company's NDA in respect of OLPRUVA™ (sodium phenylbutyrate) for oral suspension for the treatment of patients with UCIDs to be a triggering event requiring it to perform that analysis. Management concluded that it was more likely than not that the fair value of the reporting unit was greater than its carrying amount. The Company performed a qualitative analysis of goodwill as of December 31, 2022 and 2021, in which management concluded that it was more likely than not that the fair value of the reporting unit is greater than its carrying amount.

Foreign Currency Transaction Gain/(Loss)

Gains and losses arising from transactions and revaluation of balances denominated in currencies other than U.S. dollars are recorded in foreign currency transaction gain/(loss) on the statements of operations.

Income Taxes

The Company recorded no income tax expense or benefit during the years ended December 31, 2022 and 2021, due to a full valuation allowance recognized against its net deferred tax assets. The Company is primarily subject to U.S. federal and Massachusetts state income taxes. The Company's tax returns for years 2016 through present are open to tax examinations by U.S. federal and state tax authorities; however, carryforward attributes that were generated prior to January 1, 2016 remain subject to adjustment upon examination if they either have been utilized or will be utilized in a future period. For federal and state income taxes, deferred tax assets and liabilities are recognized based upon temporary differences between the financial statement and the tax basis of assets and liabilities. Deferred income taxes are based upon prescribed rates and enacted laws applicable to periods in which differences are expected to reverse. A valuation allowance is recorded when it is more likely than not that some portion or all of the deferred tax assets will not be realized. Accordingly, the Company provides a valuation allowance, if necessary, to reduce deferred tax assets to amounts that are realizable. Utilization of net operating losses may be subject to substantial annual limitations due to the "change in ownership" provisions of the Internal Revenue Code of 1986, and similar state provisions. The annual limitations may result in the expiration of net operating losses before utilization.

The tax positions taken or expected to be taken in the course of preparing the Company's tax returns are required to be evaluated to determine whether the tax positions are "more-likely-than-not" of being sustained by the applicable tax authority. Tax positions not deemed to meet a more-likely-than-not threshold would be recorded as a tax expense in the current year. There were no uncertain tax positions that require accrual or disclosure in the financial statements as of December 31, 2022 and 2021. The Company's policy is to recognize interest and penalties related to income tax, if any, in income tax expense. As of December 31, 2022 and 2021, the Company had no accruals for interest or penalties related to income tax matters.

The Coronavirus Aid, Relief and Economic Security Act (the "CARES Act") was enacted in the U.S. on March 27, 2020. The CARES Act, among other things, includes provisions relating to refundable payroll tax credits, deferment of employer side social security payments, net operating loss carryback periods, alternative minimum tax credit refunds, modifications to the net interest deduction limitations, increased limitations on qualified charitable contributions, and technical corrections to tax depreciation methods for qualified improvement property. The Company is required to recognize the effects of tax law changes in the period of enactment. The enactment of the CARES Act did not result in material adjustments for the income tax provision for the year ended December 31, 2022 or to the Company's assessment of the realizability of deferred tax assets as the carry back of net operating losses was used as a source of income. There were no other effects to the Company's tax provision as a result of the CARES Act as of December 31, 2022.

Basic and Diluted Net Loss per Common Share

Basic and diluted net loss per common share is computed using the weighted average number of common shares outstanding during the period. Diluted net loss per share is computed using the sum of the weighted average number of common shares outstanding during the period and, in those instances where it would be dilutive, the weighted average number of potential shares of common stock-including the assumed exercise of stock options and warrants, the impact of unvested restricted stock, and the potential shares assuming conversion of convertible debt. Basic and diluted shares outstanding are the same for each period presented when all common stock equivalents, including potential shares from convertible debt and warrants, would be antidilutive due to the net losses incurred, except in certain instances as noted below.

The two-class method is an earnings allocation formula that treats a participating security, such as a warrant, as having rights to earnings that otherwise would have been available to common stockholders. However, the two-class method does not impact the net loss per share of common stock as the Company has been in a net loss position and while our warrants are considered a participating security, the terms of the warrant agreement does not obligate them to participate in losses. Diluted net income per share is computed using the more dilutive of (a) the two-class method or (b) the if-converted method or treasury stock method, as applicable, to the potentially dilutive instruments. A contract that may be settled in shares and is reported as an asset or liability for accounting purposes may require an adjustment to the numerator for any changes in income or loss that would result if the contract had been reported as an equity instrument for accounting purposes during the period, and doing so is dilutive to the net loss per share calculation (including as a result of the inclusion of underlying shares in the net loss per share calculation).

Segment Information

Operating segments are defined as components of an enterprise about which separate discrete information is available for evaluation by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one operating segment, which is the business of a pharmaceutical company focused on the acquisition, development, and commercialization of therapies for serious rare and life-threatening diseases with significant unmet medical needs.

Recently Adopted Accounting Pronouncements

In August 2020, the FASB issued ASU No. 2020-06, *Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging – Contracts in Entity's Own Equity (Subtopic 815-40)*, which

simplifies the accounting for convertible instruments by removing, in certain cases, the need for models that required separate accounting for embedded conversion features and also amends the guidance for the derivatives scope exceptions for contracts in an entity’s own equity. This ASU also requires expanded disclosures, including additional information related to the terms and features of convertible instruments and information about events or conditions that cause conversion contingencies to be met or conversion terms to be significantly changed. The Company early adopted ASU No. 2020-06 in the first quarter of 2021. See Note 6 regarding the Marathon Convertible Notes which were recognized in the first quarter of 2022 consistent with the adoption of this guidance.

In May 2021, the FASB issued ASU No. 2021-04, Earnings Per Share (Topic 260), Debt—Modifications and Extinguishments (Subtopic 470-50), Compensation—Stock Compensation (Topic 718), and Derivatives and Hedging—Contracts in Entity’s Own Equity (Subtopic 815-40): Issuer’s Accounting for Certain Modifications or Exchanges of Freestanding Equity-Classified Written Call Options (a consensus of the FASB Emerging Issues Task Force), which clarifies and reduces diversity in issuers’ accounting for modifications or exchanges of freestanding equity-classified written call options that remain equity classified after modification or exchange. The Company adopted ASU No. 2021-04 in the first quarter of 2022. There was no impact on the Company’s financial statements or disclosures as a result of the adoption of this guidance.

In November 2021, the FASB issued ASU No. 2021-10, *Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance*, which requires annual disclosures regarding transactions with a government that are accounted for by applying a grant or contribution accounting model. The Company adopted ASU No. 2021-10 in the fourth quarter of 2021. There was no impact on the Company’s financial statements or disclosures as a result of the adoption of this guidance.

3. PROPERTY AND EQUIPMENT

Property and equipment consisted of the following at December 31, 2022 and 2021:

	December 31, 2022	December 31, 2021
Computer hardware and software	\$ 142,870	\$ 113,847
Leasehold improvements	52,887	60,535
Furniture and fixtures	111,603	145,487
Manufacturing equipment	135,330	—
Subtotal property and equipment, gross	442,690	319,869
Less accumulated depreciation	(228,112)	(205,757)
Property and equipment, net	<u>\$ 214,578</u>	<u>\$ 114,112</u>

Property and equipment are stated on the basis of historical cost less accumulated depreciation. Depreciation is provided using the straight-line method over the estimated useful lives of the assets. Major renewals and improvements are capitalized, while minor replacements, maintenance and repairs are charged to current operations. Impairment losses are recorded on long-lived assets used in operations when indicators of impairment are present and the undiscounted cash flows estimated to be generated by those assets are less than the assets’ carrying amount. Computer hardware and software are depreciated over an estimated useful life of 3 years, leasehold improvements are depreciated over the shorter of the estimated useful life of the asset or the duration of the current lease arrangement, furniture and fixtures are depreciated over an estimated useful life of 7 years, and manufacturing equipment is depreciated over the estimated useful life of the particular asset.

4. ACCRUED EXPENSES

Accrued expenses consisted of the following at December 31, 2022 and 2021:

	December 31, 2022	December 31, 2021
Accrued employee bonus and vacation	\$ 2,624,910	\$ 419,354
Accrued interest	313,068	—
Accrued precommercial costs	203,016	395,923
Accrued legal	172,945	162,812
Accrued accounting, audit, and tax fees	82,779	167,630
Accrued license fees	80,526	86,259
Accrued contract research and regulatory consulting	68,432	47,637
Accrued miscellaneous expenses	66,039	216,103
Accrued contract manufacturing	42,679	827,390
Accrued consulting	3,000	105,085
Total accrued expenses	<u>\$ 3,657,394</u>	<u>\$ 2,428,193</u>

5. LEASES

On March 6, 2018, the Company entered into a lease agreement (the “Newton Lease”), commencing on October 1, 2018, for certain premises, which consist of 2,760 square feet of office space located in Newton, Massachusetts. On March 5, 2019, the Company entered into a modified lease agreement (the “Additional Newton Lease”) to lease an additional 1,600 square feet of office space, commencing on June 1, 2019, located in Newton, Massachusetts. The Newton Lease expired on May 31, 2022. On October 15, 2021, the Company entered into a lease amendment extending the Additional Newton Lease through December 31, 2022. Effective with the expiration of the Newton Lease and the extension of the Newton Additional Lease, the space leased by the Company in Newton was reduced to 1,600 square feet as of June 1, 2022. The Additional Newton Lease expired on December 31, 2022, and the Company is renting space on month-to-month basis for this facility. The Company is required to share in certain taxes and operating expenses associated with the Newton Lease and the Additional Newton Lease.

The Company entered into a triple net lease (the “Bend Lease”) effective April 1, 2018 for certain premises consisting of 2,288 square feet of office space located in Bend, Oregon. On April 23, 2019, the Company entered into a modified lease agreement (the “Additional Bend Lease”) to lease an additional 1,389 square feet of office space, commencing on May 1, 2019, located in Bend, Oregon. On November 17, 2021, the Company entered into a lease agreement to extend the term of the Bend Lease and the Additional Bend Lease to June 30, 2022 and to further extend the term either (1) until June 30, 2027 if FDA approval of OLPRUVA™ was received in June 2022, or (2) until June 30, 2025 if FDA approval of OLPRUVA™ was not received in June 2022. As FDA approval of OLPRUVA™ was not received in June 2022, the Company entered into a lease amendment in June 2022 such that the renewal term for this office space was extended until June 30, 2025.

The leases for the Newton and Bend office space are classified as operating leases. The leases contain immaterial provisions for rent holidays and rent escalations over the term of the leases, which have been included in the Company’s right of use asset and lease liabilities. In the year ended December 31, 2021, the Company recorded a non-cash transaction to recognize an additional \$0.4 million right of use asset and lease liability in conjunction with the modifications to the leases. The Company’s lease liability as of December 31, 2022 and 2021 represents the net present value of future lease payments utilizing discount rates of 8% to 10%, which correspond to the Company’s incremental borrowing rates as of the effective dates of the leases. As of December 31, 2022, the weighted average remaining lease term was 2.8 years. For the years ended December 31, 2022 and 2021, the Company recorded expense of \$0.2 million and \$0.3 million, respectively, related to the leases and made cash payments of \$0.2 million and \$0.3 million, respectively, for amounts included in the measurement of lease liabilities. The Company is therefore reporting a right-of-use asset of \$0.2 million in Other non-current assets and lease liabilities totaling \$0.2 million in Other current liabilities and Other non-current liabilities as of December 31, 2022.

The following table reconciles the undiscounted lease liabilities to the total lease liabilities recognized on the balance sheet as of December 31, 2022.

Undiscounted lease liabilities for years ending December 31,	
2023	103,925
2024	107,290
2025	54,579
Total undiscounted lease liabilities	\$ 265,794
Less effects of discounting	(16,204)
Total lease liabilities as of December 31, 2022	\$ 249,590

The Company's lease liabilities are reported on the balance sheets as follows:

	December 31,	
	2022	2021
Other current liabilities	\$ 103,925	\$ 184,340
Other non-current liabilities	145,665	209,497
Total lease liabilities	\$ 249,590	\$ 393,837

6. DEBT

SWK Credit Agreement

On March 4, 2022, the Company entered into the SWK Credit Agreement with the lenders party thereto and SWK, as the agent, sole lead arranger and sole bookrunner, which provides for a senior secured term loan facility in an aggregate amount of \$6.5 million in a single borrowing (the "Original Term Loan"). The Original Term Loan closed on March 14, 2022, after consummation of the Convertible Note Financing (as defined and described below) as well as the satisfaction of other closing conditions as set forth in the SWK Credit Agreement. The proceeds of the Original Term Loan are being used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement (as defined and described below) and the Marathon Credit Agreement (as defined and described below) and for other working capital and general corporate purposes. On August 19, 2022, the Company entered into an amendment (the "First Amendment") to the SWK Credit Agreement, which extended the date through which the Company has the option to capitalize interest on the SWK Credit Agreement and which revised the Company's minimum cash requirement under the Original Term Loan.

The Original Term Loan bears interest at an annual rate of the sum of (i) 3-month LIBOR (or such other rate as may be agreed by the Company and SWK following the date on which 3-month LIBOR is no longer available), subject to a 1% floor, plus (ii) a margin of 11%, with such interest payable quarterly in arrears. In the event of default, the interest rate will increase by 3% per annum over the contract rate effective at the time of default but shall not be higher than the maximum rate permitted to be charged by applicable laws. For the period ended December 31, 2022, the current interest rate applicable to the Original Term Loan is 15.8%. The Company has the option to capitalize such interest commencing on the date on which the Original Term Loan was funded and continuing until February 15, 2023. Commencing on February 15, 2023, the principal amount of the Original Term Loan will amortize at a rate of \$0.7 million payable quarterly. The final maturity date of the Original Term Loan is March 4, 2024. The Company is required to pay \$2.1 million of principal payments in 2023, with the remainder payable in 2024. The Company has the option to prepay the Original Term Loan in whole or in part. Upon the repayment of the Original Term Loan (whether voluntary or at scheduled maturity), the Company must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid to SWK under the SWK Credit Agreement on or prior to the prepayment date) equal to 1.5 times the outstanding principal amount of the Original Term Loan, plus any and all paid-in-kind interest amounts. The Original Term Loan contains a provision for the establishment of an alternative rate of interest if LIBOR were to no longer be available at any point while the Original Term Loan is outstanding. Under the Original Term Loan as amended, the Company's minimum cash requirement is such that its unencumbered liquid assets must not be less than the lesser of (a) the outstanding principal amount of the Original Term Loan, or (b) \$1.5 million; provided, however, that such \$1.5 million amount shall automatically be increased to \$3.0 million on the date that is 14 days following the date, if

any, that the Company's Board of Directors determines that discontinuation of the development program for the Company's product candidate known as ACER-801 (osacetant) for the treatment of vasomotor symptoms is warranted based upon a serious adverse event or a lack of efficacy at any dose studied in the results from a completed Phase 2a trial.

The Original Term Loan is secured by a first priority lien on all assets of the Company and any of its future subsidiaries pursuant to the SWK Security Agreement. The SWK Credit Agreement contains customary representations and warranties and affirmative and negative covenants. The Company paid to SWK \$0.1 million in origination fees on the date on which the Original Term Loan was funded. The Original Term Loan contains certain provisions which could accelerate the maturity date of the outstanding loan should the Company be out of compliance with any of the stated covenants. At December 31, 2022, the Company did not deem probable any events that would give rise to such an acceleration. The Company classified the fair value of the interest and principal amortization payments of \$1.5 million due within twelve months from the date of this report as current in the balance sheet as of December 31, 2022.

In connection with the execution of the SWK Credit Agreement, the Company issued a warrant (the "First SWK Warrant") to purchase 150,000 shares of the Company's common stock at an exercise price of \$2.46 per share. In connection with the execution of the First Amendment, the Company issued to SWK an additional warrant to purchase 100,000 shares of the Company's common stock at an exercise price of \$1.51 per share (such warrant, the "SWK Amendment Warrant" and, together with the First SWK Warrant, the "SWK Warrants"). SWK may exercise the SWK Warrants in accordance with the terms thereof for all or any part of such shares of common stock from the date on which the Original Term Loan was funded or such SWK Warrant was issued, as applicable, until and including March 4, 2029.

The Company recognized the fair value of the First SWK Warrant for \$0.3 million as additional paid in capital as of the date of the closing of the transaction. Additionally, the Company recognized the fair value of the SWK Amendment Warrant in connection with the First Amendment, for \$0.1 million as additional paid in capital and as non-operating cost of debt issuance, as of the date of the First Amendment.

The Company evaluated its compliance with all covenants with respect to the SWK Credit Agreement as amended and concluded that it was in compliance as of December 31, 2022.

See Note 12, Subsequent Events for further discussion of the status of the SWK Credit Agreement and related arrangements.

Marathon Convertible Notes

On March 4, 2022, the Company also entered into the Marathon Convertible Note Purchase Agreement with MAM Aardvark, LLC ("Marathon") and Marathon Healthcare Finance Fund, L.P. ("Marathon Fund" and together with "Marathon" each a "Holder" and collectively the "Holders") pursuant to which the Company issued and sold to the Holders the Marathon Convertible Notes in an aggregate amount of \$6.0 million (the "Convertible Note Financing"). The Convertible Note Financing closed on March 14, 2022 after satisfaction of closing conditions as set forth in the Marathon Convertible Note Purchase Agreement. The proceeds of the Convertible Note Financing are being used to pay fees, costs and expenses related to the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement and for other working capital and general corporate purposes.

The Marathon Convertible Notes bear interest at an annual rate of 6.5%, with such interest payable quarterly; provided, however, that until the first to occur of OLPRUVA™ Approval and the repayment in full of the Original Term Loan, interest will not be payable in cash, but will accrue and be payable in cash upon the earlier of a) the repayment of all obligations under the Original Term Loan and termination of such Original Term Loan or b) within three business days of OLPRUVA™ Approval. Subject to the restrictions set forth in an agreement among each of the Holders and SWK, as agent and lender, and any other intercreditor or subordination agreement entered into in connection with the Term Loan (defined below), each of the Holders has the right, during the 30-day periods beginning 12 months, 18 months and 24 months after the closing date of the Convertible Note Financing, to require

the Company to redeem the Convertible Secured Note held by such Holder at a redemption price of the outstanding principal amount plus any accrued but unpaid interest. In the event of default, interest on the Marathon Convertible Notes will increase to the lower of 11.5% per annum or the highest rate permitted by law. Each of the Holders also has the right to convert all or any portion of the outstanding principal amount plus any accrued but unpaid interest under the Marathon Convertible Note held by such Holder into shares of common stock at a conversion price of \$2.50 per share, subject to adjustment, for an aggregate of 2.4 million shares upon conversion of the original principal amount. The nature of the adjustment to conversion price is limited to instances such as stock splits and reverse stock splits. Each Holder has certain rights with respect to the registration by the Company for resale of the shares of common stock issuable upon conversion of the Marathon Convertible Note held by such Holder which are forth in the Marathon Convertible Note Purchase Agreement. Any outstanding principal, together with all accrued and unpaid interest, will be payable on the earlier of the third anniversary of the date of issuance, or upon a change of control of the Company.

Pursuant to the Marathon Convertible Note Purchase Agreement, the Marathon Convertible Notes are secured by a lien on collateral representing substantially all assets of the Company, although such security interest is subordinated to the Company's obligations under the SWK Credit Agreement and may also be subordinated to the Company's obligations under the Marathon Credit Agreement.

The Company evaluated its compliance with all covenants with respect to the Marathon Convertible Note Purchase Agreement and concluded that it was in compliance as of December 31, 2022.

See Note 12, Subsequent Events for further discussion of the status of the Marathon Convertible Notes.

Marathon Credit Agreement

On March 4, 2022, the Company also entered into the Marathon Credit Agreement with the lenders party thereto and Marathon, as the agent, sole lead arranger and sole bookrunner, which provides for a senior secured term loan facility in an aggregate amount of up to \$42.5 million in a single borrowing (the "Term Loan"). The Term Loan will be available to be borrowed only following OLPRUVA™ Approval and until December 31, 2022 (i.e., if OLPRUVA™ Approval does not occur on or before December 31, 2022, then the Term Loan will not be available unless the Company is able to obtain an extension for the time period beyond December 31, 2022, to the actual PDUFA target action date), and funding of the Term Loan is also subject to the satisfaction of conditions as set forth in the Marathon Credit Agreement. Although the Company's resubmitted NDA in respect of OLPRUVA™ (sodium phenylbutyrate) for oral suspension for the treatment of patients with UCIDs has been accepted for substantive review by the FDA, the PDUFA target action date is January 15, 2023. The Term Loan, if it becomes available, will be used to refinance certain other indebtedness of the Company (including the Original Term Loan), to pay fees, costs and expenses related to the Marathon Credit Agreement and for other working capital and general corporate purposes. Should the Term Loan become available, the Company will pay Marathon a commitment fee equal to 1.5% of the term loan amount. The Marathon Credit Agreement also includes an accordion feature pursuant to which the Company, Marathon and the lenders under the Marathon Credit Agreement may agree to increase the Term Loan commitments by up to an additional \$50.0 million dollars for a total commitment of \$92.5 million; provided, however, that any such increase is within the sole discretion of each party (i.e., the Company cannot unilaterally trigger such an increase).

The Term Loan would bear interest at an annual rate of 13.5% and would be payable quarterly in arrears. The Company would have the option to capitalize up to 4% of such interest commencing on the Term Loan Funding Date and continuing until the third anniversary of the Term Loan Funding Date. Commencing on the third anniversary of the Term Loan Funding Date, the principal outstanding amount of the Term Loan would amortize at a rate of 2.78%, payable monthly. The final maturity date of the Term Loan would be the earlier of six years after the Term Loan Funding Date or December 31, 2028. The Company would have the option to prepay the Term Loan in whole or in part at any time, subject to a prepayment fee equal to (a) if the prepayment is made prior to March 4, 2025, then the greater of 5% or the amount of interest that would have accrued from the date of prepayment until March 4, 2025, (b) if the prepayment is made on or after March 4, 2025, but prior to March 4, 2026, then 3%, (c) if the prepayment is made on or after March 4, 2026, but prior to March 4, 2027, then 2%, or (d) if the prepayment is made on or after March 4, 2027, then 1%.

The Term Loan would be secured by a first priority lien on all assets of the Company and any of its future subsidiaries pursuant to a Guarantee and Collateral Agreement to be entered into on the Term Loan Funding Date between the Company and Marathon, as agent (the “Marathon Security Agreement”). The Marathon Credit Agreement contains customary representations and warranties and affirmative and negative covenants. The Company paid \$0.2 million in commitment fees to Marathon in connection with obtaining the commitments in respect of the Term Loan and will pay \$0.6 million in additional commitment fees to Marathon following OLPRUVA™ Approval or any change of control of the Company or sale or transfer of the OLPRUVA™ product.

In connection with the Marathon Credit Agreement, on March 4, 2022, the Company, Marathon and the Marathon Fund also entered into the Royalty Agreement pursuant to which, in the event of the funding of the Term Loan, the Company will pay Marathon and the Marathon Fund, on a quarterly basis, 2% of certain aggregate commercial revenue from sales of OLPRUVA™ during that quarter (i.e., 2% of the net sales and of the amount of certain other payments), subject to a cap on the aggregate amount of such payments of \$15.0 million. Upon a change of control of the Company or the sale of the OLPRUVA™ business to a third party, the Company would pay Marathon and the Marathon Fund the difference between \$15.0 million and the aggregate amount of the payments previously made by the Company to Marathon and the Marathon Fund pursuant to the Royalty Agreement.

As of December 31, 2022, the Company had not requested funding of the Term Loan, and as such had not triggered the associated Royalty Agreement. On December 30, 2022, the Company and Marathon entered into an Extension Agreement which extended the Term Loan Commitment Date to January 16, 2023. See Note 12, Subsequent Events for further discussion of the status of the Marathon Convertible Notes and the Marathon Credit Agreement.

The Company engaged an exclusive financial advisor with respect to the financings contemplated by the SWK Credit Agreement, the Marathon Convertible Note Purchase Agreement and the Marathon Credit Agreement. In connection with the funding of the Original Term Loan and the Convertible Note Financing, the Company paid its financial advisor a fee of \$0.5 million for its services.

The Company is eligible to elect the fair value option under ASC 815 and bypass analysis of potential embedded derivatives and further analysis of bifurcation of any such financial instruments and has elected such option. The Company recognized the First SWK Warrant at fair value as of the date of the close of the transaction and recorded it in equity. The Original Term Loan and Marathon Convertible Notes met the definition of a “recognized financial liability” which is an acceptable financial instrument eligible for the fair value option under ASC 825-10-15-4 and do not meet the definition of any of the financial instruments found within ASC 825-10-15-5 that are not eligible for the fair value option. Therefore, both the Original Term Loan and Marathon Convertible Notes are recorded at their fair value upon issuance and subsequently re-measured at each reporting period until their maturity, prepayment or conversion. Additionally, all issuance costs incurred in connection with a debt instrument that is measured at fair value pursuant to the election of the fair value option are expensed during the period the debt is acquired. The Original Term Loan was recorded at fair value of \$6.2 million after allocating the fair value of the First SWK Warrant of \$0.3 million.

The Company incurred \$1.2 million of debt issuance costs, which were expensed as incurred due to the election of the fair value option and were included in interest expense in the accompanying statement of operations for the year ended December 31, 2022. Debt issuance costs were comprised of \$0.5 million that related to the costs and expense paid directly to SWK and the Holders, \$0.7 million of costs and expenses paid to the Company’s financial advisor, and other legal and accounting costs. The fee of \$0.2 million paid in connection with obtaining the commitments in respect of the Term Loan was paid to Marathon through gross proceeds received from the Marathon Convertible Notes. The Company recorded this fee as expense during the year ended December 31, 2022. As a result of the approval of OLPRUVA™, the Company will pay \$0.6 million for the Term Loan commitment fee and has recognized a liability for \$0.6 million and a current asset for deferred financing costs of \$0.4 million as of December 31, 2022, and has recognized expense during the period of \$0.2 million for this fee.

See Note 12, Subsequent Events for further discussion of the status of the Term Loan and related arrangements.

7. FAIR VALUE MEASUREMENTS

In instances where the determination of the fair value measurement is based on inputs from different levels of the fair value hierarchy, the level in the fair value hierarchy within which the entire fair value measurement falls is based on the lowest level input that is significant to the fair value measurement in its entirety. The Company's assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment and considers factors specific to the asset or liability.

The 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. At each reporting period, the Company reviews the assets and liabilities that are subject to ASC 815-40. At each reporting period, all assets and liabilities for which the fair value measurement is based on significant unobservable inputs or instruments which trade infrequently and therefore have little or no price transparency are classified as Level 3. The valuation methodologies used for the Company's financial instruments measured on a recurring basis at fair value, including the general classification of such instruments pursuant to the valuation hierarchy, is set forth in the tables below.

The following table presents the Company's assets and liabilities that are measured and recognized at fair value on a recurring basis classified under the appropriate level of the fair value hierarchy as of December 31, 2022.

	As of December 31, 2022		Fair Value Measurements As of December 31, 2022		
	Carrying Amount	Fair Value	Level 1	Level 2	Level 3
Assets:					
Money Market Funds in Cash Equivalents	\$ 1,829,218	\$ 1,829,218	\$ 1,829,218	\$ —	\$ —
Liabilities:					
Debt:					
Marathon Convertible Notes	\$ 6,360,600	\$ 6,360,600	\$ —	\$ —	\$ 6,360,600
Original Term Loan	\$ 5,567,231	\$ 5,567,231	\$ —	\$ —	\$ 5,567,231
	<u>\$ 11,927,831</u>	<u>\$11,927,831</u>	<u>\$ —</u>	<u>\$ —</u>	<u>\$11,927,831</u>

A lattice-based model was used to estimate the fair value of the Marathon Convertible Notes at December 31, 2022. The lattice model utilizes a "decision tree," whereby future movement in the Company's common stock price is estimated based on a volatility factor. Additionally, the Company included in its decision tree, when relevant, a probability assessment of the approval of ACER-001 and the resulting impact of such an event. The Company classified the fair value of the Marathon Convertible Notes as a Level 3 measurement due to the lack of observable market data. The lattice model requires the development and use of assumptions, including the Company's stock price volatility returns, an appropriate risk-free interest rate, default intensity rate, and expected recovery rate given default.

The Company updated its estimate of fair value of the Original Term Loan based on the probability-weighted net present value of future cash flows at December 31, 2022.

The significant unobservable inputs used in calculating the fair value of the Marathon Convertible Notes and Original Term Loan represent management's best estimates and involve inherent uncertainties and the application of management's judgment. Any significant changes in the inputs described herein may result in significantly higher or lower fair value measurements. The Company recognized a decrease in the fair value of the Original Term Loan of \$0.6 million during the year ended December 31, 2022 through non-operating income in the statement of operations as "Changes in fair value of debt instruments gain (loss)". During the year ended December 31, 2022, the Company recognized an increase in the fair value of the Marathon Convertible Notes of \$0.4 million through non-operating income in the statement of operations. The Company recognized \$0.3 million of accrued interest in connection with the Marathon Convertible Notes as of December 31, 2022 for the interest accrued on the notes since the date of

issuance and payable as of this date in cash, now that it is allowable under the subordination agreement with the receipt of approval of OLPRUVA™.

The following table describes changes in debt recorded at fair value in the Company’s financial statements for the year ended December 31, 2022.

	December 31, 2021	Loan Received	Payments	Accrued interest expense	Adjustment to Fair Value Mark to Market	December 31, 2022
Marathon Convertible Notes (1)	\$ —	\$ 6,000,000	\$ —	\$ 313,068	\$ 47,532	\$ 6,360,600
Original Term Loan	—	6,172,969	—	—	(605,738)	5,567,231
	<u>\$ —</u>	<u>\$12,172,969</u>	<u>\$ —</u>	<u>\$ 313,068</u>	<u>\$ (558,206)</u>	<u>\$11,927,831</u>

(1) Marathon Convertible Notes were recorded as \$0.3 million in accrued interest expenses and \$6.0 million in convertible note payable, at fair value in the Company’s balance sheet at December 31, 2022.

8. COMMITMENTS AND CONTINGENCIES

License Agreements

In April 2014, the Company obtained exclusive rights to intellectual property relating to OLPRUVA™ for the treatment of inborn errors of branched-chain amino acid metabolism, including MSUD, and preclinical and clinical data, through a license agreement with Baylor College of Medicine (“BCM”). Under the terms of the agreement, as amended, the Company has worldwide exclusive rights to develop, manufacture, use, sell and import licensed products as defined in the agreement. The license agreement requires the Company to make certain upfront and annual payments to BCM, as well as reimburse certain legal costs, make payments upon achievement of defined milestones, and pay royalties in the low single-digit percent range on net sales of any developed product over the royalty term.

In August 2016, the Company signed an agreement with Assistance Publique—Hôpitaux de Paris, Hôpital Européen Georges Pompidou (“AP-HP”) (via its Department of Clinical Research and Development) granting the Company the exclusive worldwide rights to access and use data from a randomized, controlled clinical study of celiprolol. The Company used this pivotal clinical data to support an NDA regulatory filing for EDSIVO™ for the treatment of vEDS. The agreement requires the Company to make certain upfront payments to AP-HP, as well as reimburse certain costs and make payment of royalties in the low single-digit percent range on net sales of celiprolol over the royalty term.

In September 2018, the Company entered into a License Agreement for Development and Exploitation with AP-HP to acquire the exclusive worldwide intellectual property rights to three European patent applications relating to certain uses of celiprolol including (i) the optimal dose of celiprolol in treating vEDS patients, (ii) the use of celiprolol during pregnancy and (iii) the use of celiprolol to treat kyphoscoliotic Ehlers-Danlos syndrome (type VI). Pursuant to the agreement, the Company will reimburse AP-HP for certain costs and will pay annual maintenance fee payments. Subject to a minimum royalty amount, the Company will also pay royalty payments on annual net sales of celiprolol during the royalty term in the low single digit percent range, depending upon whether there is a valid claim of a licensed patent. Under the agreement, the Company will control and pay the costs of ongoing patent prosecution and maintenance for the licensed applications. The Company may terminate the agreement in its sole discretion upon written notice to AP-HP, and AP-HP may terminate the agreement in the event the Company fails to make the required payments after notice and opportunity to cure. Additionally, the agreement will terminate if the Company terminates clinical development, marketing approval is withdrawn by the health or regulatory authorities in all countries, the Company ceases to do business or there is a procedure of winding-up by court decision against the Company. The Company subsequently filed three U.S. patent applications on this subject matter in October 2018.

In December 2018, the Company entered into an exclusive license agreement with Sanofi granting the Company worldwide rights to ACER-801, a clinical-stage, selective, non-peptide tachykinin NK3 receptor antagonist. The agreement required the Company to make a certain upfront payment to Sanofi, make payments upon achievement of defined development and sales milestones and pay royalties on net sales of ACER-801 over the royalty term. The Company plans to initially pursue development of ACER-801 as a potential treatment for iVMS.

In May 2021, the Company entered into an agreement with Emory University to acquire the exclusive worldwide intellectual property rights to a family of patents and patent applications related to the use of neurokinin receptor antagonists in managing conditioned fear and treating anxiety disorders including post-traumatic stress disorder. The Company has obtained issued claims in both Europe and the United States and continues to pursue additional claim scope in both jurisdictions. Pursuant to the agreement, the Company reimburses Emory for certain patent prosecution costs and annual maintenance fees. Should the Company obtain approval for a treatment method within the scope of a valid claim of a licensed patent, the Company will be obligated to make royalty payments on annual net sales of osanetant either in the low single digit percent range, or alternatively, that meet an agreed minimum royalty.

Collaboration Agreement

On March 19, 2021, the Company entered into the Collaboration Agreement with Relief providing for the development and commercialization of OLPRUVA™ for the treatment of various inborn errors of metabolism, including for the treatment of UCDs and MSUD. The Collaboration Agreement is the culmination of the Option Agreement previously entered into between the Company and Relief on January 25, 2021, which provided Relief with an exclusive period of time up to June 30, 2021 for the parties to enter into a mutually acceptable definitive agreement with respect to the potential collaboration and license arrangements. In consideration for the grant of the exclusivity option, (i) the Company received from Relief an upfront non-refundable payment of \$1.0 million, (ii) Relief provided to the Company a 12-month secured loan in the principal amount of \$4.0 million with interest at a rate equal to 6% per annum, as evidenced by a promissory note the Company issued to Relief, and (iii) the Company granted Relief a security interest in all of its assets to secure performance of the promissory note, as evidenced by a security agreement. Upon signing the Collaboration Agreement, the Company received a \$10.0 million cash payment from Relief (the \$14.0 million (“Reimbursement Payment”) from Relief to the Company, offset by repayment of the \$4.0 million outstanding balance of the prior loan, plus interest), and Relief released its security interest in the Company’s assets pursuant to the Promissory Note. Under the terms of the Collaboration Agreement, Relief committed to pay the Company Development Payments of up to an additional \$20.0 million for U.S. development and commercial launch costs for the UCDs and MSUD indications. During the three months ended June 30, 2021, the Company received from Relief the \$10.0 million First Development Payment. The Company was contractually entitled to receive from Relief an additional \$10.0 million Second Development Payment conditioned upon the FDA’s acceptance of an NDA for OLPRUVA™ in a UCD for filing and review. This acceptance was received on October 4, 2021. On October 6, 2021, the Company entered into a Waiver and Agreement with Relief to amend the timing for the Second Development Payment. The Company received the Second Development Payment in two \$5.0 million tranches on each of October 12, 2021 and January 14, 2022. Further, the Company retained development and commercialization rights in the U.S., Canada, Brazil, Turkey and Japan (“Acer Territory”). The companies will split net profits from the Acer Territory 60%:40% in favor of Relief. Relief licensed the rights for the rest of the world (“Relief Territory”), where the Company will receive from Relief a 15% royalty on all net sales received in the Relief Territory. The Company could also receive a total of \$6.0 million in milestone payments based on the first European (EU) marketing approvals of OLPRUVA™ for a UCD and MSUD.

Paycheck Protection Program (“PPP”) Loan

On April 11, 2020, the Company was advised that its principal bank, JPMorgan Chase Bank, N.A., had approved a \$0.6 million loan under the PPP pursuant to the CARES Act that was signed into law on March 27, 2020. As a U.S. small business, the Company qualified for the PPP, which allows businesses and nonprofits with fewer than 500 employees to obtain loans of up to \$10 million to incent companies to maintain their workers as they manage the business disruptions caused by the COVID-19 pandemic.

The loan, evidenced by a promissory note to JPMorgan Chase Bank, N.A. as lender, had a term of two years, was unsecured, and was guaranteed by the Small Business Administration. The loan bore interest at a fixed rate of one percent per annum, with the first six months of interest and principal deferred. Some or all of a loan may be forgiven if at least 75% of the loan proceeds are used by the Company to cover payroll costs, including benefits, and if the Company maintains its employment and compensation within certain parameters during the period following the loan origination date and complies with other relevant conditions. On June 5, 2020, the Payroll Protection Flexibility Act of 2020 was signed into law, adjusting certain terms of the loans issued under the PPP, including extending the initial deferral period from six to up to ten months, reducing from 75% to 60% the portion of loan proceeds required to be used to cover payroll costs, and allowing borrowers to elect a 24-week rather than an eight-week period related to employment and compensation provisions.

The Company accounted for the loan according to ASC 470. The Company was advised by JPMorgan Chase Bank, N.A. that the principal and interest associated with its PPP loan were forgiven in full as of June 10, 2021.

Litigation

From time to time, the Company may become involved in litigation or proceedings relating to claims arising out of its operations. To the extent that the Company incurs legal costs associated with any potential loss contingency, those legal costs are expensed as incurred.

The Securities Class Action and Stockholder Derivative Actions

On July 1, 2019, plaintiff Tyler Sell filed a putative class action lawsuit, *Sell v. Acer Therapeutics Inc. et al.*, No. 1:19-cv-06137GHW, against the Company, Chris Schelling and Harry Palmin, in the U.S. District Court for the Southern District of New York. The Complaint alleged that the Company violated federal securities laws by allegedly making material false and misleading statements regarding the likelihood of FDA approval for the EDSIVO™ NDA. With the selection of a lead plaintiff, the case was later captioned *Skiadas v. Acer Therapeutics Inc. et al.* The parties reached an agreement in principle to settle this action for a payment of \$8.4 million, which was approved by the Court on January 7, 2022. As of December 31, 2021, the Company had recognized liabilities of \$8.4 million for the proposed settlement and of \$0.9 million for costs related to both the derivative and class action cases in other current liabilities and had also recognized an asset of an equal amount in other current assets representing the recovery from its insurance carriers of an equal amount. Both the liabilities and the asset were derecognized during the year ending December 31, 2022 as payment of the settlement was made by the Company's insurance carriers.

On August 12, 2019, a stockholder derivative action, *Gress v. Aselage et al.*, No. 1:19-cv-01505-MN, was filed in the U.S. District Court for the District of Delaware against certain of the Company's present and former officers and directors, asserting damages resulting from the alleged breach of their fiduciary duties, based on the same facts at issue in the *Skiadas* case. On March 17, 2020, a second stockholder derivative action, *Giroux v. Amello et al.*, No. 1:20-cv-10537-GAO, was filed in the U.S. District Court for the District of Massachusetts against certain of the Company's present and former officers and directors, asserting claims based on the same facts at issue in the *Skiadas* and *Gress* cases. On June 23, 2020, a third stockholder derivative action, *King v. Schelling, et al.*, No. 1:20-cv-04779-GHW, was filed in the U.S. District Court for the Southern District of New York against certain of the Company's present and former officers and directors that arises from the same facts underlying the *Skiadas*, *Gress*, and *Giroux* cases. On July 6, 2020, a fourth stockholder derivative action, *Diaz v. Amello et al.*, No. 1:20-cv-00909-MN, was filed in the U.S. District Court for the District of Delaware. By Stipulation and Order dated August 7, 2020, the *Gress* and *Diaz* cases were consolidated under the caption *In re Acer Therapeutics Inc. Derivative Litigation*, Lead Case No. 1:19-cv-01505-MN. As disclosed previously, the parties reached an agreement to settle all of the derivative cases. At a hearing held on May 12, 2021 in the District Court of Massachusetts, the Court administering the matter, the settlement was approved. Payment of the settlement amount of \$0.5 million, plus legal fees and costs in excess of the retention (deductible) amount, has been made by the Company's insurance carriers.

Commitments Under Clinical Trial Agreements

The Company has entered into agreements with two CROs in connection with the conduct of two separate clinical trials for EDSIVO™ and ACER-801. As a part of those agreements, the Company has agreed to pay any

third-party costs or subcontracts associated with those agreements which are unpaid by the CRO. Such reimbursement would apply only to costs approved in advance by the Company. Those CRO agreements are subject to termination at any time, with or without cause, by the Company, in which case only costs earned or non-cancellable to date of termination would remain subject to reimbursement.

9. STOCKHOLDERS' (DEFICIT) EQUITY

At-the-Market Facility

On November 9, 2018, the Company entered into a sales agreement with Roth Capital Partners, LLC, and on March 18, 2020, the Company entered into an amended and restated sales agreement with JonesTrading Institutional Services LLC and Roth Capital Partners, LLC. The agreement provides a facility for the offer and sale of shares of common stock from time to time having an aggregate offering price of up to \$50.0 million depending upon market demand, in transactions deemed to be an “at-the-market” (“ATM”) offering. The Company has no obligation to sell any shares of common stock pursuant to the agreement and may at any time suspend sales pursuant to the agreement. Each party may terminate the agreement at any time without liability. The Company will need to keep current its shelf registration statement and the offering prospectus relating to the ATM facility, in addition to providing certain periodic deliverables under the sales agreement, in order to use such facility. Due to the SEC’s “baby shelf rules,” which prohibit companies with a public float of less than \$75 million from issuing securities under a shelf registration statement in excess of one-third of such company’s public float in a 12-month period, the Company is currently only able to issue a limited number of shares which aggregate to not more than one-third of the Company’s public float. During the year ended December 31, 2022, the Company sold an aggregate of 3,312,471 shares of common stock through the ATM at an average gross sale price of \$1.9749 per share, for gross proceeds of \$6.5 million. Proceeds, net of \$0.2 million in fees and offering costs, were \$6.3 million. During the year ended December 31, 2021, the Company sold 877,107 shares of common stock at an average gross sale price of \$3.1692 per share, for gross proceeds of \$2.8 million. Proceeds, net of \$0.2 million of fees and offering costs were \$2.6 million. As of December 31, 2022, \$33.5 million remained available under the Company’s ATM facility.

See Note 12, Subsequent Events for further discussion of the status of the Company’s ATM facility.

Common Stock Purchase Agreement

On April 30, 2020, the Company entered into an equity line purchase agreement and a registration rights agreement pursuant to which Lincoln Park committed to purchase up to \$15.0 million of the Company’s common stock. Under the terms and subject to the conditions of the purchase agreement, the Company had the right, but not the obligation, to sell to Lincoln Park, and Lincoln Park was obligated to purchase up to \$15.0 million of the Company’s common stock. Such sales of common stock by the Company were subject to certain limitations, and occurred from time to time, at the Company’s sole discretion, over the 36-month period commencing on June 8, 2020. The number of shares the Company was able to sell to Lincoln Park on any single business day in a regular purchase was 50,000, but that amount was able to be increased up to 100,000 shares, depending upon the market price of the Company’s common stock at the time of sale and subject to a maximum limit of \$1.0 million per regular purchase. The purchase price per share for each such regular purchase was based on prevailing market prices of the Company’s common stock immediately preceding the time of sale as computed under the purchase agreement. In addition to regular purchases, the Company was also able to direct Lincoln Park to purchase other amounts as accelerated purchases or as additional accelerated purchases if the closing sale price of the common stock exceeded certain threshold prices as set forth in the purchase agreement.

Under applicable rules of the Nasdaq Capital Market, in no event may the Company issue or sell to Lincoln Park under the purchase agreement more than 19.99% of the shares of the Company’s common stock outstanding immediately prior to the execution of the purchase agreement, unless (i) the Company obtains stockholder approval to issue shares of common stock in excess of the Exchange Cap or (ii) the average price of all applicable sales of common stock to Lincoln Park under the purchase agreement equals or exceeds \$2.1668, such that issuances and sales of the common stock to Lincoln Park under the purchase agreement would be exempt from the issuance limitation under applicable Nasdaq rules.

Lincoln Park has no right to require the Company to sell any shares of common stock to Lincoln Park, but Lincoln Park is obligated to make purchases as the Company directs, subject to certain conditions. In all instances, the Company may not sell shares of its common stock to Lincoln Park under the purchase agreement if doing so would result in Lincoln Park beneficially owning more than 9.99% of its common stock. The Company determined that the right to sell additional shares represents a freestanding put option under ASC 815 Derivatives and Hedging, but has a fair value of zero, and therefore no additional accounting was required.

Actual sales of shares of common stock to Lincoln Park under the purchase agreement will depend on a variety of factors to be determined by the Company from time to time, including, among others, market conditions, the trading price of the common stock and determinations by the Company as to the appropriate sources of funding for the Company and its operations. However, there can be no assurance that the Company will be able to receive the entire obligation amount from Lincoln Park because the purchase agreement contains limitations, restrictions, requirements, events of default and other provisions that could limit the Company's ability to cause Lincoln Park to buy common stock from the Company.

The proceeds under the purchase agreement to the Company will depend on the frequency and prices at which the Company sells shares of its stock to Lincoln Park. The Company issued 148,148 shares of common stock to Lincoln Park as a commitment fee in connection with entering into the purchase agreement. The \$0.4 million fair value of the commitment fee shares was recorded to General and administrative expenses along with other costs incurred in connection with entering into the purchase agreement.

During the year ended December 31, 2022, the Company sold 772,057 shares of common stock under its purchase agreement with Lincoln Park at a weighted average price of \$1.42 per share, resulting in net proceeds of \$1.1 million. During the year ended December 31, 2021, the Company sold 200,000 shares of common stock under its purchase agreement with Lincoln Park at a weighted average price of \$2.47 per share, resulting in proceeds of \$0.5 million. The Lincoln Park facility was completed on December 30, 2022.

Private Placement

On November 29, 2022, the Company entered into a securities purchase agreement for the sale and issuance of an aggregate of 1,229,508 shares of the Company's common stock, for an aggregate purchase price of \$1.5 million, in a private placement with the Company's President and Chief Executive Officer and a member of the Company's Board of Directors and with the Chairman of the Company's Board of Directors at a price per share of \$1.22. The shares of common stock issued in the private placement constitute "restricted securities" under the federal securities laws and are subject to a minimum six-month holding period.

2018 Stock Incentive Plan

The Company's 2018 Stock Incentive Plan (the "2018 Plan"), adopted on May 14, 2018, originally provided for the grant of up to 500,000 shares of common stock as stock options, restricted stock, stock appreciation rights, restricted stock units, performance-based awards and cash-based awards that may be settled in cash, stock or other property to employees, executive officers, directors, and consultants.

In addition to the 500,000 shares, the total number of shares reserved for issuance under the 2018 Plan also consists of the sum of the number of shares subject to outstanding awards under the Company's 2010 Stock Incentive Plan, as amended and restated (the "2010 Plan"), and the 2013 Stock Incentive Plan, as amended (the "2013 Plan"), as of the effective date of the 2018 Plan that are subsequently forfeited or terminated for any reason prior to being exercised or settled, plus the number of shares subject to vesting restrictions under the 2010 Plan and the 2013 Plan on the effective date of the 2018 Plan that are subsequently forfeited, plus the number of shares reserved but not issued or subject to outstanding grants under the 2010 Plan and the 2013 Plan as of the effective date of the 2018 Plan, up to a maximum of 635,170 shares in aggregate. In addition, the number of shares authorized for issuance under the 2018 Plan is automatically increased (the "evergreen provision") on the first day of each fiscal year beginning on January 1, 2019, and ending on (and including) January 1, 2028, in an amount equal to the lesser of (i) 4% of the outstanding shares of common stock on the last day of the immediately preceding fiscal year, or (ii) another amount (including zero) determined by the Company's Board of Directors. On January 1, 2022 and

2021, 572,410 and 529,325 additional shares, respectively, were authorized according to the evergreen provision. On February 18, 2022, the Company's Board of Directors amended and restated the 2018 Plan to add a provision permitting the grant of inducement awards under Nasdaq Marketplace Rule 5635(c)(4) to eligible recipients and initially reserved 200,000 shares of the Company's common stock for issuance pursuant to inducement awards granted under the 2018 Plan. Any shares subject to awards granted under the 2018 Plan that are forfeited or terminated before being exercised or settled, or are not delivered to the participant because such award is settled in cash, will again become available for issuance under the 2018 Plan. Shares withheld to satisfy the grant, exercise price or tax withholding obligation related to an award will again become available for issuance under the 2018 Plan.

The 2018 Plan is administered by the Company's Board of Directors, which may in turn delegate authority to administer the plan to a committee such as the Compensation Committee, referred to herein as the 2018 Plan administrator. Subject to the terms of the 2018 Plan, the 2018 Plan administrator will determine recipients, the number of shares or amount of cash subject to awards to be granted, whether an option is to be an incentive stock options or non-incentive stock options and the terms and conditions of the stock awards, including the period of their exercisability and vesting. Subject to the limitations set forth below, the 2018 Plan administrator will also determine the exercise price of options granted under the 2018 Plan. The 2018 Plan expressly provides that, without the approval of the stockholders, the 2018 Plan administrator does not have the authority to reduce the exercise price of any outstanding stock options or stock appreciation rights under the 2018 Plan (except in connection with certain corporate transactions, such as stock splits, certain dividends, recapitalizations, reorganizations, mergers, spin-offs and the like), or cancel any outstanding underwater stock options or stock appreciation rights in exchange for cash or new stock awards under the 2018 Plan.

Option awards are generally granted with an exercise price equal to the fair value of the common stock at the date of grant and have contractual terms of ten years. Stock options granted to executive officers and employees generally vest either 1) over a four-year period, with 25% vesting on the one-year anniversary of the grant date and the remaining 75% vesting quarterly over the remaining three years, assuming continued service, and with vesting acceleration in full immediately prior to a change in control, or 2) for certain stock options granted on September 18, 2019, 50% vest on each of January 1, 2021 and January 1, 2022, assuming continued service, and with vesting acceleration in full immediately prior to a change in control. For certain grants such as those made to members of the Company's Board of Directors, vesting occurs 12 months after the date of the grant. Restricted stock units generally vest and are settled upon the first anniversary of the grant date. There were no grants of restricted stock units during the years ended December 31, 2022 or 2021 and no unvested restricted stock units as of December 31, 2022 or 2021.

At December 31, 2022, 389,313 shares of common stock remained available for the grant of future awards under the 2018 Plan.

2013 Stock Incentive Plan

The Company's 2013 Plan provided for the issuance of up to 165,000 shares of common stock as incentive or non-qualified stock options and/or restricted common stock to employees, officers, directors, consultants and advisers. Option awards were generally granted with an exercise price equal to the fair value of the common stock at the date of grant and had contractual terms of ten years. At December 31, 2022, all shares available under the 2013 Plan were subject to outstanding equity awards, and no new awards may be granted under the 2013 Plan.

2010 Stock Incentive Plan

The Company's 2010 Plan, as amended and restated, provided for the grant of up to 470,170 shares of common stock as incentive or non-qualified stock options, stock appreciation rights, restricted stock units and/or restricted common stock to employees, officers, directors, consultants and advisers. Option awards were generally granted with an exercise price equal to the fair value of the common stock at the date of grant and had contractual terms of ten years. At December 31, 2022, all shares available under the 2010 Plan were subject to outstanding equity awards, and no new awards may be granted under the 2010 Plan.

Stock Plan Activity

A summary of option activity under the 2018 Plan, 2013 Plan, and 2010 Plan for the year ended December 31, 2022 is as follows:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in Thousands)
Options outstanding at December 31, 2021	1,954,975	\$ 8.16	7.8	
Granted	960,500	\$ 2.33		
Cancelled/forfeited	(120,625)	\$ 3.41		
Options outstanding at December 31, 2022	2,794,850	\$ 6.36	7.4	\$ 211
Options exercisable at December 31, 2022	1,462,238	\$ 9.56	6.3	\$ 4

At December 31, 2022, there was \$2.2 million of unrecognized compensation expense related to the stock-based compensation arrangements granted under all plans, which will be recognized as expense over the remaining vesting period for those options of 2.6 years. The weighted average grant-date fair value of options granted during the years ended December 31, 2022 and 2021 was \$1.99 and \$2.57, respectively. The fair value of shares vested during the years ended December 31, 2022 and 2021 was \$2.2 million and \$2.0 million, respectively. The amount of stock-based compensation expense recorded to research and development expenses and to general and administrative expenses is detailed in table below:

	Years Ended December 31,	
	2022	2021
Stock-based compensation expense		
Research and development	\$ 615,477	\$ 696,283
General and administrative	1,225,022	1,590,724
Total stock-based compensation expense	\$ 1,840,499	\$ 2,287,007

Warrants issued to SWK

	Year Ended December 31,			
	2022		2021	
	Number	Weighted Average Exercise Price	Number	Weighted Average Exercise Price
Outstanding at beginning of the period	—	\$ —	—	—
Granted during the period	250,000	2.08	—	—
Outstanding at end of the period	250,000	\$ 2.08	—	\$ —
Exercisable at end of the period	250,000	\$ 2.08	—	\$ —
Weighted average remaining life	6.3 years		—	

10. INCOME TAXES

There was no provision for income taxes for the years ended December 31, 2022 and 2021, due to the Company's operating losses and a full valuation allowance on deferred tax assets. Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and liabilities are as follows:

	December 31,	
	2022	2021
Deferred tax assets:		
Net operating loss carry forwards	\$ 17,548,951	\$ 12,059,019
Capitalized research and development costs	22,913,646	18,865,707
Accrued liabilities	691,212	156,415
Tax credit carryforwards	9,457,090	8,730,816
Stock-based compensation	2,086,266	1,745,654
Deferred collaboration funding	2,151,339	3,312,415
Operating lease	63,824	94,946
Debt issuance costs	229,073	—
Unrealized foreign exchange gain	13,756	(3,616)
Total deferred tax assets	55,155,157	44,961,356
Valuation allowance	(55,033,001)	(44,866,411)
Net deferred tax assets	122,156	94,945
Deferred tax liabilities:		
Operating lease right of use asset	(59,470)	(94,945)
Fair value debt	(62,686)	—
Total deferred tax liabilities	(122,156)	(94,945)
	\$ —	\$ —

A reconciliation of the U.S. federal statutory tax rate to the effective tax rate is as follows:

	December 31,	
	2022	2021
Federal statutory rate	21.0%	21.0%
R&D and Orphan Drug credits	2.7%	6.4%
State income tax, net of federal tax benefit	15.9%	5.4%
Valuation allowance	(38.9%)	(33.2%)
Share-based compensation	(0.7%)	(0.3%)
Other, net	0.0%	0.7%
Effective tax rate	0.0%	0.0%

Management currently believes that it is more likely than not that the deferred tax assets relating to the loss carryforwards and other temporary differences will not be realized in the future. Through December 31, 2022, for income tax reporting purposes, the Company had U.S. federal net operating loss carryforwards of \$66.6 million and research and development credits and Orphan Drug credits of \$9.4 million that can be carried forward and offset against taxable income. For state purposes, the Company had state net operating loss carryforwards of \$65.6 million and research and development credits of \$67 thousand that can be carried forward and offset against taxable income. Federal net operating loss generated prior to 2018 and Massachusetts net operating losses can be carried forward for 20 years and begin to expire in 2031. Research and development credits and Orphan Drug credits begin to expire in 2032 and 2034, respectively. Federal net operating loss generated after 2017 can be carried forward indefinitely. Utilization of net operating losses may be subject to substantial annual limitations due to the “change in ownership” provisions of the Internal Revenue Code of 1986, and similar state provisions. The annual limitations may result in the expiration of net operating losses before utilization.

There were no uncertain tax positions that require accrual or disclosure in the financial statements as of December 31, 2022 and 2021. The Company’s policy is to recognize interest and penalties related to income tax, if any, in income tax expense. As of December 31, 2022 and 2021, the Company had no accruals for interest or penalties related to income tax matters.

Beginning in 2022, the Tax Cuts and Jobs Act of 2017 (“TCJA”) eliminated the option to deduct research and development expenditures in the current year pursuant to IRC Section 174 and requires taxpayers to amortize them

over five years for research performed in the U.S. and fifteen years for research performed outside the U.S. We have included the impact of this provision, which results in a gross deferred tax asset of approximately \$19.0 million as of December 31, 2022.

The 2017 merger of Opexa Therapeutics, Inc. and private Acer Therapeutics Inc. resulted in an ownership change for the Company. Additional ownership changes in the future could result in additional limitations on the Company’s net operating loss carryforwards and certain other tax attributes. Consequently, even if the Company achieves profitability, it may not be able to utilize a material portion of its net operating loss carryforwards and certain other tax attributes, which could increase its tax obligations and thus have a material adverse effect on its cash flow and results of operations.

Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an “ownership change,” 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 and taxes may be limited. In general, an “ownership change” generally occurs if there is a cumulative change in the Company’s ownership by “five-percent shareholders” that exceeds 50 percentage points over a rolling three-year period. Similar rules may apply under state tax laws. The Company experienced an ownership change on July 17, 2015 and August 3, 2018, and may experience ownership changes in the future as a result of this issuance or future transactions in the Company’s stock, some of which may be outside the Company’s control. As a result, if the Company earns net taxable income, the Company’s ability to use the Company’s pre-change net operating loss carryforwards, or other pre-change tax attributes, to offset U.S. federal and state taxable income and taxes may be subject to significant limitations.

11. NET LOSS PER SHARE

Basic net loss per share is computed by dividing the net loss in each period by the weighted-average number of common shares outstanding during such period. Diluted net loss per share is computed similarly to basic net loss per share except that the denominator is increased to include the number of additional common shares that would have been outstanding if the potential common shares had been issued and if the additional common shares were dilutive. For the periods presented, common stock equivalents, consisting of stock-based awards and the SWK Warrants, were not included in the calculation of the diluted loss per share because to do so would be antidilutive. The exercise prices of the SWK Warrants are subject to a proportionate adjustment in the event of a stock dividend or stock split. The Company concluded that they should be deemed participating securities. However, as the Company is currently operating in a net loss position as of the December 31, 2022 and has not declared any dividends, such inclusion of the participating securities related to the SWK Warrants (as common stock equivalents) would be antidilutive and thus would be excluded from the calculation of net loss per share. When calculating diluted net loss per share, the Company includes, only if dilutive, the potential common shares associated with the Marathon Convertible Notes using the “if-converted” method, which adjusts the numerator for any impact to earnings for the period and includes in the denominator the shares assumed to be converted at the beginning of the period.

As of December 31, 2022 and 2021, the number of shares of common stock underlying potentially dilutive securities consist of:

	December 31,	
	2022	2021
Options to purchase common stock	2,794,850	1,954,975
SWK Warrants	250,000	—
Total	3,044,850	1,954,975

The application of the “if-converted” method to the 2.4 million shares associated with the Marathon Convertible Notes was not applicable for the year ended December 31, 2022 because to do so would have been antidilutive.

12. SUBSEQUENT EVENTS

Subsequent to December 31, 2022, the Company sold an aggregate of 1,462,254 shares of common stock under its ATM facility at an average gross sale price of \$2.81 per share, resulting in gross proceeds of \$4.1 million. Proceeds, net of \$0.1 million of offering costs, were \$4.0 million.

On March 14, 2023, the Company granted options to acquire a total of 630,000 shares of its common stock to its directors, officers, and employees.

Amendments to Borrowing Agreements

On January 30, 2023, the Company entered into a Second Amendment (the “Second Amendment”) to the SWK Credit Agreement. In addition to other provisions, the Second Amendment provides for an additional senior secured term loan to be made to the Company in an aggregate amount of \$7.0 million in a single borrowing which was funded on January 31, 2023 (the “Second Term Loan”, and together with the Original Term Loan, the “SWK Loans”).

Pursuant to the terms of the August 2022 SWK Credit Agreement as amended by the Second Amendment (the “Current SWK Credit Agreement”):

- **Interest Rate:** Interest is now calculated on the SWK Loans based on 3-month SOFR instead of 3-month LIBOR, such that the SWK Loans now bear interest at an annual rate of the sum of (i) 3-month SOFR, subject to a 1% floor, plus (ii) a margin of 11%, with such interest payable quarterly in arrears.
- **Capitalization of Interest:** The Company’s option to capitalize accrued interest (the “PIK Amount”) has been extended through May 15, 2023 (instead of the previous February 15, 2023).
- **Maturity Date:** The final maturity date of the Second Term Loan is March 4, 2024, which is the same as the final maturity date of the Original Term Loan.
- **Exit Fees:** The Company has the option to prepay the Second Term Loan in whole or in part. Upon the repayment of the Second Term Loan (whether a voluntary prepayment, an accelerated repayment or at scheduled maturity), the Company must pay an exit fee so that SWK receives an aggregate amount (inclusive of all principal, interest and origination and other fees paid in cash to SWK under the SWK Credit Agreement with respect to the Second Term Loan, but excluding the Third Warrant (defined below)) equal to the outstanding principal amount of the Second Term Loan (inclusive of PIK Amounts) multiplied by: (i) if the repayment occurs on or before April 15, 2023, 1.18, (ii) if the repayment occurs on or after April 16, 2023 but prior to May 16, 2023, 1.28667, (iii) if the repayment occurs on or after May 16, 2023 but prior to June 16, 2023, 1.39334, and (iv) if the repayment occurs on or after July 16, 2023, 1.5. The Second Amendment did not modify the exit fee applicable to the Original Term Loan.
- **Minimum Cash Requirement:** The Second Amendment revised the liquidity covenant and, due to topline results announced in March 2023 from the Company’s Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, which showed that ACER-801 was safe and well-tolerated but did not achieve statistical significance when evaluating ACER-801’s ability to decrease the frequency or severity of hot flashes in postmenopausal women, the Current SWK Credit Agreement now provides that the Company’s cash and cash equivalents balance minus the aggregate amount of any accounts payable which are unpaid more than 90 days beyond terms consistent with the Company’s practice must not be less than the lesser of (a) the outstanding principal amount of the SWK Loans, or (b) \$3.0 million (as opposed to \$1.5 million for clause (b) prior to the announcement of such topline results).
- **Amortization:** Due to topline results announced in March 2023 from the Company’s Phase 2a proof of concept clinical trial to evaluate ACER-801 as a potential treatment for moderate to severe VMS associated with menopause, the principal amount of the SWK Loans amortizes at a monthly rate of \$0.6 million starting April 15, 2023, until the Company has issued additional equity or subordinated debt resulting in net cash proceeds of not less than \$7.7 million (i.e., the sum of \$10.0 million less the net

proceeds from the March 2023 Offering), at which point the SWK Loans would revert to amortizing at a rate of \$1.3 million payable quarterly.

In connection with the execution of the Second Amendment, the Company issued to SWK an additional warrant (the “Third Warrant”) to purchase 250,000 shares of the Company’s common stock at an exercise price of \$2.39 per share. SWK may exercise the Third Warrant in accordance with the terms thereof for all or any part of such shares of common stock from the date of issuance until and including March 4, 2029.

On January 30, 2023, the Company entered into an Amendment Agreement (the “Marathon Amendment Agreement”) with Marathon and Marathon Fund (i.e., the Holders) with respect to the Marathon Convertible Notes.

Pursuant to the terms of the Marathon Amendment Agreement:

- Each Holder agrees to defer payment by the Company of accrued and unpaid interest on their respective Marathon Convertible Note existing on the date of the Marathon Amendment Agreement through March 31, 2023, with such deferred interest, together with any accrued and unpaid interest on each Marathon Convertible Note incurred after March 31, 2023, to be due and payable in cash by the Company on April 15, 2023.
- Each Marathon Convertible Note is amended with retroactive effect to delete the concept of a default rate of interest.
- Each Marathon Convertible Note is amended to obligate the Company to repurchase such Marathon Convertible Note, on or before the fifth (5th) business day (but with five (5) business days’ notice) following the earlier of June 15, 2023 or the Company’s receipt of gross proceeds of at least \$40.0 million from the issuance or sale of equity, debt and/or hybrid securities, loans or other financing on a cumulative basis since January 1, 2023 (excluding the Second Term Loan), at a price equal to 200% (the “Buy-Out Percentage”) of the outstanding principal amount of such Marathon Convertible Note, together with any accrued but unpaid interest thereon to the date of such repurchase; provided, that if the Company is prohibited from effectuating such repurchases pursuant to a subordination agreement with SWK, the Company shall cause the repurchase to occur on or before the fifth (5th) business day following the earlier of such prohibition being no longer applicable or the payment in full of all senior indebtedness described in such subordination agreement, but with five (5) business days’ notice; and provided, further, that if such repurchase has not occurred by April 15, 2023, the Buy-Out Percentage shall be increased by 2500 basis points for each 90-day period after April 15, 2023, pro-rated for the actual number of days elapsed in the 90-day period before repurchase actually occurs (for example, if the repurchase occurs on May 30, 2023, the Buy-Out Percentage shall be increased to 212.5%).

With respect to the Credit Agreement, dated as of March 4, 2022, as amended by the Extension Agreement dated as of December 30, 2022 (as so amended, the “Marathon Term Credit Agreement”), among the Company, the Lenders party thereto (the “Lenders”) and Marathon, not individually, but solely in its capacity as administrative and collateral agent for the Lenders (the “Administrative Agent”), which provided for a senior secured term loan facility in an aggregate amount of up to \$42.5 million in a single borrowing, the parties have entered into a Termination Agreement dated as of January 30, 2023 (the “Termination Agreement”). Pursuant to the Termination Agreement, the lending commitments of the Lenders are terminated without having been drawn upon, the Marathon Term Credit Agreement and all other loan documents entered into in connection therewith are terminated, and the Company agrees to pay the Administrative Agent a commitment fee of \$0.6 million (which was earned as a result of the recent approval by the FDA of OLPRUVA™ for oral suspension in the U.S. for the treatment of certain patients living with urea cycle disorders involving deficiencies of carbamylphosphate synthetase, ornithine transcarbamylase, or argininosuccinic acid synthetase) and certain legal costs on the date on which the repurchase of the Marathon Convertible Notes occurs pursuant to the Marathon Amendment Agreement.

Results from ACER-801 Phase 2a Trial

The Company announced on March 17, 2023, that topline results from its Phase 2a proof of concept clinical trial to evaluate ACER-801 (osanetant) as a potential treatment for moderate to severe Vasomotor Symptoms (VMS) associated with menopause showed that ACER-801 was safe and well-tolerated but did not achieve statistical

significance when evaluating ACER-801's ability to decrease the frequency or severity of hot flashes in postmenopausal women. As a result, the Company announced it is pausing the ACER-801 program until it has conducted a thorough review of the full data set.

Securities Purchase Agreement

On March 21, 2023, the Company entered into a securities purchase agreement (the "Purchase Agreement") with an institutional accredited investor (the "Purchaser") pursuant to which the Company agreed to issue and sell, (i) in a registered direct offering, an aggregate of 2,335,000 shares (the "Shares") of the Company's common stock, par value \$0.0001 per share ("Common Stock"), and pre-funded warrants to purchase up to 585,306 shares of Common Stock (the "Pre-Funded Warrants") at an exercise price of \$0.001 per share, and (ii) in a concurrent private placement, warrants to purchase up to 2,920,306 shares of Common Stock (the "Common Warrants") at an exercise price of \$0.791 per share. Such registered direct offering and concurrent private placement are referred to herein as the "March 2023 Offering." The combined purchase price for one Share and one Common Warrant was \$0.916, and the combined purchase price for one Pre-Funded Warrant and one Common Warrant was \$0.915. The March 2023 Offering was priced at-the-market under Nasdaq rules. The Company received aggregate gross proceeds from the Offering of approximately \$2.7 million before deducting the placement agent fee (as described in greater detail below) and related offering expenses, resulting in net proceeds of approximately \$2.3 million. The March 2023 Offering closed on March 24, 2023.

The Purchase Agreement contains customary representations and warranties and agreements of the Company and the Purchaser and customary indemnification rights and obligations of the parties. Pursuant to the terms of the Purchase Agreement and subject to certain exceptions, the Company has agreed to certain restrictions on the issuance and sale of its Common Stock or Common Stock Equivalents (as defined in the Purchase Agreement) during the 30-day period following the closing of the March 2023 Offering.

The Shares, the Pre-Funded Warrants and the shares of Common Stock issuable thereunder were offered by the Company pursuant to a registration statement on Form S-3 (File No. 333-261342), which was filed with the Securities and Exchange Commission (the "Commission") on November 24, 2021 and was declared effective by the Commission on December 7, 2021 (the "Registration Statement"), and a prospectus supplement dated as of March 21, 2023. With respect to the Company's amended and restated sales agreement dated March 18, 2020 (the "Sales Agreement"), with JonesTrading Institutional Services LLC and Roth Capital Partners, LLC (the "Agents") relating to the offer and sale of Common Stock having an aggregate offering price of up to \$50.0 million from time to time through or to the Agents acting as the Company's sales agent or principal, pursuant to which the Company has filed with the Commission several prospectus supplements to the base prospectus included with the Registration Statement (the "Prospectuses"), in connection with the March 2023 Offering, the Company filed with the Commission a further prospectus supplement to suspend the Sales Agreement and terminate the continuous offering by the Company under the Prospectuses.

The Common Warrants were offered in a private placement under Section 4(a)(2) of the Securities Act of 1933, as amended (the "Securities Act"), and, along with the shares of Common Stock underlying the Common Warrants, have not been registered under the Securities Act or applicable state securities laws.

The Pre-Funded Warrants were offered, in lieu of shares of Common Stock, to any Purchaser whose purchase of shares of Common Stock and Common Warrants in the Offering would otherwise result in such Purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at such Purchaser's option upon issuance, 9.99%) of the Company's outstanding Common Stock immediately following the consummation of the Offering. Each Pre-Funded Warrant represents the right to purchase shares of Common Stock at an exercise price of \$0.001 per share of Common Stock. The Pre-Funded Warrants are exercisable immediately and may be exercised at any time until the Pre-Funded Warrants are exercised in full, subject in each case to the beneficial ownership limitations set forth in the Pre-Funded Warrant.

Each Common Warrant represents the right to purchase shares of Common Stock at an exercise price of \$0.791 per share of Common Stock. The Common Warrants are exercisable immediately and have a term of five

and one-half years from the issuance date, subject in each case to the beneficial ownership limitations set forth in the form of Common Warrant.

The Company entered into an engagement letter with H.C. Wainwright & Co., LLC (“Wainwright”), pursuant to which Wainwright agreed to serve as the exclusive placement agent for the issuance and sale of securities of the Company pursuant to the Purchase Agreement. As compensation for such placement agent services, the Company has agreed to pay Wainwright a total cash fee equal to 7.5% of the aggregate gross proceeds of the Offering; a non-accountable expense allowance of \$70,000 and clearing fees of \$15,950. The Company has also granted Wainwright a right of first refusal for a period of six months following the closing of the Offering to act as sole book-running manager, sole underwriter or sole placement agent for any public or private placement or other capital-raising financing, subject to certain exceptions.

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

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed by us in the reports that we file or submit to the SEC under the Securities Exchange Act of 1934, as amended, is recorded, processed, summarized, and reported within the time periods specified by the SEC's rules and forms, and that information is accumulated and communicated to our management, including our Principal Executive Officer and Principal Financial Officer (to whom we refer in this periodic report as our Certifying Officers), as appropriate to allow timely decisions regarding required disclosure.

Our management, with the participation of our Certifying Officers, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022, pursuant to Rule 13a-15(b) under the Securities Exchange Act. Based upon that evaluation, our Certifying Officers concluded that, due to the material weakness described below, our disclosure controls and procedures were not effective as December 31, 2022.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of our management, including our Certifying Officers, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”). Based on our evaluation under the framework in Internal Control – Integrated Framework issued by COSO, our management concluded that our internal control over financial reporting was not effective as of December 31, 2022 in providing reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles due to the material weakness identified below with respect to earnings per share.

This annual report does not include an attestation report of our registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our registered public accounting firm pursuant to the rules of the SEC that permit us to provide only management's report in this annual report.

Material Weaknesses in Internal Control over Financial Reporting

A material weakness is defined as a deficiency or combination of deficiencies in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis.

We identified a material weakness in our internal controls over financial reporting as of December 31, 2022, as follows:

- We did not design or maintain procedures or controls to accurately apply ASC 260, Earnings Per Share. Specifically, that our accounting policies and procedures for calculating earnings per share under the fair value option method did not consider dilutive impacts related to changes in fair value of debt instruments. This material weakness resulted in a restatement in our form 10-Q/A for the period ended June 30, 2022, and is further described in Part I, Item 1, Note 10 “Net Loss Per Share,” to the unaudited condensed interim financial statements included in such Form 10-Q/A.

Remediation of Previously Identified Material Weakness

We previously identified and disclosed in our December 31, 2021 10-K a material weakness related to deficiencies in the design and operating effectiveness of controls over complex and nonrecurring transactions. Specifically, our internal controls were not designed appropriately to include all necessary reviews of assumptions, estimates, and computations related to nonrecurring and complex transactions.

During 2022, we implemented the following changes to our processes to improve our internal controls over financial reporting with respect to complex and nonrecurring transactions.

- Enhanced the design of our review procedures and controls with respect to accounting for any new complex transactions, as well as the periodic evaluation of ongoing activities that would give rise to any complex or nonrecurring transaction accounting and disclosures.
- Implemented additional review procedures with respect to accounting under ASC 808 and ASC 606 to ensure our accounting will continue to be in accordance with that guidance on an ongoing basis.
- Implemented additional identification, accounting, and review controls with respect to complex and nonrecurring transactions, as well as augmentation of existing staff with internal and external skilled accounting resources, as appropriate, to strengthen the quality and accuracy of our review.

These actions resulted in an improved internal control environment that was in place for a period of time to allow for our management to conclude, based on evidence obtained in validating the design and operating effectiveness of these controls, that we have fully remediated the material weakness related to complex and nonrecurring transactions as of December 31, 2022.

Remediation Activities and Status of Remaining Material Weakness

We have implemented additional controls, review procedures, and training to enhance our accounting for earnings per share calculations, specifically:

- Clarified our internal documentation and revised our accounting position to appropriately consider the impact of diluted earnings per share calculations related to an instrument recorded as an asset or liability at fair value with changes in fair value recorded through earnings.
- Designed discrete controls over the calculation and presentation of earnings per share into a separate set of control activities with proper review, to ensure the appropriate level of accuracy and precision is applied to every potential common share appropriately.

We are committed to maintaining a strong internal control environment and implementing measures designed to help ensure that any material weakness are remediated as soon as possible. We believe we have made progress towards remediation and continue to implement our remediation plan for the current material weakness in internal control over financial reporting, which includes steps to continuously improve our reporting processes and procedures, and design and implement new controls. We will consider the material weakness remediated after the applicable controls operate for a sufficient period of time, and management has concluded, through testing, that the controls are operating effectively.

Changes in Internal Control over Financial Reporting

Other than implementing the remediation plan(s) as referenced above, and any incremental review, there have been no changes in our internal control over financial reporting during the quarter ended December 31, 2022 that have 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.

Executive Officers

The names of our executive officers and their ages as of March 1, 2023 are as follows:

Name	Age	Position
Chris Schelling	47	President, Chief Executive Officer and Director
Jefferson E. Davis	56	Chief Business Officer
Tanya Hayden	43	Chief Operating Officer
Donald R. Joseph	68	Chief Legal Officer and Secretary
John M. Klopp	48	Chief Technical Officer
Harry S. Palmin	53	Chief Financial Officer
Bernie Paul	64	Chief People Officer
Adrian Quartel	56	Chief Medical Officer

Biographical information for our executive officers is set forth below:

Chris Schelling has served as a director and as our President and Chief Executive Officer since the completion of the 2017 merger of Opexa Therapeutics, Inc. (“Opexa”) (Nasdaq: OPXA), a biotechnology company, and private Acer. Mr. Schelling founded private Acer Therapeutics Inc. in December 2013 and served as a director from that time until the 2017 merger. From December 2013 to February 2016, he served as private Acer’s Chief Operating Officer, and from February 2016 until the Merger, he served as private Acer’s President and Chief Executive Officer. Prior to founding private Acer, he served as Executive Director of Strategic Marketing at BioMarin Pharmaceutical Inc. (“BioMarin”) (Nasdaq: BMRN), a Nasdaq-listed biotechnology company, from May 2006 to October 2012. Mr. Schelling also founded Censa Pharmaceuticals Inc. (“Censa”), a biopharmaceutical company, in 2015 and served as a director until the acquisition by PTC Therapeutics Inc., a biopharmaceutical company, in May 2020. He has also served as a director at Cascade Prodrug, Inc., a developer of chemotherapy technology, since June 2017. He has also held roles at Abgenix, Inc. (“Abgenix”), a biopharmaceutical company, Cell Therapeutics, Inc. (“Cell Therapeutics”) (Nasdaq: CTIC), a company that focuses on development, acquisition, and commercialization of drugs for the treatment of cancer, Stanford Research Institute Consulting, a non-profit research institute, and Organon & Co. (NYSE: OGN), a pharmaceutical company. Mr. Schelling earned B.A. degrees in biology and history from Carroll College.

Jefferson E. Davis was appointed as our Chief Business Officer in February 2021. He previously served as our head of corporate development from July 2020 to January 2021 and as Acting Chief Business Officer of private Acer and then public Acer from December 2013 to October 2018. He served as Vice President of Corporate Development for Censa from November 2019 until its acquisition by PTC Therapeutics Inc. (Nasdaq: PTCT), a pharmaceutical company, in May 2020, and as a consultant from May 2015 to November 2019. Mr. Davis was employed by Extera Partners, an advisory and new venture creation firm in the life science industry, from April 2011 to July 2020, having served as a Partner from October 2014. In addition, he held senior business and corporate development roles at Genzyme Corporation, a biotechnology company, from January 2006 to May 2011, Archemix, a biotechnology company, from December 2003 to January 2006, ImmunoGen, Inc., (Nasdaq: IMGN), a biotechnology company, from October 2001 to December 2003, GenVec, Inc., a biotechnology company, from March 1998 to November 2001, and Eli Lilly and Company (NYSE: LLY), a pharmaceutical company, from March 1996 to February 1998. Mr. Davis earned a B.S. in biochemistry from North Carolina State University and an M.B.A. from Duke University.

Tanya Hayden was appointed as our Chief Operating Officer in June 2022. She previously served as our Vice President of Program and Strategic Alliance Management from June 2021 to June 2022. Prior to joining the Company, Ms. Hayden served as the Director of Operational Excellence at Lonza Group Ltd., a biotechnology research company, from April 2018 to June 2021, and as Director, Value Chain Management from November 2018 to May 2021. Prior to that, she served most recently as Vice President of Manufacturing at Bend Research Inc. –

Capsugel, a pharmaceutical manufacturing company, from January 2014 to April 2018. Ms. Hayden received a B.S. degree in Chemistry from Gonzaga University.

Donald R. Joseph has served as our Chief Legal Officer and Secretary since April 2018. He previously served as an advisor and consultant to biopharmaceutical and global health organizations. He has over twenty years of biopharmaceutical industry experience, including senior management positions in global health non-profit organizations. Mr. Joseph served as Chief Legal Officer and Board Secretary of Humanigen, Inc. (“Humanigen”) (Nasdaq: HGEN) (previously known as KaloBios Pharmaceuticals, Inc.), a biopharmaceutical company, from June 2013 to November 2015. Prior to Humanigen, he was Chief Executive Officer of BIO Ventures for Global Health (“BVGH”), from February to November 2012 and Chief Operating Officer from April 2010 to January 2012. He is a former Chairman and Secretary and former member of the BVGH Board of Directors. He previously served as General Counsel, Corporate Secretary, and in other senior management roles at publicly held biopharmaceutical companies, including Abgenix from January 2005 to March 2006 and Renovis, Inc., a biopharmaceutical company, from May 2006 to December 2006. Mr. Joseph has served since August 2017 as lead independent director of Achieve Life Sciences, Inc. (Nasdaq: ACHV), a pharmaceutical company. Before entering the life sciences industry, Mr. Joseph practiced business law for a number of years in major firms, including as an international partner at Baker & McKenzie. He received his J.D. degree from the University of Texas School of Law, with honors.

John M. Klopp has served as our Chief Technical Officer since September 2019. He previously served as our Vice President, Manufacturing from January 2018 to September 2019. Prior to joining Acer, Mr. Klopp served as Senior Director, Manufacturing Management for Ultragenyx Pharmaceutical Inc. (Nasdaq: RARE), a biopharmaceutical company, where he worked from March 2013 to January 2018. Mr. Klopp holds a B.S. degree in chemistry from Pennsylvania State University and an M.S. in chemistry from the University of California, Berkeley.

Harry S. Palmin has served as our Chief Financial Officer since the completion of the 2017 merger of Opexa and private Acer and was appointed to the additional position of Chief Operating Officer from September 2018 to June 2022. From December 2013 to February 2016, Mr. Palmin served as the President, Chief Executive Officer and a director of private Acer, and from February 2016 to September 2017 he served as private Acer’s acting Chief Financial Officer. Prior to joining private Acer, he served in a variety of roles at Novelos Therapeutics, Inc., a pharmaceutical company, including as President and director from 1998 to October 2013, Chief Executive Officer from January 2005 to October 2013 and acting Chief Financial Officer from 1998 to September 2005. He has also held roles at Lehman Brothers and Morgan Stanley. Mr. Palmin earned a B.A. in economics from Brandeis University and an M.A. in international economics and finance from the Brandeis University International Business School.

Bernie Paul was appointed as our Chief People Officer in January 2022. He previously served as our Vice President, Human Resources from May 2019 to January 2021. Prior to joining Acer, Mr. Paul served as an advisor and consultant to various corporations from December 2017 to May 2019. Mr. Paul served as Vice President of Human Resources at Clarisonic, Inc., a skin care device production company, (acquired by L’Oréal Inc.) from June 2011 to December 2017. Earlier in his career, he served as Vice President Human Resources at Trubion Pharmaceuticals, Inc., a biopharmaceutical company, (acquired by Emergent BioSolutions Inc. (NYSE: EBS)) from May 2006 to March 2011 and as Vice President of Human Resources at Corixa Corporation, a biotechnology company, (acquired by GSK plc (NYSE: GSK)) from March 1995 to February 2006. Mr. Paul earned a B.S. in Education from Montana State University at Billings and an M.S. in Education from the State University of New York at Buffalo.

Adrian Quartel was appointed as our Chief Medical Officer in February 2022. He previously oversaw all scientific and medical functions as Chief Medical Officer at Adamas Pharmaceuticals, Inc., a biotechnology company, from September 2020 to February 2022. From June 2017 to September 2020, he served as the Group Vice President, Global Medical Affairs at BioMarin. Prior to BioMarin, Dr. Quartel held senior medical leadership roles where he was responsible for clinical development, pharmacovigilance, and medical affairs at Astellas Pharma Inc. from January 2004 to September 2006, at Chiltern, a specialist contract research organization, from September 2006 to July 2007, and at ICON plc (Nasdaq: ICLR), a clinical research organization, from August 2001 to January 2004. Earlier in his career, Dr. Quartel worked as a clinical research fellow at UCLA Cedar Sinai and as a resident in cardio-thoracic surgery at Erasmus University Medical Center. Dr. Quartel received an M.D. from Erasmus University Medical School, Rotterdam, in the Netherlands, and a post graduate specialization in pharmaceutical

medicine from the Faculty of Pharmaceutical Medicine in London. He is board certified by the General Medical Council (GMC) in pharmaceutical medicine in the United Kingdom.

Directors

All of the current directors serve until the next annual stockholders' meeting or until their successors have been duly elected and qualified. The current members of the Board of Directors and their ages as of March 1, 2023 are as follows:

Name	Age	Position
Stephen J. Aselage	71	Chairman of the Board
Jason Amello	54	Director
John M. Dunn	71	Director
Michelle Griffin	57	Director
Chris Schelling	47	Director, President and Chief Executive Officer

Biographical information for our directors is set forth below:

Stephen J. Aselage has served as Chairman of the Board since the completion of the 2017 merger of Opexa and private Acer. From October 2015 until the merger, Mr. Aselage served as the Chairman of private Acer's Board of Directors. Most recently, he was the Chief Executive Officer of Traver Therapeutics, Inc. ("Traver Therapeutics") (formerly known as Retrophin, Inc.) (Nasdaq: TVTX), a biopharmaceutical company, from November 2014 until his retirement in January 2019 and a member of its board of directors from October 2012 to May 2022. From May 2014 to November 2014, Mr. Aselage served as the Chief Operations Officer and interim Chief Executive Officer of Traver Therapeutics. Prior to joining Traver Therapeutics, he held a variety of roles at BioMarin as Executive Vice President and Chief Business Officer from December 2009 to September 2012 and Senior Vice President of Global Commercial Development from July 2005 to December 2009. He has also held leadership roles at Cell Therapeutics, SangStat Medical Corporation, a biotechnology company, Advanced Tissue Sciences, Inc., a leading tissue engineering company, and Genentech, Inc., a biotechnology company. Mr. Aselage earned a B.S. in biology from the University of Notre Dame. Mr. Aselage currently serves on the Advisory Council for the Department of Science at the University of Notre Dame and also serves on the board of directors at BioCryst Pharmaceuticals, Inc. (Nasdaq: BCRX), a pharmaceutical company, since January 2019, and at Acuitas Therapeutics, Inc., a biotechnology company. We believe that Mr. Aselage is qualified to serve on our Board due to his extensive experience in the pharmaceuticals and biotechnology industry, which will enable him to contribute important insights to our Board on strategic leadership and drug commercialization matters.

Jason Amello has served as a director since the completion of the 2017 merger of Opexa and private Acer. Since September 2022, Mr. Amello has served as Chief Financial Officer of Candel Therapeutics, Inc. (Nasdaq: CADL), a biopharmaceutical company. From September 2020 to September 2022, Mr. Amello served as Chief Financial Officer of Saniona AB, a rare disease biopharmaceutical company. From September 2013 to August 2020, he served as Senior Vice President, Chief Financial Officer and Treasurer of Akebia Therapeutics, Inc. (Nasdaq: AKBA), a biopharmaceutical company. From May 2012 to May 2013, Mr. Amello served as Executive Vice President, Chief Financial Officer and Treasurer of ZIOPHARM Oncology, Inc., a biopharmaceutical company. From April 2000 to June 2011, he held various positions at Genzyme Corporation, a then Nasdaq-listed biotechnology company, most recently, from December 2008 to June 2011, as Senior Vice President, Corporate Controller, and Chief Accounting Officer. Earlier in his career, Mr. Amello spent ten years in the business advisory and assurance practice of Deloitte Touche Tohmatsu Limited, serving in various roles of increasing responsibility through Senior Manager. He currently serves on the board of directors of the New England Baptist Hospital, an orthopedic specialty hospital. Mr. Amello earned a B.A. in accounting from Boston College and is a Certified Public Accountant in the Commonwealth of Massachusetts. We believe that Mr. Amello is qualified to serve on our Board due to his extensive experience in finance related to managing life sciences companies, which will enable him to contribute important insights to our Board on financial matters toward the continued growth and expansion of Acer.

John M. Dunn has served as a director since the completion of the 2017 merger of Opexa and private Acer. From October 2015 until the merger, Mr. Dunn served as a member of private Acer's Board of Directors. Since April 2021, Mr. Dunn has served as General Counsel for CalciMedica Inc., a biotechnology company. From April 2019 to April 2021, he worked as a consultant in the life sciences industry. From November 2014 to April 2019, he served as General Counsel of Vital Therapies, Inc. ("Vital Therapies"), now Immunic, Inc. (Nasdaq: IMUX), a biotherapeutic company. Prior to joining Vital Therapies, Mr. Dunn was a consultant from February 2012 to November 2014, an Executive Vice President of Biogen Idec, Inc., now Biogen Inc. ("Biogen") (Nasdaq: BIIB), a biotechnology company, from November 2003 to January 2012, where he was the head of that firm's corporate venture group, and General Counsel of IDEC Pharmaceuticals from 2002 until its merger with Biogen in November 2003. Mr. Dunn has served as a director of Sharp HealthCare, a nonprofit regional health care delivery system, since 2019. Mr. Dunn earned a B.S. in finance and a J.D. from the University of Wyoming. We believe that Mr. Dunn is qualified to serve on our Board as a result of his deep experience relating to corporate governance and regulatory and financing matters in the pharmaceuticals and biotechnology industry, which will enable him to contribute important strategic insights to our Board.

Michelle Griffin has served as a director since the completion of the 2017 merger of Opexa and private Acer. Ms. Griffin serves as a member of the board of directors and as Chair of the audit committees for Chinook Therapeutics, Inc. (Nasdaq: KDNY), a biotechnology company, since October 2020, Adaptive Biotechnologies Corporation (Nasdaq: ADPT), a biotechnology company, since March 2019. She has also served as a director for HTG Molecular Diagnostics, Inc. (Nasdaq: HTGM), a life sciences company since August 2018 and serves as a member of its audit and compensation committees. From 2013 to 2020, Ms. Griffin served as the Principal of Pacific Biotechnology Consulting Group, a firm providing consulting services to biotechnology companies and their boards of directors. Ms. Griffin previously served as a member of the board of directors and as Chair of the audit committee for then publicly traded companies PhaseRx, Inc., a biotechnology company, from 2016 until its acquisition by Roivant Sciences GmbH (Nasdaq: ROIV), a healthcare company, in 2018, OncoGenex Pharmaceuticals, Inc. ("OncoGenex Pharmaceuticals"), a biopharmaceutical company, from 2008 to 2011, and Sonus Pharmaceuticals, Inc., a biotechnology company, (subsequently acquired by OncoGenex) from 2004 to 2008. Ms. Griffin served from January 2011 to March 2013 as Executive Vice President, Operations and Chief Financial Officer of OncoGenex Pharmaceuticals. During various periods from 1997 to 2011, she served in the capacity of Chief Financial Officer for Trubion Pharmaceuticals, Inc., a biopharmaceutical company, Dendreon Corporation, a biotechnology company, and Corixa Corporation, a biotechnology and pharmaceutical company. Ms. Griffin earned a B.S. in marketing from George Mason University and an M.B.A. with a specialization in finance and international business from Seattle University. We believe that Ms. Griffin is qualified to serve on our Board as a result of her extensive operational experience in the biotechnology industry and deep experience in public company financial matters, which will enable her to contribute important insights to our Board on drug development and financial matters.

Chris Schelling. Refer to "Executive Officers" section above for Mr. Schelling's biographical information. We believe that Mr. Schelling's role in the founding of Acer, his experience as Acer's Chief Executive Officer and his experience in the biotechnology industry qualify him to serve on our Board.

Audit Committee

The Company has a separately designated standing Audit Committee established in accordance with section 3(a)(58)(A) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). The Audit Committee of the Board currently consists of Mr. Amello (chair), Mr. Dunn, and Ms. Griffin, each of whom is an independent, non-employee director. The Audit Committee selects, on behalf of our Board of Directors, an independent public accounting firm to audit our financial statements, discusses with the independent auditors their independence, reviews and discusses the audited financial statements with the independent auditors and management, recommends to our Board of Directors whether the audited financials should be included in our annual reports to be filed with the SEC, and oversees management's identification, evaluation, and mitigation of major risks to the Company. The Audit Committee operates pursuant to a written charter. During the last fiscal year, the Audit Committee held six meetings.

All of the members of the Audit Committee are non-employee directors who: (1) met the criteria for independence as required by Nasdaq listing standards and as set forth in Rule 10A-3(b)(1) under the Exchange Act; (2) did not participate in preparation of our financial statements during the past three years; and (3) are able to read and understand fundamental financial statements, including a balance sheet, income statement, and cash flow

statement. The Board of Directors has determined that Ms. Griffin and Messrs. Amello and Dunn each, individually, qualifies as an “audit committee financial expert” as defined in Securities and Exchange Commission (“SEC”) rules and regulations and also possesses the financial sophistication and requisite experience as required under Nasdaq listing standards.

Code of Ethics

In accordance with SEC rules, the Audit Committee and the Board of Directors has adopted a Policy on Whistleblower Protection and Code of Ethics which is applicable to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions, which we sometimes refer to as our senior financial officers. The Board of Directors believes that these individuals must set an exemplary standard of conduct, particularly in the areas of accounting, internal accounting control, auditing and finance. This Code of Ethics sets forth ethical standards to which the designated officers must adhere and other aspects of accounting, auditing and financial compliance. The Code of Ethics is available free of charge on our website at www.acertx.com. Please note that the information contained on our website is not incorporated by reference in, or considered to be a part of, this report.

Delinquent Section 16(a) Reports

Section 16(a) of the Exchange Act requires our executive officers and directors, and persons who own more than 10% of a registered class of our equity securities, to file reports of ownership on Forms 3, 4 and 5 with the SEC. These persons are required to furnish us with copies of all Forms 3, 4 and 5 they file. Based solely on our review of the copies of such forms we have received and written representations from certain reporting persons that they filed all required reports, we believe that all of our executive officers, directors and greater than 10% stockholders complied on a timely basis with all Section 16(a) filing requirements applicable to them with respect to transactions during 2022 except as follows: Mr. Paul filed a Form 4 on January 21, 2022 with respect to an acquisition that was required to be filed by January 19, 2022.

Item 11. Executive Compensation.

Executive Officer Compensation

The following table sets forth certain information concerning compensation earned by or paid to certain persons who we refer to as our “Named Executive Officers” for services provided for the fiscal years ended December 31, 2022 and 2021.

2022 Summary Compensation Table

Name and Principal Position	Year	Salary(\$)	Bonus(\$) ⁽¹⁾	Option Awards(\$) ⁽²⁾	All Other Compensation(\$)	Total(\$)
Chris Schelling	2022	\$ 500,015	\$ 239,800	\$ 94,465 ⁽³⁾	\$ —	\$ 834,280
<i>President and Chief Executive Officer</i>	2021	\$ 436,000	\$ —	\$ 116,236 ⁽³⁾	\$ —	\$ 552,236
Harry S. Palmin	2022	\$ 392,400	\$ 152,960	\$ 47,233 ⁽³⁾	\$ —	\$ 592,593
<i>Chief Financial Officer</i>	2021	\$ 382,400	\$ —	\$ 174,354 ⁽³⁾	\$ —	\$ 556,754
Adrian Quartel ⁽³⁾	2022	\$ 365,064	\$ —	\$ 435,980 ⁽³⁾	\$ —	\$ 801,044
<i>Chief Medical Officer</i>						

- (1) The Company awarded and communicated discretionary bonuses as of March 31, 2022; however, (i) payment was delayed subject to attainment of adequate funding (as determined in the discretion of the Board of Directors) and the recipient's continued employment through the payment date, and (ii) payment has not yet occurred as of the date of this report.
- (2) Amounts shown in this column represent the aggregate grant date fair value of awards made during the years presented, calculated in accordance with Accounting Standards Codification ("ASC") Topic 718. See Note 2 to our financial statements appearing elsewhere in this report for a discussion of the relevant assumptions used in calculating these amounts.
- (3) Dr. Quartel has served as Chief Medical Officer since February 21, 2022.

Narrative Disclosure to Summary Compensation Table

Our Board of Directors reviews compensation annually for all of the executive officers. Compensation awarded to Named Executive Officers in 2022 and 2021 generally consisted of base salary, discretionary cash bonuses, and equity awards for options to purchase shares of our common stock. In setting executive compensation, our Board of Directors previously retained the services of Radford (which is a part of Aon Hewitt, a business unit of Aon plc) as an independent compensation consultant and considered compensation for comparable positions in the market, the historical compensation levels of the executives, individual performance as compared to its expectations and objectives, the desire to motivate employees to achieve short- and long-term results that are in the best interests of our stockholders, and a long-term commitment to our company. We do not target a specific competitive position or a specific mix of compensation among elements of compensation. In reviewing the reports prepared by Radford, our Compensation Committee considered the independence of Radford pursuant to SEC rules and the corporate governance rules of the Nasdaq Capital Market and concluded that no conflict of interest exists that would prevent Radford from independently advising the Compensation Committee.

On February 22, 2018, we entered into an employment agreement with each of Messrs. Schelling and Palmin, and on February 21, 2022, we entered into an employment agreement with Dr. Quartel. The terms and conditions of such employment agreements are described below and are identical for each executive officer, other than in respect of each individual's title, duties, salary and target bonus percentage as set forth below.

Pursuant to each individual's employment agreement, each executive is compensated at an annual base rate and is eligible to receive an annual discretionary cash bonus of up to a target bonus percentage of his base salary (i.e., 55% for Mr. Schelling and 40% for each of the other executive officers) per 12-month period, based upon the achievement of corporate objectives established from time to time by our Board of Directors, and subject to review and adjustment from time to time as determined by the Board. In addition, each executive receives our standard benefits and insurance coverage as generally provided to our employees. Each executive's employment is at-will and he serves as an executive officer at the discretion of our Board of Directors.

In the event the executive's employment is terminated by us without Cause (as defined in the agreement) or due to a Constructive Termination (as defined in the agreement), in each instance during the period commencing one month prior to a Change in Control (as defined in the agreement) and terminating 12 months after such Change in Control, the executive will be entitled to (i) a payment, less applicable taxes and withholdings, equal to his then-current base salary for a period of 12 months plus (ii) 1x times his annual discretionary target bonus calculated for such period. In the event the executive's employment is terminated by us without Cause or due to a Constructive Termination occurring outside of a Change in Control Period (as defined in the agreement), the executive will be entitled to a payment, less applicable taxes and withholdings, equal to his then-current base salary for a period of 12 months. The executive would receive any such payment in the form of a lump sum 60 days following such termination of employment. In addition, whether in the context of a Change in Control or otherwise, (x) if the executive elects to continue his health insurance coverage under COBRA, then we will reimburse the executive for the same portion of the executive's monthly premium over such 12-month period as we are then paying for health insurance coverage for active employees, and (y) to the extent not otherwise addressed by any equity-based compensation arrangements, the executive will be entitled to 12 months of credited vesting beyond the employment termination date for any outstanding equity-based awards. The severance benefits are subject to the executive having been continuously employed through the termination event as well as executing and delivering a general release and

waiver of claims in favor of us. The timing of any payments to the executive under the employment agreement are subject to applicable requirements of Section 409A of the Internal Revenue Code of 1986 and the related Treasury Regulations and may be delayed or reformed to comply with such provisions. In the event any payment or benefit the executive might be entitled to receive would constitute a “parachute payment” under Section 280G of the Internal Revenue Code, such payment or benefit will be reduced so as not to trigger excise tax under Section 4999 of such Code.

2022 Outstanding Equity Awards at Fiscal Year-End

The following table presents information regarding outstanding equity awards at December 31, 2022 for each of the Named Executive Officers.

Name	Grant Date	Option Awards			
		Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date
Chris Schelling	1/14/22	—	50,000 ⁽¹⁾	\$ 2.21	1/14/32
	1/15/21	17,500	22,500 ⁽¹⁾	\$ 3.85	1/15/31
	2/1/19	67,966	4,534 ⁽¹⁾	\$ 24.46	2/1/29
Harry S. Palmin	10/4/17	46,000	— ⁽¹⁾	\$ 15.34	10/4/27
	1/14/22	—	25,000 ⁽¹⁾	\$ 2.21	1/14/32
	1/15/21	26,250	33,750 ⁽¹⁾	\$ 3.85	1/15/31
	9/18/19	40,000 ⁽²⁾	—	\$ 3.42	9/18/29
Adrian Quartel	2/1/19	25,318	1,682 ⁽¹⁾	\$ 24.46	2/1/29
	10/4/17	67,600	— ⁽¹⁾	\$ 15.34	10/4/27
	2/21/22	—	200,000 ⁽¹⁾	\$ 2.55	2/21/32

(1) The options vest over a four-year period, with 25% of the shares vesting on the one-year anniversary of the grant date and the remaining shares vesting quarterly over the remaining three-year period, assuming continued service. The options will accelerate and become fully vested immediately prior to a Change in Control (as defined in our 2010 Stock Incentive Plan and our 2018 Stock Incentive Plan, as applicable), but only to the extent that the optionee remains in service immediately prior to such Change in Control.

(2) This option became fully vested on January 1, 2022.

2022 Director Compensation

The following table presents summary information regarding compensation of the non-employee members of our Board of Directors who served during any part of the fiscal year ended December 31, 2022.

Name	Fees Earned or Paid in Cash (\$)	Option Awards (\$) (1)(2)	All Other Compensation (\$)	Total (\$)
Jason Amello	48,125	34,952	—	83,077
Stephen J. Aselage	70,000	34,952	—	104,952
John M. Dunn	50,000	34,952	—	84,952
Michelle Griffin	53,125	34,952	—	88,077

(1) Amounts shown in this column represent the aggregate grant date fair value of stock option awards made during 2020, calculated in accordance with ASC Topic 718. See Note 2 to our financial statements appearing elsewhere in this report for a discussion of the relevant assumptions used in calculating these amounts.

(2) The aggregate number of shares underlying outstanding option awards as of December 31, 2022 was: Mr. Amello, 57,500 shares; Mr. Aselage, 75,500 shares; Mr. Dunn, 70,500 shares; and Ms. Griffin, 57,500 shares.

Standard Compensation Arrangements

Independent directors receive compensation for their service on our Board of Directors that consists of cash compensation and equity awards as described below. A director who is also our employee does not receive any additional compensation for services as a member of our Board of Directors. We reimburse our directors for travel and lodging expenses in connection with their attendance at Board of Directors and committee meetings. Our standard annual compensation arrangements consist of the following:

Board Member Cash Compensation:

- Annual Board member retainer – \$35,000
- Additional non-executive Board Chair retainer – \$25,000

Additional Committee Chair Cash Compensation:

- Audit – \$15,000
- Compensation – \$10,000
- Nominating/Governance – \$7,500

Additional Committee Member Cash Compensation:

- Audit – \$7,500
- Compensation – \$5,000
- Nominating/Governance – \$3,750

Board Member Equity Compensation:

- Initial stock option award to newly-appointed directors – 9,000 shares, vesting quarterly over a three-year period from the date of grant, with vesting to accelerate immediately prior to a Change in Control (as defined in our 2018 Stock Incentive Plan).
- Annual stock option award – 18,500 shares, vesting on the one-year anniversary from the date of grant, with vesting to accelerate immediately prior to a Change in Control (as defined in our 2018 Stock Incentive Plan).

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

The following table sets forth, as of March 1, 2023, the number and percentage of outstanding shares of our common stock beneficially owned by: (a) each person who is known by us to be the beneficial owner of more than 5% of our outstanding shares of common stock; (b) each of our directors; (c) our Named Executive Officers; and (d) all current directors and executive officers as a group. As of March 1, 2023, there were 21,086,534 shares of common stock issued and outstanding.

Beneficial ownership has been determined in accordance with Rule 13d-3 under the Exchange Act. Under this rule, certain shares may be deemed to be beneficially owned by more than one person (if, for example, persons share the power to vote or the power to dispose of the shares). In addition, shares are deemed to be beneficially owned by a person if the person has the right to acquire shares (for example, upon exercise of an option or warrant) within 60 days of the date as of which the information is provided. In computing the percentage ownership of any person, the number of shares is deemed to include the number of shares beneficially owned by such person by reason of such acquisition rights. As a result, the percentage of outstanding shares of any person as shown in the following table does not necessarily reflect the person's actual voting power at any particular date.

To our knowledge, except as indicated in the footnotes to this table and pursuant to applicable community property laws, the persons named in the table have sole voting and investment power with respect to all shares of common stock shown as beneficially owned by them.

Beneficial Ownership Table

Name and Address of Beneficial Owner ⁽¹⁾	Number of Shares Owned	Percentage of Class
5% Stockholders (excluding Executive Officers and Directors):		
Funds affiliated with TVM Capital Life Science	2,672,309 ⁽²⁾	12.7%
Nantahala Capital Management, LLC	1,226,191 ⁽³⁾	5.8%
Executive Officers and Directors:		
Chris Schelling	2,869,154 ⁽⁴⁾	13.5%
Harry S. Palmin	301,162 ⁽⁵⁾	1.4%
Adrian Quartel	50,000 ⁽⁶⁾	*
Jason Amello	57,500 ⁽⁷⁾	*
Stephen J. Aselage	559,241 ⁽⁸⁾	2.60%
John M. Dunn	97,880 ⁽⁹⁾	*
Michelle Griffin	57,500 ⁽¹⁰⁾	*
All current directors and executive officers as a group (12 persons)	4,496,520 ⁽¹¹⁾	20.3%

* Less than 1%

- (1) Unless otherwise indicated in the footnotes, the mailing address of the beneficial owner is c/o Acer Therapeutics Inc., One Gateway Center, Suite 356, 300 Washington Street, Newton, Massachusetts 02458.
- (2) This information is based on Amendment No. 1 to Schedule 13D filed with the SEC on August 24, 2018. Consisting of shares of common stock beneficially owned by certain investment funds affiliated with TVM Capital Life Science as follows: (i) 1,697,709 shares of common stock held by TVM Life Science Ventures VII L.P. (“TVM VII LP”); (ii) 725,844 shares of common stock held by TVM Life Science Ventures VI GmbH & Co. KG (“TVM VI German”); and (iii) 248,756 shares of common stock held by TVM Life Science Ventures VI L.P. (“TVM VI Cayman”). With respect to the shares held by TVM VII LP, TVM LSV VII (GP) Ltd. (“TVM VII GP”) is the general partner of TVM VII LP. Luc Marengere, Reshenth Beeby, Gary Leatt, Hubert Birner, Stefan Fischer and Helmut Schühlsler are members of the investment committee of TVM VII GP, which has voting and investment power with respect to these shares, and may be deemed to beneficially own such shares. TVM VII GP and Messrs. Birner, Fischer, Schühlsler, Marengere, and Leatt and Ms. Beeby each disclaim beneficial ownership of the reported securities, other than those shares which the reporting person owns of record. The address of TVM VII LP is 204, Rue Notre-Dame Ouest, Bureau 350, Montreal A8 H2Y 1TE, Canada. With respect to the shares held by TVM VI German, Messrs. Birner, Fischer and Schühlsler are members of the investment committee of TVM Life Science Ventures Management VI L.P. (“TVM VI Management”), which is the managing limited partner of TVM VI German with voting and dispositive power over the shares held by TVM VI German, and may be deemed to beneficially own such shares. TVM VI Management and Messrs. Birner, Fischer and Schühlsler each disclaim beneficial ownership of the shares held by TVM VI German, other than those shares which the reporting person owns of record. The address of TVM VI German is Ottostrasse 4, 80333 Munich, Germany. With respect to the shares held by TVM VI Cayman, Messrs. Birner, Schühlsler and Fisher are members of the investment committee of TVM VI Management, which is the managing limited partner of TVM VI Cayman with voting and dispositive power over the shares held by TVM VI Cayman, and may be deemed to beneficially own such shares. TVM VI Management and Messrs. Birner, Schühlsler and Fischer each disclaim beneficial ownership of the shares held by TVM VI Cayman, other than those shares which the reporting persons owns of record. The address of TVM VI Cayman is Ottostrasse 4, 80333 Munich, Germany.
- (3) This information is based on a Schedule 13G/A filed with the SEC on February 14, 2023. Pursuant to the Schedule 13G, Nantahala Capital Management, LLC (“Nantahala”) and each of Wilmot B. Harkey and Daniel Mack, as managing members of Nantahala, share voting and investment power with respect to the shares, which are held by funds and separately managed accounts under control of Nantahala. The address for Nantahala and Messrs. Harkey and Mack is 130 Main Street, 2nd Floor, New Canaan, Connecticut 06840.
- (4) Consisting of (i) 2,712,529 shares of common stock; and (ii) 156,625 shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.

- (5) Consisting of (i) 125,000 shares of common stock; and (ii) 176,162 shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.
- (6) Represents shares of common stock underlying stock options exercisable within 60 days March 1, 2023.
- (7) Represents shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.
- (8) Consisting of (i) 483,741 shares of common stock; and (ii) 75,500 shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.
- (9) Consisting of (i) 27,380 shares of common stock; and (ii) 70,500 shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.
- (10) Represents shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.
- (11) Consisting of: (i) 3,434,580 shares of common stock; and (ii) 1,061,940 shares of common stock underlying stock options exercisable within 60 days of March 1, 2023.

Securities Authorized for Issuance Under Equity Compensation Plans

The following table sets forth information, as of December 31, 2022, with respect to our compensation plans under which common stock is authorized for issuance. These plans consist of our 2018 Stock Incentive Plan, our 2013 Stock Incentive Plan, and our 2010 Stock Incentive Plan. We believe that the exercise price for all of the options granted under these plans reflect at least 100% of fair market value on the dates of grant for the options at issue.

Equity Compensation Plan Information

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options (A)	Weighted Average Exercise Price of Outstanding Options (B)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column (A)) [©]
Equity Compensation Plans Approved by Stockholders	2,794,850	\$ 6.36	389,313
Equity Compensation Plans Not Approved by Stockholders	—	—	—
Total	2,794,850	\$ 6.36	389,313

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

Transactions with Related Persons

Since January 1, 2021, we have engaged in the following reportable transactions with our directors, executive officers, beneficial holders of more than 5% of our voting securities, and affiliates or their immediate family members.

On November 29, 2022, we entered into a securities purchase agreement for the sale and issuance of an aggregate of 1,229,508 shares of our common stock, for an aggregate purchase price of \$1.5 million, in a private

placement transaction at a price per share of \$1.22, which represented a 5.2% premium to the \$1.16 closing price of the common stock on that day. The shares were purchased by the following director and executive officer:

Name	Relationship	Purchase Price	Number of Shares Purchased
Chris Schelling	President, Chief Executive Officer and Director	\$999,999.84	819,672
Stephen J. Aselage	Chairman of the Board of Directors	\$499,999.92	409,836

The shares of common stock issued in the private placement constitute “restricted securities” under the federal securities laws and were subject to a minimum six-month holding period. The private placement closed on December 2, 2022.

Director Independence

The Board of Directors determined that Ms. Griffin and Messrs. Amello, Aselage and Dunn are each an independent director within the meaning of Nasdaq listing standards, which directors constitute a majority of the Board of Directors. The Board of Directors has determined that each member of the Board’s Audit, Compensation and Nominating and Corporate Governance Committees is independent (or similarly designated) based on the Board of Directors’ application of the standards of Nasdaq, and the rules and regulations promulgated by the SEC or the Internal Revenue Service, as appropriate for such committee membership. There are no family relationships among any of our directors or executive officers. The current members of these committees are as follows:

Director	Audit Committee	Compensation Committee	Nominating and Corporate Governance Committee
Jason Amello	C		
Stephen J. Aselage		X	X
John M. Dunn	X		C
Michelle Griffin	X	C	

C = Chair

Item 14. Principal Accountant Fees and Services.

The following table presents the aggregate fees billed to us for the fiscal years ended December 31, 2022 and 2021 by BDO USA, LLP (“BDO”), who was appointed as our independent registered public accounting firm on March 7, 2019.

	Year Ended December 31,	
	2022	2021
Audit fees ⁽¹⁾	\$ 704,450	\$ 506,254
Audit-related fees ⁽²⁾	—	—
Tax fees ⁽³⁾	—	—
All other fees	—	—
Total fees	<u>\$ 704,450</u>	<u>\$ 506,254</u>

- (1) Audit fees consist of fees billed for services relating to the audit of our annual financial statement and review of our quarterly financial statements, services that are normally provided in connection with statutory and regulatory filings or engagements, comfort letters, reports on an issuer’s internal controls, and review of documents to be filed with the SEC (e.g. periodic filings, registration statements, and company responses to SEC comment letters).
- (2) Audit-related fees are related to other assurance and related services that are traditionally performed by an independent accountant such as employee benefit plan audits, due diligence related to mergers and acquisitions, accounting assistance and audits in connection with proposed or consummated acquisitions, attest services that are not required by statute or regulation, and consultations concerning proposed accounting and reporting standards.
- (3) Tax fees are for services relating to tax compliance, tax advice and tax planning.

Policy on Audit Committee Pre-Approval and Permissible Non-Audit Services of Independent Auditors

The Board of Directors’ policy is to pre-approve all audit and permissible non-audit services provided by the independent auditors. These services may include audit services, audit-related services, tax services and other services. Pre-approval is generally provided for up to one year and any pre-approval is detailed as to the particular service or category of services and is generally subject to a specific budget. The independent auditors and management are required to periodically report to the Board of Directors regarding the extent of services provided by the independent auditors in accordance with this pre-approval, and the fees for the services performed to date. The Board of Directors may also pre-approve particular services on a case-by-case basis. While the Audit Committee’s practice is to pre-approve 100% of any audit-related services, tax services, or other services provided by our independent auditors, there were no such services rendered during the last two fiscal years.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a) Documents filed as part of this report:

1. Financial Statements are filed as part of this Annual Report on Form 10-K. The following financial statements are included in Item 8:

	<u>Page</u>
Report of Independent Registered Public Accounting Firm	102
Balance Sheets as of December 31, 2022 and 2021	104
Statements of Operations for the Years Ended December 31, 2022 and 2021	105
Statements of Changes in Stockholders' (Deficit) Equity for the Years Ended December 31, 2022 and 2021	106
Statements of Cash Flows for the Years Ended December 31, 2022 and 2021	107
Notes to Financial Statements	108

2. Financial Statement Schedules

The required information is included in the financial statements or notes thereto.

3. List of Exhibits:

<u>Exhibit No.</u>	<u>Description</u>
3.1	Certificate of Incorporation, as filed with the Delaware Secretary of State on May 15, 2018 (incorporated by reference to Exhibit 3.3 to the Company's Current Report on Form 8-K filed on May 15, 2018).
3.2	Bylaws, effective May 15, 2018 (incorporated by reference to Exhibit 3.4 to the Company's Current Report on Form 8-K filed on May 15, 2018).
3.3	Certificate of Ownership and Merger, as filed with the Delaware Secretary of State on May 15, 2018 (incorporated by reference to Exhibit 3.5 to the Company's Current Report on Form 8-K filed on May 15, 2018).
4.1	Description of the Company's capital stock registered pursuant to Section 12 of the Securities Exchange Act of 1934 (incorporated by reference to Exhibit 4.1 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019).
4.2	Specimen common stock certificate (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed on May 15, 2018).
4.3	Form of Pre-Funded Common Stock Purchase Warrant issued pursuant to Securities Purchase Agreement, dated as of March 21, 2023, between Acer Therapeutics Inc. and the Purchaser (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed on March 22, 2023).
4.4	Form of Common Stock Purchase Warrant issued pursuant to Securities Purchase Agreement, dated as of March 21, 2023, between Acer Therapeutics Inc. and the Purchaser (incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed on March 22, 2023).
10.1+^	Acer Therapeutics Inc. Amended and Restated 2010 Stock Incentive Plan (incorporated by reference to Appendix A to the Company's Definitive Proxy Statement on Schedule 14A filed on April 11, 2016).
10.2+^	Amendment No. 1 to the Acer Therapeutics Inc. Amended and Restated 2010 Stock Incentive Plan (incorporated by reference to Exhibit 10.35 to the Company's Registration Statement on Form S-4, as amended, (File No. 333-219358) filed on July 19, 2017).

Exhibit No.	Description
10.3+^	Form of award agreement for awards made under the Acer Therapeutics Inc. Amended and Restated 2010 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed August 14, 2014).
10.4+^	Form of restricted stock agreement for awards made under the Acer Therapeutics Inc. Amended and Restated 2010 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q filed on May 12, 2015).
10.5+	Acer Therapeutics Inc. 2013 Stock Incentive Plan, as amended (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on September 20, 2017).
10.6+	Acer Therapeutics Inc. 2018 Stock Incentive Plan, as amended and restated as of February 18, 2022 (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed on February 22, 2022).
10.7+	Form of Notice of Stock Option Grant and Stock Option Agreement for option awards to be made under the 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.7 to the Company's Annual Report on Form 10-K for the year ended December 31, 2020).
10.8+	Form of Notice of Restricted Stock Unit Award and Restricted Stock Unit Agreement for awards under the 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.8 to the Company's Annual Report on Form 10-K for the year ended December 31, 2018).
10.9◆◆	Agreement of Access and Use of Clinical Trial Data, dated as of August 3, 2016, by and between Acer Therapeutics Inc. and L'Assistance Publique—Hôpitaux de Paris (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed on August 10, 2021).
10.10◆	License Agreement for Development and Exploitation, dated as of September 19, 2018, by and between Acer Therapeutics Inc. and Assistance Publique – Hôpitaux de Paris (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed on November 9, 2018).
10.11◆◆	Exclusive License Agreement, dated as of April 4, 2014, by and between Acer Therapeutics Inc. and Baylor College of Medicine (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q filed on May 17, 2021).
10.12	First Amendment to License Agreement dated April 28, 2014 by and between Baylor College of Medicine and Acer Therapeutics Inc. (incorporated by reference to Exhibit 10.18 to the Company's Registration Statement on Form S-4, as amended (File No. 333-219358), filed on July 19, 2017).
10.13	Second Amendment to License Agreement, dated March 17, 2015, by and between Acer Therapeutics Inc. and Baylor College of Medicine (incorporated by reference to Exhibit 10.19 to the Company's Registration Statement on Form S-4, as amended (File No. 333-219358), filed on July 19, 2017).
10.14	Third Amendment to License Agreement, dated September 8, 2016, by and between Acer Therapeutics Inc. and Baylor College of Medicine (incorporated by reference to Exhibit 10.20 to the Company's Registration Statement on Form S-4, as amended (File No. 333-219358), filed on July 19, 2017).
10.15◆◆	License Agreement, dated as of December 21, 2018, by and between Acer Therapeutics Inc. and Sanofi (incorporated by reference to Exhibit 10.1 to the to the Company's Quarterly Report on Form 10-Q filed on August 13, 2020.)
10.16+	Employment Agreement, dated February 22, 2018, by and between Acer Therapeutics Inc. and Chris Schelling (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on February 27, 2018).

Exhibit No.	Description
10.17+	Employment Agreement, dated February 22, 2018, by and between Acer Therapeutics Inc. and Harry S. Palmin (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on February 27, 2018).
10.18+	Employment Agreement, dated April 20, 2018, by and between Acer Therapeutics Inc. and Donald R. Joseph (incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q filed on May 14, 2018).
10.19+	Notice of Stock Option Grant (Inducement Award) and Stock Option Agreement (Inducement Award) for inducement option award made under the 2018 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on February 22, 2022).
10.20+	Employment Agreement, dated February 21, 2022, by and between Acer Therapeutics Inc. and Adrian W. Quartel (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on February 22, 2022).
10.21	Lease Agreement, dated March 6, 2018, by and between Acer Therapeutics Inc. and Commonwealth Development LLC, as trustee of the Gateway Realty Trust (incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q filed on May 14, 2018).
10.22	Lease Agreement, dated March 5, 2019, by and between Acer Therapeutics Inc. and Commonwealth Development LLC, as trustee of the Gateway Realty Trust (incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed on August 13, 2019).
10.23	Lease Agreement, dated October 15, 2021, by and between Acer Therapeutics Inc. and Commonwealth Development LLC, as trustee of the Gateway Realty Trust (incorporated by reference to Exhibit 10.27 to the Company's Annual Report on Form 10-K for the year ended December 31, 2021).
10.24	Triple Net Lease, dated April 1, 2018, by and between Acer Therapeutics Inc. and Eastern Western Corp. (incorporated by reference to Exhibit 10.6 to the Company's Quarterly Report on Form 10-Q filed on May 14, 2018).
10.25	First Amendment, dated April 23, 2019, by and between Acer Therapeutics Inc. and Eastern Western Corp. (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q filed on August 10, 2021).
10.26	Second Amendment, dated November 17, 2021, by and between Acer Therapeutics Inc. and Eastern Western Corp (incorporated by reference to Exhibit 10.30 to the Company's Annual Report on Form 10-K for the year ended December 31, 2021).
10.27+	Form of Indemnification Agreement between the Company and its directors and officers (incorporated by reference to Appendix F to the Company's Definitive Proxy Statement on Schedule 14A filed on April 9, 2018).
10.28	Amended and Restated Sales Agreement, dated March 18, 2020, by and among Acer Therapeutics Inc., Roth Capital Partners, LLC, and JonesTrading Institutional Services LLC (incorporated by reference to Exhibit 10.27 to the Company's Annual Report on Form 10-K for the year ended December 31, 2019).
10.29	Purchase Agreement, dated April 30, 2020, by and between Acer Therapeutics Inc. and Lincoln Park Capital Fund, LLC (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on April 30, 2020).
10.30	Registration Rights Agreement, dated April 30, 2020, by and between Acer Therapeutics Inc. and Lincoln Park Capital Fund, LLC (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on April 30, 2020).

Exhibit No.	Description
10.31	Research Collaboration Agreement, dated March 26, 2020, by and between Acer Therapeutics Inc. and the National Center for Advancing Translational Sciences (incorporated by reference to Exhibit 10.30 to the Company's Registration Statement on Form S-1, as amended (File No. 333-238192) filed on June 1, 2020).
10.32◆◆	Collaboration and License Agreement, dated March 19, 2021, by and between Acer Therapeutics Inc. and Relief Therapeutics Holding AB (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on March 22, 2021).
10.33	Credit Agreement dated March 4, 2022, among Acer Therapeutics Inc., the lenders party thereto and SWK Funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.34	Amendment to Credit Agreement dated August 19, 2022, among Acer Therapeutics Inc., the lenders party thereto and SWK Funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on August 23, 2022).
10.35	Second Amendment to Credit Agreement dated January 30, 2023, among Acer Therapeutics Inc., the lenders party thereto and SWK Funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on January 31, 2023).
10.36	Warrant issued on August 19, 2022, by the Company to SWK Funding LLC pursuant to the Amendment to Credit Agreement dated August 19, 2022, among Acer Therapeutics Inc., the lenders party thereto and SWK Funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on August 23, 2022).
10.37	Warrant issued on January 30, 2023, by the Company to SWK Funding LLC pursuant to the Second Amendment to Credit Agreement dated January 30, 2023, among Acer Therapeutics Inc., the lenders party thereto and SWK funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on January 31, 2023).
10.38	Guarantee and Collateral Agreement dated March 4, 2022, among Acer Therapeutics Inc. and SWK Funding LLC, as agent (incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.39	Warrant issued on March 4, 2022, by the Company to SWK Funding LLC pursuant to the Credit Agreement dated March 4, 2022, among Acer Therapeutics Inc., the lenders party thereto and SWK Funding LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.40	Secured Convertible Note Purchase Agreement dated March 4, 2022, between Acer Therapeutics Inc., MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. (incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.41	Amendment Agreement dated January 30, 2023, with respect to Secured Convertible Note Purchase Agreement between Acer Therapeutics Inc., MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. (incorporated by reference to Exhibit 10.7 to the Company's Current Report on Form 8-K filed on January 31, 2023).
10.42	Form of Secured Convertible Note issued by Acer Therapeutics Inc. to MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. pursuant to the Secured Convertible Note Purchase Agreement dated March 4, 2022, between Acer Therapeutics Inc. and MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. (incorporated by reference to Exhibit 10.5 to the Company's Current Report on Form 8-K filed March 7, 2022).

Exhibit No.	Description
10.43	Credit Agreement dated March 4, 2022, among Acer Therapeutics Inc., the lenders party thereto and MAM Aardvark, LLC, as the agent, sole lead arranger and sole bookrunner (incorporated by reference to Exhibit 10.6 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.44	Form of Guarantee and Collateral Agreement to be dated the Term Loan Funding Date among Acer Therapeutics Inc. and MAM Aardvark, LLC, as agent (incorporated by reference to Exhibit 10.7 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.45	Synthetic Royalty Agreement dated March 4, 2022, between Acer Therapeutics Inc., MAM Aardvark, LLC and Marathon Healthcare Finance Fund, L.P. (incorporated by reference to Exhibit 10.8 to the Company's Current Report on Form 8-K filed March 7, 2022).
10.46	Securities Purchase Agreement, dated November 29, 2022, by and between Acer Therapeutics Inc. and the investors listed on Schedule I (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed November 30, 2022).
10.47	Extension Agreement, dated as of December 30, 2022, among Acer Therapeutics Inc., MAM Aardvark, LLC as administrative and collateral agent for the lenders, and the lenders party (incorporated by reference to Exhibit 10.1 to the Company Current Report on Form 8-K filed January 3, 2023).
10.48	Termination Agreement dated as of January 30, 2023 among Acer Therapeutics Inc., the Lenders party thereto and MAM Aardvark, LLC, not individually, but solely in its capacity as administrative and collateral agent for the Lenders (incorporated by reference to Exhibit 10.9 to the Company's Current Report on Form 8-K filed on January 31, 2023).
10.49	Form of Securities Purchase Agreement, dated as of March 21, 2023, between Acer Therapeutics Inc. and the Purchaser (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on March 22, 2023).
23.1*	Consent of Independent Registered Public Accounting Firm BDO USA, LLP.
24.1*	Power of Attorney (see the signature page hereof).
31.1*	Certification of Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2*	Certification of Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1**	Certification of Principal Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2**	Certification of Principal Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS*	Inline 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.
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 Exhibits 101).

* Filed herewith.

+ Management contract or compensatory plan or arrangement.

◆ Confidential treatment was granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

◆◆ Portions of the exhibit have been omitted for confidential treatment.

^ The name of this plan has been amended to reflect the current name of the Company.

** In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release No. 34-47986, the certifications furnished in Exhibits 32.1 and 32.2 hereto are deemed to accompany this Annual Report on Form 10-K and will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934. Such exhibits will not be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934.

Item 16. Form 10-K Summary.

Not Applicable.

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.

ACER THERAPEUTICS INC.

Date: March 27, 2023

By: /s/ Harry S. Palmin
Harry S. Palmin
Chief Financial Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Chris Schelling and Harry S. Palmin, and each of them, his or her true and lawful attorneys-in-fact, each with full power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact or their substitute or substitutes may do or cause to be done by virtue hereof.

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

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Chris Schelling</u> Chris Schelling	President and Chief Executive Officer and Director <i>(Principal Executive Officer)</i>	March 27, 2023
<u>/s/ Harry S. Palmin</u> Harry S. Palmin	Chief Financial Officer <i>(Principal Financial and Accounting Officer)</i>	March 27, 2023
<u>/s/ Jason Amello</u> Jason Amello	Director	March 27, 2023
<u>/s/ Stephen J. Aselage</u> Stephen J. Aselage	Chairman of the Board	March 27, 2023
<u>/s/ John M. Dunn</u> John M. Dunn	Director	March 27, 2023
<u>/s/ Michelle Griffin</u> Michelle Griffin	Director	March 27, 2023

