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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2022

OR

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

For the transition period from _____ to _____

Commission File Number 001-39756

ARS Pharmaceuticals, Inc.

(Exact name of Registrant as specified in its Charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**81-1489190** **(I.R.S. Employer Identification No.)**
11682 El Camino Real, Suite 120 **San Diego, California** **(Address of principal executive offices)**	**92130** **(Zip Code)**

Registrant's telephone number, including area code: (206) 456-2900

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.0001 per share	**SPRY**	**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 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 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	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☒

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

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

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 ☒

As of March 17, 2023 there were 94,403,028 shares of registrant's common stock, $0.0001 par value per share, outstanding.

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant was approximately $102.9 million as of June 30, 2022 (the last trading day of the registrant's most recently completed second quarter) based on the closing price of $4.24 as reported on the Nasdaq Global Market on such date. Shares of the registrant's common stock held by executive officers, directors, and their affiliates have been excluded from this calculation. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for its 2023 Annual Meeting of Stockholders, which the registrant intends to file pursuant to Regulation 14A with the Securities and Exchange Commission not later than May 1, 2023, are incorporated by reference into Part III of this Annual Report on Form 10-K.

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PART I

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (this "Annual Report") contains forward-looking statements that involve risks and uncertainties. We make such forward-looking statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995 and other federal securities laws. All statements other than statements of historical facts contained in this Annual Report are forward-looking statements. In some cases, you can identify forward-looking statements by words such as "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intend," "may," "plan," "potential," "predict," "project," "seek," "should," "target," "will," "would," or the negative of these words or other comparable terminology. These forward-looking statements include, but are not limited to, statements about:

- any statements regarding future economic conditions or performance;
- research and development plans, including planned clinical trials, for *neffy*, including for additional indications;
- the design and potential benefits of *neffy*;
- our plans to submit a supplemental New Drug Application ("NDA") to the U.S. Food and Drug Administration ("FDA") and a post approval variation to the European Medicines Agency ("EMA") for 1.0 mg *neffy* and the timing thereof;
- our expectations regarding the timing for FDA review of our NDA for *neffy*, including the anticipated Prescription Drug User Fee Act ("PDUFA") target action date;
- our plans to submit regulatory filings for *neffy* in Japan and China in collaboration with our partners and the timing thereof;
- the expected timing for regulatory review decisions for *neffy*;
- the timing of the commercial launch of *neffy*, if approved;
- the commercial potential of and commercialization strategy for *neffy*;
- the size of the markets for *neffy* and any other product candidates, the projected growth thereof, and our ability to capture and grow those markets;
- the rate and degree of market acceptance of *neffy* and any other product candidates;
- our expected competitive position;
- our expectations regarding our ability to achieve gross profit margins similar to small molecule drugs;
- our potential to become the standard in treatment and transform the treatment of allergic reactions;
- the likelihood of *neffy* attaining favorable coverage;
- the expected intellectual property protection for *neffy*;
- legislative and regulatory developments in the United States and foreign countries;
- estimates regarding anticipated operating losses, capital requirements and needs for additional funds;
- our ability to obtain, maintain and successfully enforce adequate patent and other intellectual property protection for *neffy* or any future product candidate; and
- statements of belief and any statement of assumptions underlying any of the foregoing.

Any forward-looking statements in this Annual Report reflect our current views with respect to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under Part I, Item 1A, "Risk Factors" of this Annual Report. In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this report, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and you are cautioned not to unduly rely upon these statements. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

SUMMARY OF RISKS ASSOCIATED WITH OUR BUSINESS

An investment in shares of our common stock involves a high degree of risk. Below is a list of the more significant risks associated with our business. This summary does not address all of the risks that we face. Additional discussion of the risks listed in this summary, as well as other risks that we face, are set forth under Part I, Item 1A, "Risk Factors" in this Annual Report. Some of the material risks associated with our business include the following:

- We are a clinical-stage biopharmaceutical company and have incurred significant losses since our inception. We anticipate that we will continue to incur significant losses for the foreseeable future. We have never generated revenue from product sales and may never be profitable.
- We have a limited operating history and only one current product candidate, *neffy*, which is in the clinical stage of development and has no commercial sales, which may make it difficult to evaluate the prospects for our future viability. We may need additional funding, and if we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development activities or commercialization efforts. Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidate.
- We currently depend on the success of *neffy*, which is our only current product candidate. If we are unable to obtain regulatory approval for, and successfully commercialize, *neffy*, or experience significant delays in doing so, our business will be materially harmed.
- If the FDA does not conclude that *neffy* or any future product candidates satisfy the requirements for the Section 505(b)(2) regulatory approval pathway, or if the requirements for such product candidates under Section 505(b)(2) are not as we expect, the approval pathway for those product candidates will likely take significantly longer, cost significantly more and entail significantly greater complications and risks than anticipated, and in either case may not be successful.
- If we fail to develop and commercialize *neffy* for additional indications or fail to discover, develop and commercialize other product candidates, we may be unable to grow our business and our ability to achieve our strategic objectives would be impaired.
- Competitive products may reduce or eliminate the commercial opportunity for *neffy* for its current or future indications. If our competitors develop technologies or product candidates more rapidly than us, or their technologies or product candidates are more effective or safer than ours, our ability to develop and successfully commercialize *neffy* may be adversely affected.
- We are dependent on international third-party licensees and assignees for the development and commercialization of *neffy* in several countries outside the United States. The failure of these third parties to meet their contractual, regulatory or other obligations could adversely affect our business.
- We may seek to enter into additional collaborations, licenses and other similar arrangements for *neffy* or any future product candidate and may not be successful in doing so, and even if we are, we may relinquish valuable rights and may not realize the benefits of such relationships.
- We currently have limited marketing, sales or distribution infrastructure. If we are unable to fully develop our sales, marketing and distribution capability on our own or through collaborations with marketing partners, we may not be successful in commercializing our product candidates.
- The market for *neffy* and any future product candidates we may develop may be smaller than we expect.
- Any of our current and future product candidates for which we, or any current or future licensing and collaboration partners, obtain regulatory approval in the future will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. If approved, *neffy* and any future product candidates could be subject to post-marketing restrictions or withdrawal from the market and we, or any current or future licensing and collaboration partners, may be subject to substantial penalties if we, or they, fail to comply with regulatory requirements or if we, or they, experience unanticipated problems with our products following approval.
- Even if *neffy* or any future product candidate of ours receives regulatory approval, it may fail to achieve the degree of market acceptance by allergists, pediatricians and other physicians, patients, caregivers, third-party payors and others in the medical community necessary for commercial success, in which case we may not generate significant revenues or become profitable.
- Our commercial success depends on our ability to obtain and maintain sufficient intellectual property protection for our product candidates and other proprietary technologies.
- Our success is highly dependent on our ability to attract and retain highly skilled executive officers and employees.

Item 1. Business.

As used in this Annual Report, unless the context indicates or otherwise requires, “ARS,” the “company,” “we,” “us,” “our,” and other similar terms refer to ARS Pharmaceuticals, Inc., a Delaware corporation and its consolidated subsidiaries.

Overview

Company Summary

We are a biopharmaceutical company focused on the development of our novel, potentially first-in-class product candidate, *neffy*® (previously referred to as ARS-1) for the emergency treatment of Type I allergic reactions, including anaphylaxis. *neffy* is a proprietary composition of epinephrine with an innovative absorption enhancer called Intravail®, which allows *neffy* to provide injection-like absorption of epinephrine at a low dose, in a small, easy-to-carry, easy-to-use, rapidly administered and reliable nasal spray.

Type I severe allergic reactions are serious and potentially life-threatening events that can occur within minutes of exposure to an allergen and require immediate treatment with epinephrine injection, the only FDA-approved medication for these reactions. While epinephrine injection devices have been shown to be highly effective, there are well published limitations that result in many patients and caregivers delaying or not administering treatment in an emergency situation. These limitations include fear of the needle, lack of portability, needle-related safety concerns, lack of reliability, and complexity of the devices. Delay in treatment can allow the allergic reaction to progress in severity leading to symptoms that seriously impact patient quality of life, to potential need for emergency services and/or hospitalizations, and to life-threatening symptoms or events.

There are approximately 25 to 40 million people in the United States who experience Type I allergic reactions. Of this group, approximately 16 million people have been diagnosed and experienced severe Type I allergic reactions that may lead to anaphylaxis, but only 3.3 million currently have an active epinephrine autoinjector prescription, and of those, only half consistently carry their prescribed autoinjector. Even if patients or caregivers carry an autoinjector, more than half either delay or do not administer the device when needed in an emergency. In aggregate, we estimate that 90% of patients prescribed an epinephrine device are not achieving an optimal treatment outcome today.

We believe *neffy*’s “no needle, no injection” delivery that eliminates needle-related apprehension and injury concerns, with its small pocket size, ease of use, and high reliability would, if approved, increase prescriptions for epinephrine and make it more likely for patients and caregivers to administer epinephrine sooner, achieve more rapid symptom relief and prevent the allergic reaction from progressing to a level of severity that could lead to hospitalization or even death. Data from our studies of *neffy* in more than 600 subjects demonstrated nasally delivered epinephrine reached blood levels comparable to those of already approved epinephrine injectable products.

Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date, and if our NDA is approved, we believe *neffy* will be the first “no needle, no injection” marketed epinephrine product for the emergency treatment of Type I allergic reactions. However, the timing for regulatory approvals is outside of our control and may be delayed and is uncertain.

Epinephrine and Allergic Reactions Background

Type I allergic reactions are potentially life-threatening hypersensitivity reactions that can occur within minutes of exposure to an allergen and need to be treated immediately to relieve symptoms and prevent further progression. Initial symptoms significantly impact patient quality of life and include difficulty breathing, bronchospasms, hypotension, presyncope, itching, hives, swelling of eyes and lips, and abdominal pain and vomiting. If not treated immediately, more severe reactions known as anaphylaxis that involve constriction of the airways, swelling of the throat, rapid heart rate, severe hypotension and other respiratory and cardiac symptoms can develop and potentially present a medical and life-threatening emergency. Immediate administration of epinephrine is currently the only first-line treatment for Type I allergic reactions, including anaphylaxis. The only out-of-hospital delivery option today is an intra-muscular injectable product, typically offered as prefilled syringes or auto-injector devices, such as EpiPen®, which is marketed by Viatris Inc., and generic versions of EpiPen, marketed by Teva Pharmaceuticals, Inc. These intra-muscular auto-injection devices have several limitations that result in under-utilization by patients and may lead to serious complications and hospitalizations.

These limitations include:

- lack ease of portability with only 50% of patients filling prescriptions carrying the device;
- reluctance to use the device with approximately 25% to 50% of patients carrying the device refusing to administer;
- apprehension stemming from the use of a needle that leads to approximately 40% to 60% of patients delaying administration by up to 18 minutes even if they are carrying the device;
- a high rate of dosing errors, with meta-analyses reporting up to 35% of patients still failing to dose correctly even after training; and
- safety concerns including lacerations, caregiver self-injection and frequent potentially cardiotoxic blood vessel injections, which occurred in approximately 14% of EpiPen subjects in our patient self-administration studies.

As a result, many of the approximately 25 to 40 million patients at risk of severe Type I allergic reactions do not receive or fill prescriptions for intra-muscular injectables. Of 3.3 million patients that do fill their prescriptions, approximately half do not carry the intra-muscular injectable products with them on a regular basis, while many of the other half delay or hesitate treatment during a severe Type I allergic reaction. This may contribute to treatment postponement, prolonging troublesome symptoms, reducing quality of life and increasing the risk of complications or even death. In addition to the 3.3 million patients who currently fill their prescriptions for an epinephrine injectable device, we estimate that approximately 2.5 million patients received a prescription in the last 3 years, but either did not fill or renew it. We believe the advantages of *neffy* will be attractive to this group and lead to an increase in the number of patients filling their prescription as further described below. These patients are additive to the 3.3 million patients that do fill a prescription per year.

Notwithstanding their widespread lack of use, we estimate that net sales of intra-muscular injectable products approved for outpatient use in the United States was approximately $1 billion in 2021 among the approximately 3.3 million patients who filled a prescription.

Our Approach

neffy™ is an investigational drug currently in clinical trials for the emergency treatment of allergic reactions (type I) including anaphylaxis. neffy™ is not approved by the FDA, EMA or other health authorities.

neffy is designed to address the shortcomings of intra-muscular injectable devices. *neffy* is a convenient "no needle, no injection," solution designed to be easier to carry, more reliable and easier to administer, without the aversion, safety concerns and fear and pain of needles associated with intra-muscular injectables. Based on the factors set forth below, we believe that *neffy* can transform the paradigm of epinephrine delivery from cumbersome, unreliable, intra-muscular injectable devices to an intranasal delivery method that makes patients more likely to administer epinephrine sooner, thus achieving more rapid symptom relief and preventing symptoms from becoming serious or life-threatening.

- ***Comparable PK and PD to injection products***. In our clinical trials, we observed that *neffy* has comparable pharmacokinetics ("PK") and pharmacodynamics ("PD") compared to marketed epinephrine injectables.

- ***Needle-free, easy-to-use, pocket-sized and highly reliable nasal spray.*** *neffy* is easier to carry than approved intra-muscular injectables because it is pocket-sized, increasing the likelihood that the device is available for use in an emergency. Our registrational self-administration study (EPI-17) with 2.0 mg *neffy* demonstrated that adult patients had zero critical dosing errors, and 100% of trained adults and trained children were able to dose successfully in two human factors validation study with a total of 150 subjects.

- ***No risk of needle-related injuries***. *neffy* has no risk of needle-related injuries including injection into a blood vessel, lacerations, or caregiver self-injection since the sprayer device does not have a needle.

- ***Less hesitation to dose epinephrine.*** Early administration of epinephrine can reduce the severity, risk of hospitalization and mortality associated with severe Type I allergic reactions. In patient surveys we have conducted, patients indicated a relief from fear of injection and an expectation to utilize *neffy* without delay in a manner more consistent with recommended guidelines due to *neffy* being a nasal spray.

- ***Low potent dose of epinephrine.*** Delivery of higher exposures of epinephrine increases the risk of overexposure and potential adverse events. *neffy* has high bioavailability matching the approved doses of injection at a low dose of 2.0 or 1.0 mg intranasally. Even in the unlikely situation where epinephrine would be 100% bioavailable after administration of *neffy*, the resulting exposure is expected to be tolerable.

- ***Increased stability over existing treatment options***. *neffy* is expected to have a shelf-life at least comparable to the 18 month shelf-life of auto-injector products, but with improved stability and shelf-life at high-temperature than existing products in the market (up to 3 months at 50°C or 122°F) that allows *neffy* to retain potency even if accidentally left in a high temperature environment.

- ***Combination of previously validated product components***. *neffy* consists of a unique combination of three validated products, which we believe will significantly reduce *neffy's* clinical and commercial development risks: epinephrine, which has been approved by regulators and accepted by the physician community as the only effective option to treat Type I allergic reactions; the intranasal device, which has been commercially proven with millions of sprayers sold to date across four FDA-approved products, including NARCAN® for opioid overdose (marketed by Emergent BioSolutions); and Intravail, an innovative absorption enhancer that has been previously included in the formulations of FDA approved products, such as VALTOCO® and TOSYMRA® nasal spray. We believe the cost of goods for *neffy* will allow us to achieve gross profit margins similar to branded oral small molecule drugs assuming prices comparable to the marketed injectable products.

- ***Well positioned for regulatory submissions, and if approved, advance to commercialization.*** Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date and we believe that the completed trials are sufficient to serve as the basis for its approval in the United States. In Europe, our Market Authorization Application ("MAA") was filed and validated for review by EMA in the fourth quarter of 2022.

- ***Potential for high demand and attractive product uptake conditions.*** We have conducted extensive market research with physicians, patients, parents and other caregivers that shows *neffy* has a clinical product profile that is highly desirable and addresses key unmet needs. We believe we can successfully commercialize *neffy* by targeting high-prescribing allergists, pediatricians and primary care physicians who we believe will prescribe *neffy* as it would be a very attractive treatment option within the patient community. In addition, our market research indicates that insurance plans (payors) perceive *neffy* as a differentiated product candidate, which we believe supports the potential for favorable market access for *neffy* at net prices comparable to, or at a premium to, the approved intra-muscular injectables. We currently own or exclusively license a robust global intellectual property portfolio including issued composition of matter and method patents relating to *neffy* that are not expected to expire until 2038 before consideration of any potential patent term extension.

Our Management Team, Financing History and Investors

We were created to innovate, develop and commercialize *neffy*, a novel, potentially first-in-class treatment that addresses Type I allergy patients' desire and need for a no needle, no injection, easy-to-use, portable and reliable solution for delivering epinephrine. To achieve this goal, we have assembled a management team with extensive experience in the development and commercialization of drugs, such as recently approved nasal sprays NARCAN (naloxone nasal spray) and VALTOCO (diazepam nasal spray).

Our company was founded by Richard Lowenthal, M.S., MSEL, Robert Bell, Ph.D. and Sarina Tanimoto, M.D., M.B.A. Pratik Shah, Ph.D. was our first external investor.

Mr. Lowenthal, our Co-Founder and Chief Executive Officer, has more than 25 years of biotechnology and pharmaceutical development experience including leading the regulatory approvals of VALTOCO (diazepam nasal spray) and NARCAN (naloxone nasal spray). Dr. Bell, our Co-Founder and Chief Scientific Officer, has more than 25 years of product development experience including leading R&D at Barr Laboratories, Somerset Pharmaceuticals and UDL Laboratories. Dr. Tanimoto, our Co-Founder and Chief Medical Officer, has more than 20 years of pharmaceutical experience in clinical drug development including supporting the approval of multiple nasal spray products such as VALTOCO and NARCAN. Dr. Shah, our Chairman, has more than 30 years of experience founding and leading biopharmaceutical companies and healthcare investment decisions including his role as Executive Chairman of Design Therapeutics, former Chairman of Synthorx (now part of Sanofi) and former Chief Executive Officer of Auspex Pharmaceuticals (now part of Teva Pharmaceuticals).

Our commercial team is led by Eric Karas, Chief Commercial Officer, who has more than 25 years of sales, marketing, market access and strategic planning experience across multiple specialty products, including leading commercial initiatives for NARCAN® nasal spray at Emergent BioSolutions and Adapt Pharmaceutical (now part of Emergent BioSolutions). Harris Kaplan, Executive Vice President, Commercial Strategy has been involved in the development and launch of 125 new products totaling more than $300 billion in peak revenues, and Dan Relovsky, Senior Vice President of Marketing, has extensive and relevant launch experience across a number of therapeutic categories.

The other key members of the ARS team bring extensive finance, business development and commercial operations experience and include Kathleen Scott, Chief Financial Officer; Justin Chakma, Chief Business Officer; Brian Dorsey, Chief Operating Officer and Alex Fitzpatrick, Chief Legal Officer.

Since our inception, we have raised over $360 million in proceeds, including equity financing from a syndicate of leading life sciences investors that include, among others, RA Capital, SR One and Deerfield, from our licensing and collaboration agreements and from our reverse merger with Silverback Therapeutics, Inc. We have entered into licensing and collaboration agreements for *neffy* with Alfresa Pharma for Japanese rights, and Pediatrix Therapeutics (founded by F-Prime Capital, Eight Roads and Creacion Ventures) for Chinese rights. We previously entered into a licensing and collaboration agreement with Recordati for development and commercialization rights in the European Union ("EU"), Iceland, Liechtenstein, Norway, Switzerland, the United Kingdom, Russia/CIS, Turkey, the Middle East and French-speaking African countries. In the first quarter of 2023, we entered into an agreement with Recordati to terminate our prior agreement with it and reacquire Recordati's rights to develop and commercialize *neffy*.

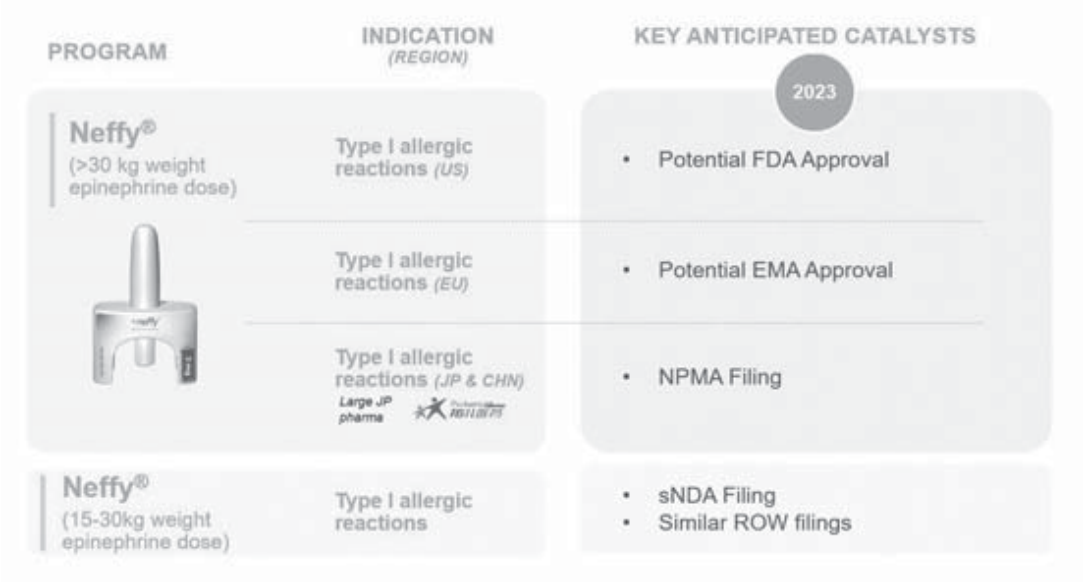
Our Pipeline: Suite of *neffy* Programs

We are focused on advancing *neffy* through regulatory approvals for the emergency treatment of Type I allergic reactions, including anaphylaxis, and commercialization. *neffy* is an intranasal composition of epinephrine that is designed to address the limitations of epinephrine intra-muscular injectable products that are available on the market today.

We submitted our NDA for the 2.0 mg *neffy* dose for adults and children greater than 30 kg in weight to the FDA in the third quarter of 2022. Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date. In the EU, our MAA for the 2.0 mg *neffy* dose for subjects greater than 30 kg in weight was filed and validated for review by EMA in the fourth quarter of 2022. We have also entered into partnerships for the development and commercialization of *neffy* in regions outside of the U.S., including our partnerships with Alfresa Pharma in Japan and Pediatrix Therapeutics in China to develop and commercialize *neffy* in those countries.

Furthermore, we also plan to pursue additional expansion in our pediatric labeling with *neffy* and are conducting a single-arm pharmacokinetic study in subjects 4 to 18 years of age. The interim pediatric data including subjects greater than 30 kg in weight is included in our initial NDA. We plan to submit a supplemental NDA ("sNDA") for *neffy* for children weighing 15 to 30 kilograms to the FDA in 2023. We also plan to submit a post-approval variation to EMA for 1.0 mg *neffy* following the potential approval of our MAA for the 2.0 mg *neffy* dose.

In addition, we believe *neffy* may be able to target other conditions in addition to Type I allergic reactions, and we have identified additional indications for further examination and potential future development.



Our Strategy

Our strategy is focused on developing and commercializing *neffy* as a potentially first-in-class approved intranasal treatment for the approximately 16 million patients in the United States who have been diagnosed and experienced severe Type I allergic reactions and are at risk of anaphylaxis, in geographic regions outside of the United States and for other allergy indications. Key elements of our strategy include:

- ***Obtain FDA approval of neffy***. Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date. If approved within our expected timeframe, *neffy* would be the first FDA-approved emergency treatment for Type I allergic reactions that is not an injection and that has no needle, which we believe would be an attractive treatment option for these patients. *neffy* has received Fast Track designation. However, the timing for regulatory approvals is outside ARS Pharma's control, may be delayed and is uncertain.

- ***Commercialize neffy in the United States***. If *neffy* is approved by the FDA, we plan to initially commercialize it in the United States by deploying a combination of direct promotion, virtual sales consultants, and non-personal promotion intended to reach, at a minimum, the healthcare professionals that account for 45% of the current epinephrine prescriptions. Our promotion will target high-prescribing allergists, pediatricians and primary care physicians through both traditional and non-traditional professional channels. Through these efforts, combined with direct-to-consumer omnichannel strategies to drive awareness and patients asking for *neffy*, we believe we can quickly and efficiently reach a majority of the approximately 3.3 million patients in the United States who filled a prescription for an epinephrine intra-muscular injectable device in 2021. In addition, we believe that the potential for *neffy* to address the limitations of auto-injectors will allow us to expand the market opportunity for *neffy* over time to include the broader population of approximately 2.5 million patients who have received a prescription, but either refused or discontinued treatment in the last three years, as well as the approximately 11 million patients who are diagnosed and under the care of physicians, but have not been prescribed an epinephrine intra-muscular injectable.

- ***Commercialize neffy outside of the United States with our partners***. We believe that there is significant commercial potential for *neffy* in markets outside of the United States. In Europe, our MAA was filed and validated for review by EMA in the fourth quarter of 2022. We intend to submit regulatory filings equivalent to an NDA in Japan and China in collaboration with Alfresa Pharma and Pediatrix Therapeutics, respectively, to whom we have granted exclusive licenses in those regions for the development and commercialization of *neffy*.

- ***Conduct additional studies of neffy to address additional Type I allergic reactions***. There remains a significant unmet need for treatments for allergies that can produce Type I reactions. We are conducting clinical studies to support the expansion of labeling for *neffy* to outpatient epinephrine use in other Type I allergy conditions for which epinephrine intra-muscular injectables are not approved.

Overview of Type I Allergic Reactions and Current Challenges

Overview of Type I Allergic Reactions

The immune system plays an important role in monitoring and protecting the body against microbial threats. However, this system can lead to overstated immune and inflammatory responses that results in adverse outcomes known as hypersensitivity reactions. Type I allergic reactions are potentially life-threatening hypersensitivity reactions that can occur within minutes following exposure to an allergen and need to be treated immediately to relieve troublesome symptoms, mitigate severity and avoid a potentially fatal event. These severe reactions are caused by exposure to a specific allergen, typically foods (most commonly, nuts, eggs, shellfish), drugs and venoms and are mediated by immunoglobulin E IgE antibodies that bind to mast cells causing the release of histamines. The histamines induce smooth muscle contraction in the airways and a wheal and flare response in the skin producing swelling and inflammation. At the same time, widespread activation of mast cells leads to systemic effects of circulatory shock, hypotension or vascular collapse, and in the most severe cases respiratory arrest and death. The severity of a Type I allergic reaction is a function of the speed of onset and the number of organ systems affected by the reaction. As such, early intervention within minutes is critical in order to provide symptom relief and to prevent severe allergic reactions, known as anaphylaxis.

Table 1: Symptoms of Type I Allergic Reactions including Anaphylaxis

Body System	Common Symptoms of Type I Allergic Reactions
Respiratory	Chest tightness, wheezing, difficulty breathing Upper airway or laryngeal angioedema including swelling of throat
Cardiovascular	Hypotension, presyncope (feeling faint), loss of consciousness
Dermatological	Urticaria (hives) and pruritus (itching)
Gastrointestinal	Abdominal pain and vomiting

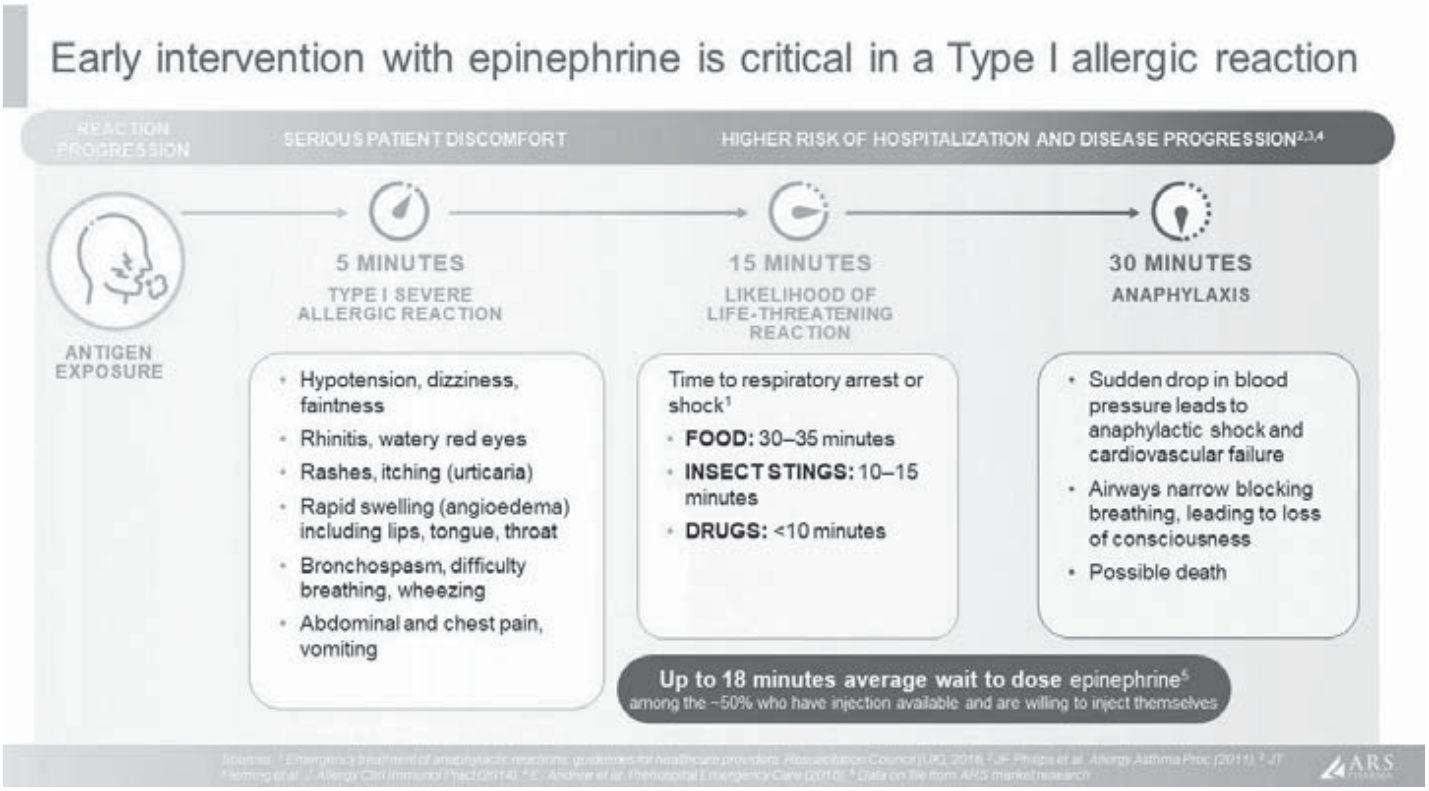
** Reprinted with permission from Dr. Pete Smith (Medical Media Kits) and Mary Johnson*

Role of Epinephrine in Treating Type I Allergic Reactions

Epinephrine intra-muscular injectables are the only current out-of-hospital treatment for severe Type I allergic reactions and are recommended to be prescribed to all patients who have experienced a severe Type I allergic reaction and have either experienced anaphylaxis or are at risk of anaphylaxis. When properly used, these devices can allow for the early administration of epinephrine to stop or reduce the intensity of the systemic allergic reaction before refractory anaphylaxis develops. Even a few minutes delay in the administration of epinephrine can lead to the need for emergency services and/or hospitalizations, comorbidities and life-threatening symptoms or events, while also prolonging the significant negative impact on patient quality of life by delaying symptom relief.

EpiPen epinephrine autoinjector was first approved by the FDA for the emergency treatment of Type I hypersensitivity reactions, including anaphylaxis, in December 1987. Other FDA-approved epinephrine intra-muscular injection products include Twinject® approved in May 2003, Adrenaclick® approved in November 2009, and Auvi-Q® approved in August 2012. In June 2017, the FDA approved Symjepi™ epinephrine injection, which is a pre-filled syringe for the same indication. These injection devices were approved by the FDA without pharmacokinetic data based on an assumption that injections and devices were all effectively the same as the reference listed drug of intra-muscular injection with a needle and syringe. Intra-muscular injection with a needle and syringe is considered the gold standard, and is almost exclusively used in non-community use clinical settings. Although there are no known differences in efficacy or time to observed effect in clinical practice between these devices, current data indicates that different devices deliver an intra-muscular dose of epinephrine with a range of PKs. A single dose with either an intra-muscular injection with needle and syringe or an auto-injector device results in resolution of allergic reaction for approximately 90% of cases within 5 to 15 minutes.

Epinephrine works due to its agonistic effects on the body's adrenergic receptors (alpha and beta receptors). By activating alpha-1 receptors, epinephrine prevents and relieves airway edema, hypotension and shock. By activating beta-1 receptors, epinephrine increases the rate and force of cardiac contractions. Lastly, epinephrine's effect on beta-2 receptors leads to bronchodilation and decreased allergy causing mediator release by mast cells.



Treatment guidelines recommend that epinephrine be administered immediately at the first sign of a severe allergic reaction. Epinephrine is the only medication that can reverse severe allergic reactions and reduce hospitalization and death. Early administration of epinephrine is associated with better outcomes and decreased likelihood of hospitalizations. The sooner epinephrine is administered following allergen exposure, the less severe the systemic allergic reaction may become, and the less likely it will develop into an anaphylaxis event. A short delay of even a few minutes in the recognition and treatment of anaphylaxis can lead to more serious symptoms, including potential hypoxia or death. Additionally, accompanying symptoms of even non-life-threatening allergic reactions can adversely impact health-related quality of life and can lead to loss of productivity, negatively impact social life, as well as lead to depression and anxiety and feelings of fear, frustration, worry and lack of control. A second dose of epinephrine is required for adequate treatment in about 10% of cases, irrespective of whether epinephrine was dosed using an auto-injector such as EpiPen or needle and syringe.

While antihistamines such as diphenhydramine, also known as Benadryl® (marketed by Johnson & Johnson), can sometimes relieve the dermatological symptoms and pruritus associated with severe Type I allergic reactions, treatment guidelines state that antihistamines should never be administered instead of epinephrine because they do not reverse the cardiovascular symptoms such as hypotension and shock, or respiratory distress. Instead, antihistamines can potentially mask symptoms and allow the disease to continue to progress silently.

In the United States, dosing recommendations for epinephrine use by intra-muscular injection are from 0.1 mg to 0.5 mg depending on weight with repeat dosing administered as needed to control a severe allergic reaction. 0.1 mg, 0.15 mg and 0.3 mg are the approved doses for the epinephrine auto-injectors. Approximately 80% of epinephrine auto-injectors prescribed in the United States for outpatient use are the 0.3 mg dose level for persons greater than 30 kg in weight, approximately 15% contain doses of 0.15 mg for persons between 15 to 30 kg and less than 5% contain 0.1 mg doses for persons less than 15 kg. A low dose of epinephrine is important for safety as overexposure to epinephrine can lead to adverse events.

Limitations of Existing Epinephrine Products

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Epinephrine intra-muscular injectables have been proven to be highly effective if they are administered timely and effectively, and work as intended, but the limitations of these products include painful application, inconvenient size and a complicated mechanism of administration. These limitations discourage patients and caregivers from carrying these devices and administering epinephrine in a timely manner. Both uptake and use of intra-muscular injection devices has been limited among eligible patients with severe Type I allergic reactions at risk of anaphylaxis. Of the approximately 16 million people in the United States who have been diagnosed and experienced Type I severe allergic reactions, only 3.3 million currently have an active and filled epinephrine autoinjector prescription.

In studies published in peer-reviewed journals, only 23% to 48% of patients self-administered with an auto-injector during a severe Type I allergic reaction, likely due to less than half of patients actually carrying their prescribed injection device, and only half administering even if the device was available. Across our market research studies, approximately 40% to 60% of patients reported using an antihistamine first, which is not known to be effective, and if carrying an intra-muscular injectable, waited an average of 8 to 18 minutes to administer the device. The principal device-related reasons for delay were presence of a needle, concern about serious cardiac side effects, and potential pain. Patients, and particularly parents who administer to their child, perceive injection to be traumatic, which leads to a fear and avoidance of administering timely treatment. Further, the potentially life-threatening nature of a severe Type I allergic reaction is often accompanied with psychological stress and panic which can lead to delays or errors in proper intra-muscular injection, which can result in hospitalization or even death. In a meta-analysis of 32 studies evaluating epinephrine injectable administration techniques, 23% to 35% of participants failed to achieve the correct administration technique following training.

Further, there is variability in respect to whether auto-injector devices are able to reliably deliver a sufficient dose of epinephrine. The FDA has reported that EpiPen device failures lead to multiple deaths and dozens of hospitalizations annually.

The injection needle can be painful and dangerous not just due to the risk of skin lacerations and the possibility of the needle hitting a patient’s bone during administration, but also the risk of serious, sudden cardiovascular events resulting from accidental blood vessel injection. In our clinical studies, we observed instances of potential accidental blood vessel injection in approximately 14% of patients dosing themselves with EpiPen.

In comparison, *neffy* is perceived by patients and parents as a potentially “game changing” device that, if approved, could improve the management of severe Type I allergic reactions by addressing the current limitations of epinephrine intra-muscular injectable devices.

Clinical Development of *neffy*

neffy is designed to provide injection-like absorption of epinephrine at a 1.0 or 2.0 mg dose comparable to 0.3 mg injection, in a small, easy-to-carry, easy-to-use, rapidly administered and reliable nasal spray. Based on our development work to date, we believe *neffy*'s "no needle, no injection" clinical profile supports differentiation over intra-muscular injections for the emergency treatment of Type I allergic reactions, including anaphylaxis.

We submitted our NDA to the FDA in the third quarter of 2022 based on a rigorous clinical development program agreed upon during pre-NDA meeting discussion with the FDA in mid-2021. Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date. The FDA reference listed drug is intra-muscular needle-in-syringe injection products but there are several approved epinephrine intra-muscular injection products, including intra-muscular auto-injectors such as EpiPen, that establish a range of exposures that have indistinguishable efficacy, time to observed clinical effect and safety.

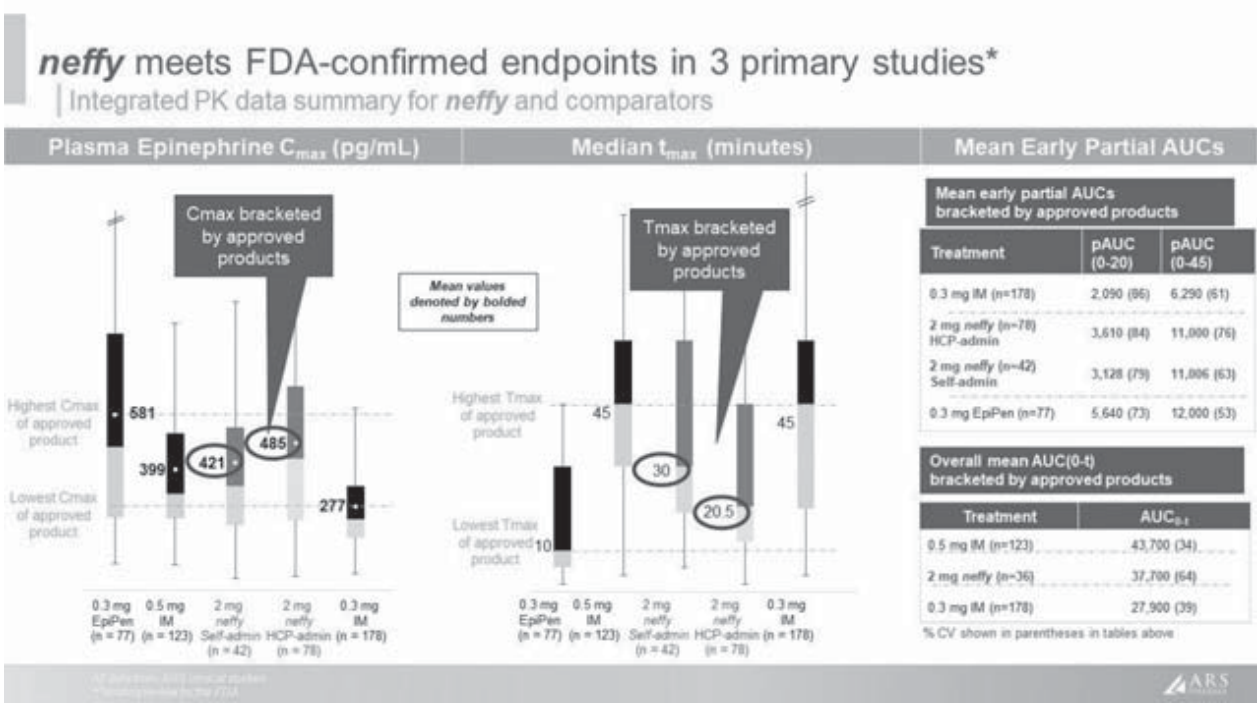
During our pre-NDA meeting in mid-2021, FDA agreed that bracketing based on the primary parameters of C_{max}, t_{max} and early partial AUCs from the range of PKs observed in listed epinephrine injection products was the best approach to ensure efficacy and safety, while bracketing by $AUC_{0\text{-}t}$ was considered an important parameter to ensure safety. PD measures of epinephrine activity such as systolic blood pressure and pulse rate were agreed to be supportive, and to be not meaningfully lower than injection. FDA also agreed that successfully demonstrating that *neffy* met these criteria in three primary studies described below would be sufficient to serve as a basis for our registration program for adults. Furthermore, FDA also agreed that a single study in pediatric subjects also described below would be sufficient to support our pediatric labeling.

We have completed three registrational clinical trials in adults using our 2.0 *neffy* dose for which we submitted our NDA to the FDA in the third quarter of 2022. The adult registrational program using the 2.0 mg *neffy* was intended to generate bioavailability, PDs and safety data in three primary studies: (i) during single and repeat dosing in healthy subjects (EPI-15), (ii) during self-administration by subjects with severe Type I allergies (EPI-17), and (iii) during rhinitis induced by a nasal challenge with an allergen (EPI-16). EPI-15 was conducted in the United States on behalf of ARS Pharma by WCCT Global, Inc., a third-party contract research organization, and selected for 59 healthy male or female volunteers between the ages of 18 to 55 years. EPI-16 was conducted in the United States on behalf of ARS Pharma by Altasciences Clinical Los Angeles, Inc., a third-party contract research organization, and selected 36 male or female volunteers between the ages of 18 to 55 years with a positive history of seasonal allergic rhinitis related to tree or grass allergens as demonstrated by skin prick test and nasal allergen challenge at screening. EPI-17 was conducted in the United States on behalf of ARS Pharma by Novum Pharmaceutical Research Services, a third party contract research organization, and selected 45 male or female volunteers between the ages of 18 to 55 years who had an ongoing history of Type I allergies. To support our proposed pediatric labeling, we are also conducting a single-arm pharmacokinetic study in subjects 4 to 18 years of age with either 1.0 mg or 2.0 mg of *neffy* depending on the subject's weight (EPI-10). EPI-10 is being conducted in the United States by ARS Pharma and selected 42 male or female subjects between the ages of 4 and 18 years who have Type I allergies that required that the subject or caregiver been prescribed an epinephrine product. The interim results of this study from 57 subjects including 16 subjects dosed with 2.0 mg *neffy* were included in our initial NDA that was accepted for review by FDA in the fourth quarter of 2022.

In addition, we have completed two proof of concept clinical studies that evaluated the bioavailability of our 2.0 mg *neffy* dose. These two earlier-stage studies were conducted in the United States on behalf of ARS Pharma by WCCT Global, Inc. and Altasciences Clinical Los Angeles, Inc, respectively, and selected a total of 26 healthy male or female volunteers between the ages of 18 to 55 years, and 42 male or female volunteers between the ages of 18 to 55 years who had an ongoing history of type I allergies.

2.0 mg *neffy* is intended to be the dose that is comparable to approved 0.3 mg epinephrine intra-muscular injection products for persons greater than 30 kg in weight, which represents approximately 80% of the prescriptions in the United States. 1.0 mg *neffy* is intended to be the dose for persons 15 to 30 kg in weight. Our NDA for the 2.0 mg dose of *neffy* for adults and children 30 kg and greater in weight was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date. We plan to submit a supplemental NDA for the 1.0 mg dose of *neffy* in 2023 for subjects 15 to 30 kg in weight.

In our clinical studies in both adults and children, 2.0 mg *neffy* gave comparable epinephrine exposures that were within the range of approved intra-muscular injection products (needle-in-syringe products and EpiPen) on key pharmacokinetic parameters (C_{max}, t_{max}, early partial AUCs, $AUC_{0\text{-}t}$). The integrated data analysis summarizing the key outcomes for registration are shown below.



The hemodynamic response, measured by systolic blood pressure and heart rate, after administration of *neffy* was comparable to some injection products including EpiPen, and was greater than 0.3 mg intra-muscular needle-with-syringe. These hemodynamic responses were within normal physiologic ranges that are typically experienced during exercise or climbing stairs.

Across all the clinical trials, a total of more than 600 subjects have been exposed to *neffy*. All doses of *neffy* ranging from 0.5 mg to 2.0 mg single doses, as well as repeat doses up to 4 mg within 10 minutes, were well-tolerated by patients. There is no meaningful pain upon administration of *neffy* with average scores of 5 to 8 as assessed on a 100 mm visual analogue scale, across studies. There was no irritation observed based on formal scoring in all studies. There were no serious treatment-related adverse events, and adverse events reported have generally not resulted in side effects more severe than grade 1, and were comparable to injection products. Since *neffy* is given without needle, there was also no needle-related injuries or accidental blood vessel injections.

In contrast, for patients self-administering devices, which involved 132 subjects dosed for each of EpiPen and Symjepi, approximately 14% of subjects dosed with EpiPen (auto-injector) and 2% of subjects dosed with Symjepi (pre-filled needle-in-syringe) experienced a potential blood vessel injection leading to a rapid bolus dose of epinephrine, which could lead to serious side effects including cardiovascular events and cerebral hemorrhage according to the FDA EpiPen label. No subjects dosed with *neffy* experienced a blood vessel injection since it is not possible via the nasal route of administration.

Furthermore, our registrational self-administration study of 2.0 mg *neffy* by adults with severe Type I allergies (EPI-17) showed no critical dosing errors with *neffy* as evaluated by human factors professionals. Furthermore, *neffy* also showed zero dosing errors in two human factor validation studies involving 150 subjects when used by trained adults or trained children across multiple demographic groups, as well as when used by passers-byers with no prior experience or training with an epinephrine device.

Key features of *neffy* demonstrated in our clinical, human factors or stability studies include:

Clinical Feature	Supporting Clinical Data
Comparable PKs at a low dose of epinephrine	C_{max}, t_{max} and AUCs were within the range of approved intra-muscular injection products with a low intranasal dose of 2.0 mg n*effy* (people >30 kg in weight) and 1.0 mg n*effy* (people 15 – 30 kg weight).
Robust PDs within a range comparable to injection products with no risk of accidental blood vessel injections	PD responses including systolic blood pressure and heart rate were within normal physiologic changes and comparable to auto-injector products, with maximum changes less that of the EpiPen. *neffy* has no potential for the accidental blood vessel injections observed with injection products such as EpiPen, which can lead to rapid and high epinephrine exposures that cause rapid increases in systolic blood pressure and can lead to cerebral hemorrhage or other cardiovascular side effects.
No meaningful pain or irritation after administration	Visual analogue scale scores were an average of 5 to 8 on a 100 mm scale, and show no meaningful pain (or burning or stinging sensation) after administration, attributable to n*effy* being an aqueous formulation. There is also no irritation observed based on formal scoring. Needle containing intra-muscular injection products are known to be painful and cause reluctance to dose.
Easy to use	No critical dosing errors during self-administration with 2.0 mg n*effy* by type I allergy adult subjects (EPI-17). Zero percent error rate in two human factors studies with 150 persons, when used by trained adults or trained children and when used by untrained passers-byers.
Easy to carry	*neffy* is comparable in size to a wireless earbud case, and multiple *neffy* devices can fit in a patient or parent's pocket to satisfy guideline recommendations.
High reliability	*neffy* 's sprayer device is designed to deliver the effective dose more than 99.999% of the time, with no recalls or warnings among the millions of the same nasal sprayer devices sold to date.
No breathing or inhalation required	*neffy* is designed to be absorbed passively through the nasal mucosa without any inhalation, sniffing or breathing required, with its particles too large to enter the lungs.
Injection-like absorption even with nasal congestion	*neffy* reaches exposures comparable to approved injectable products even after induction of moderate to severe nasal rhinitis and/or edema (e.g., nasal congestion)
Shelf-life at least comparable to injection products, but also with high temperature stability	Drug stability studies show that n*effy* has a shelf-life at least comparable to the 18 month shelf-life of EpiPen, but with high temperature stability, based on stability data from the 2.0 mg dose of *neffy* for 12 months and the 1.0 mg dose of *neffy* for 24 months. *neffy* remains within specifications even when exposed to temperatures of 50ºC (122ºF) for at least three months, or temperatures of 40ºC (104ºF) for at least six months.

Planned Clinical Trials in Additional Indications

Epinephrine has been used empirically by physicians and included in treatment guidelines for multiple allergy conditions that do not fall under the emergency treatment of Type I allergic reactions indication that epinephrine auto-injectors are labelled for. The needle-free, portable, easy-to-use and potentially safer clinical profile of *neffy* supported by pharmacokinetic and pharmacodynamic data could enable the broader adoption of epinephrine in the outpatient setting for these other indications. We are conducting proof of concept studies evaluating *neffy* in additional allergy indications where *neffy* could potentially be used multiple times a year to treat acute episodes.

Development outside the United States

In Europe, our MAA was filed and validated for review by EMA in the fourth quarter of 2022.In the Day 120 comments, we received during EMA's review of our prior 1.0 mg dose *neffy* MAA submission, EMA required a preclinical dog anaphylaxis study, which we completed with data showing no meaningful differences in epinephrine absorption of *neffy* in dogs in a normal state or an anaphylactic state. In April 2022, we voluntarily withdrew our 1.0 mg *neffy* MAA submission to re-submit a 2.0 mg *neffy* MAA submission and allow EMA to review both our 2.0 mg *neffy* and preclinical dog anaphylaxis study results.

We are also pursuing pediatric approval of *neffy* in Europe based on the same US pediatric study. We plan to submit a post-approval variation to EMA for the 1.0 mg *neffy* following the potential approval of the 2.0 mg *neffy* dose.

Our partners in Japan and China expect that they will file for regulatory approval in their respective regions at end of 2023 or early 2024 following our anticipated FDA approval of *neffy*.

Commercialization Opportunity and Commercialization Plan

Type I Allergy Market Overview

neffy is a needle-free, low-dose intranasal epinephrine nasal spray in clinical development for use as a rescue medication for people with Type I severe allergic reactions including anaphylaxis. *neffy* was designed to provide injection-like absorption of epinephrine, in a small, easy-to-carry, easy-to-use, rapidly administered, and reliable nasal spray device.

All systemic allergic reactions have the potential of progressing to anaphylaxis and becoming life-threatening. These reactions can be unpredictable and progress quickly to develop severe symptoms within a few minutes after exposure and can progress to a life-threatening event if not treated immediately. Patient and caregiver preparedness to act quickly and confidently during a severe allergic reaction is imperative. Hesitation can lead to worse clinical outcomes and can be fatal.

Epinephrine is the first-line treatment for the emergency treatment of Type I allergic reactions including anaphylaxis. Epinephrine needs to be given as soon as symptoms occur because it is the only medication proven to stop a potentially life-threatening allergic reaction.

Needle-free and easy-to-use *neffy* may allow for improved patient and caregiver preparedness to give epinephrine quickly, confidently, and without hesitation that is caused by fear of the needle. Intended for use at the first signs of an allergic response, *neffy* is designed to provide patients and their families with a new option to rapidly resolve symptoms and prevent progression to severe anaphylaxis.

If approved for use, we believe our first-in-class nasal spray may transform the way we think about and use life-saving epinephrine.

Existing US Market Opportunity

We estimate approximately 25 to 40 million people in the United States have experienced Type I allergic reactions. Of this group, approximately 16 million people have been diagnosed and experienced severe Type I allergic reactions that may lead to anaphylaxis, but only about 3.3 million of them filled a prescription in 2021 for an epinephrine intra-muscular injectable device, including auto-injectors, equating to approximately 10 million devices.

Of those 3.3 million people, roughly half don't carry these devices due to many drawbacks that can result in patient and caregiver injury, hesitation, and delays in administration principally because of apprehension and pain of needles. In turn, the failure or delay of epinephrine delivery can allow the allergic reaction to progress in severity causing life-threatening symptoms or events that potentially require emergency services and/or hospitalization.

We believe *neffy* could address the needs of not only the approximately 3.3 million patients in the United States who currently fill intra-muscular injectable prescriptions, but also the more than 22 million eligible Type I allergy patients in the United States who are at risk of severe allergic reactions that are not prescribed or do not fill their epinephrine prescriptions, including approximately 2.5 million former injectable patients in the United States in the last three years that either refused to fill, or did not renew an intramuscular injectable device prescription.

Based on market access research and data from IQVIA, we estimate that 2021 U.S. net sales for intra-muscular injectable devices were approximately $1 billion. Approximately 80% of the epinephrine intra-muscular injectables sold in the United States in 2021 were for the 0.3 mg dose for adults and children greater than 30 kg in weight.

We have conducted multiple market research studies with caregivers, generally parents, and patients with severe Type I allergic reactions in the United States to evaluate potential market perceptions of *neffy* and currently available epinephrine delivery devices. Based on two independent quantitative market research studies including a total of 350 patients and 75 allergists, pediatricians and primary care physicians, approximately 80% of patients with a current epinephrine auto-injector prescription stated that they would prefer *neffy*. Furthermore, 100% of the physicians surveyed stated they would prescribe if their patient asked for neffy, indicating that *neffy* prescriptions would likely be highly driven by patient preference and awareness of *neffy*.

In our market research, parents and people with current or prior epinephrine auto-injector prescriptions were asked if and when they would adopt a new nasal spray device product such as *neffy*.

- A majority indicated they would adopt *neffy* within three months of it coming to market,
- 69% of patients indicated they would use *neffy* sooner than their current auto-injector device,
- 65 to 72% of patients indicated that they would use *neffy* first instead of an over-the-counter antihistamine
- 88% reported they would be more willing to use *neffy* in public.

These data suggest that *neffy* has the potential to be rapidly adopted by most of the approximately 3.3 million patients in the United States today who fill their epinephrine auto-injector prescription, if approved. These patients serve as our base estimate for the current epinephrine market for *neffy*.

Key potential growth levers for *neffy* within the existing epinephrine market for the emergency treatment of Type I allergic reactions, which currently consists of only intra-muscular injectable products include:

- **Consistent base market growth observed with the epinephrine intra-muscular injectable products.** From 2007 to 2021, the number of epinephrine intra-muscular injectable devices sold in the United States has increased by approximately 5% annually based on IQVIA unit sales data, primarily due to the increasing size of the overall population affected by severe Type I allergies, led by food-based allergies.

- **Potential promotional lift due to new marketing and education efforts by a branded product such as *neffy***. The existing market for epinephrine intra-muscular injectable products is characterized by being highly promotionally sensitive, particularly from a consumer perspective, and our market research has indicated that *neffy*'s user-friendly product profile has the potential to resonate significantly with consumers. We estimate that branded marketing of EpiPen prior to generic entry contributed a promotional lift of 31% over base epinephrine intra-muscular injectable market trends. We plan to reach and support patients directly through efficient direct-to-consumer advertising after educating professional physician practices and securing appropriate payer coverage for *neffy*.

- **Targeting the approximately 2.5 million former patients that either do not fill their epinephrine intra-muscular injectables prescriptions or whose prescriptions have recently lapsed**. The exodus of patients who have received prescriptions from the market has been attributed to a number of factors, including reduced promotional activities in recent years, limited adherence program effectiveness (lapsed prescriptions) and patient adversity to currently marketed products (i.e., fear of needles and concerns regarding poor reliability). In our market research of 100 former patients who refused to fill or renew a prescription, approximately 75% indicated a willingness to return to the market and request *neffy* if approved. We hope to engage with these patients through programs to encourage appropriate epinephrine use with *neffy* and increase consistency of epinephrine acquisition to help manage their condition.

- **Increased per patient device acquisition by patients and parents.** In our market research of 350 patients with an active intra-muscular injectable prescription, approximately 70% to 80% of patients reported an intention to acquire additional devices compared to their current injectable device if *neffy* is approved by the FDA. Currently, we estimate only between 20% to 30% of patients currently obtain more than one pack (containing two devices) per year today.

US Market Expansion Opportunity

While we believe the existing epinephrine intra-muscular injectables market is a large commercial opportunity for *neffy* with multiple independent opportunities for further growth, IQVIA claims data indicates that many diagnosed, identifiable eligible patients do not receive prescriptions for intra-muscular injectables. Outside of the five million patients who were recently prescribed an epinephrine injectable device, there are approximately 11 million patients who are under the care of physicians per IQVIA claims data, but have not been prescribed an epinephrine intra-muscular injectable device, as well as another approximately 9 million patients not currently under the care of physicians.

- **Over time, targeting the approximately 11 million identified and diagnosed in-office patients in IQVIA claims data with Type I allergic reactions that are eligible but have not been prescribed epinephrine device.** In our market research, physicians indicated they would prescribe *neffy* to more than half of the patients who were eligible, but do not currently receive an intra-muscular injectable prescription.

- **Development in new allergy indications.** There are approximately 10 million patients with allergy conditions (e.g., urticaria flares and asthma exacerbations) where epinephrine has never been formally developed as a prescription product, despite being used in-hospital to resolve such acute symptoms. Such patients in other conditions experience multiple episodes each year, and we believe they would likely use multiple *neffy* each year to resolve their symptoms. Therefore, the market opportunity for treating such conditions may be as large as the type I allergy including anaphylaxis indication.

  We are conducting a randomized, placebo-controlled proof of concept study evaluating the safety and efficacy of *neffy* in approximately 24 subjects with frequent urticaria flares. We expect to complete enrollment and report topline data from this study in the second half of 2023.

Ex-US Market Opportunity

- Outside of the United States, we estimate that there are an additional 15 million patients in Europe, and over 30 million patients in Asia including China and Japan, that experience Type I allergic reactions that are clinically appropriate for being prescribed *neffy*.

- In 2021, epinephrine intra-muscular injectable sales outside the United States were approximately $250 million based on IQVIA data. In Europe and Japan, sales of epinephrine injectable devices are approximately $160 million. We believe education around Type I allergic reactions and marketing of intra-muscular injectables has been limited in these regions, and that promotion and the availability of *neffy* would significantly expand the market.

- Market research conducted in Europe with 120 patients who have an epinephrine auto-injector prescription indicated that 98% would prefer *neffy*, and that they would acquire approximately twice as many *neffy* devices compared to their current injectable device, if approved.

- To target these opportunities outside of the United States, we have entered into licensing and collaboration agreements with Alfresa Pharma for Japanese rights to *neffy* and Pediatrix Therapeutics (founded by F-Prime Capital, Eight Roads and Creacion Ventures) for Chinese rights to *neffy*. We intend to pursue strategic partnerships for the commercialization of *neffy* in additional regions outside of the United States, subject to FDA approval of *neffy*.

- We previously entered into a licensing and collaboration agreement with Recordati for development and commercialization rights in the EU, Iceland, Liechtenstein, Norway, Switzerland, the United Kingdom, Russia/CIS, Turkey, the Middle East and French-speaking African countries. In the first quarter of 2023, we entered into an agreement with Recordati to terminate our prior agreement with it and reacquire Recordati's rights to develop and commercialize *neffy*.

Commercial Strategy

We believe that the epinephrine market is a highly consumer driven market. We expect this to be especially true for *neffy*, given that 100% of the physicians surveyed in our quantitative market research studies indicated that they would prescribe *neffy* if asked by a patient and approximately 70% of physicians would recommend *neffy*. As a result, we believe that driving consumer awareness, so that patients and parents ask their healthcare provider for *neffy*, while minimizing both access and educational barriers to acceptance is essential.

Our plan to execute on our go-to-market strategy for *neffy* includes the following:

We plan to create healthcare professional and consumer awareness and anticipation prior to launch. We are refining our go-to-market strategy and creating awareness about our company and our technology. We expect to expand medical affairs capabilities prior to commercial launch to establish additional relationships with key opinion leaders and gain insight into current practice patterns and burdens. The medical affairs team will also collaborate with the commercial team to help payers fully understand *neffy's* value proposition and the limitations associated with needle injectors. We also plan to begin to raise awareness and support meaningful education through partnership with patient advocacy groups and medical societies as well as a disease education campaign including through social media and digital.

Based on the unmet needs that we identified, our pre-launch activities may be focused on delivering disease awareness and education surrounding the appropriate epinephrine use to prevent anaphylaxis to allergists and pediatricians as well as parents and patients in partnership with allergy and professional advocacy groups. These disease education efforts will more specifically reinforce the importance of early administration of epinephrine at the first sign of a severe Type I allergic reaction, help stakeholders understand the factors that are associated with hesitation to fill and use epinephrine earlier in a reaction, and the importance of alternative epinephrine delivery options to support those affected by severe allergic reactions. In our market research, 42% of patients who had used an epinephrine injectable device during a recent episode reported that they delayed use by an average of approximately 9 minutes. If *neffy* were available, these patients reported that they would reduce their average wait time to use by 45%. Additionally, 47% of patients reported they were more likely to fill prescriptions and 86% of patients reported they would carry *neffy* with them. We believe a broad understanding of this evidence will help to establish and increase the urgency to treat patients with *neffy* and support our rapid launch uptake following FDA approval, if achieved.

We plan to initially commercialize *neffy* in the United States with a combination of direct promotion, virtual sales consultants, and non-personal promotion intended to reach, at a minimum, the healthcare professionals that account for 45% of the current epinephrine prescriptions. Our promotion will focus the launch on the highest potential practicing allergists, pediatricians, and primary care physicians. In our market research, approximately 80% of patients see their treating physicians at least every six months, and 98% at least once a year. We plan to optimize our field representatives based on planned research on current market dynamics, geo-targeting and assessment of current professional-industry interaction preferences initially to reach these professionals. We expect significant reach to be achieved based on expanded use of non-personal promotional tactics and virtual sales representatives to reach healthcare professionals and focus on the sequential activation of patient demand through direct-to-consumer tactics that will help also drive physician awareness due to overlapping exposure.

We intend to partner with patient advocacy organizations as well as influencers and leverage an omnichannel strategy including direct-to-patient and parent tactics, social and traditional media, digital presence, and additional public relations to drive awareness, for patients to ask for *neffy*, and communicate our value proposition. The pent-up patient demand that we believe is ready to be activated by *neffy* is reflected in our market research where 87% of patients indicated a high likelihood to proactively visit their physician in-person and ask about getting a new prescription for *neffy* (43% of patients indicating a 10 out of 10 likelihood, and 44% of patients indicating a 7-9 out of 10 likelihood). Our research also showed that physicians would recommend *neffy* to approximately 70% of their patients. In addition, the severe Type I allergy market has historically been highly promotionally sensitive, and in recent years, there has been limited investment in education or promotion, which we believe provides an opportunity for significant promotional lift from our planned marketing efforts.

We intend to establish *neffy* as the dominant and most recognized brand in the category. We believe *neffy*'s potential brand recognition and user-friendly profile can be an important driver of growth and source of competitive differentiation, especially as the first "no needle, no injection" solution for severe Type I allergic reactions. We have designed *neffy* to offer healthcare professionals, patients and caregivers a simple, injection-free, portable, highly reliable and user-friendly alternative that facilitates early administration of epinephrine to provide rapid symptom relief and to stop the allergic reaction from progressing to more serious events. We believe the attractiveness and meaningful differentiation of *neffy* across both physicians and payers will stimulate a high patient and parent desire to switch to or return to managing their condition with *neffy*.

We intend to secure affordable market access for all consumers by optimizing contracting, co-pay support and distribution of *neffy*. To ensure access and affordability for *neffy*, we plan to engage with payors to convey the clinical rationale and value proposition of *neffy*. To date, we have conducted extensive market research with approximately 50 decision-makers at payors to help forecast the potential commercial opportunity for *neffy* in the United States. Health insurers surveyed have indicated that *neffy* is perceived as differentiated brand from epinephrine auto-injector products, with its needle-free route of administration and increased likelihood of being carried as the most important product attributes. Based on these analyses and our planned contracting strategy, we believe payers can support favorable and broad market access for *neffy*. Further, we will offer comprehensive patient support programs in the form of co-pay buydowns to help ensure access and affordability for all patients.

We intend to expand the market beyond the 3.3 million patients currently filling epinephrine injection device prescriptions. We believe that the severe Type I allergy market is currently significantly underpenetrated due to the lack of, and limitations in, current treatment options. We believe the availability of *neffy* could drive increased device uptake among the existing 3.3 million patients currently filling epinephrine injection device prescriptions, adoption by the approximately 2.5 million patient that receive, but do not fill their prescription, and the 11 million patients diagnosed and managed by physicians who do not currently have an epinephrine auto-injector, especially those incorrectly using antihistamines as a substitute. Other launches of intranasal products for emergency use into previously injection-only markets such as NARCAN (marketed by Emergent BioSolutions), VALTOCO (marketed by Neurelis), NAYZILAM (marketed by UCB) and BAQSIMI (marketed by Eli Lilly) have rapidly captured a significant percentage of the existing market, and also expanded their respective markets. Both products use the same device that we have chosen for *neffy*. We believe that NARCAN's widespread use clearly demonstrates market uptake in response to the advantages of an intranasal product via proven device over injection, considering in particular that NARCAN is used in life threatening rescue situations where reliable administration is required for confident administration, similar to severe Type I allergic reactions. Beyond just reliability, we believe that an intranasal product has unique advantages for treating a severe Type I allergic reaction due to patient and parent fear and avoidance of injection and because time is of the essence. This perspective is distinct from other diseases with chronic use of injection products, administration by a trained professional is required, or where the injection is more manageable and tolerated. In our market research, respondents have described *neffy* as "game-changing" and we believe *neffy*, if approved, can make a significant difference in patient lives and outcomes.

If approved, we plan to establish a distribution channel in the United States for the commercialization of *neffy*. We expect to sell *neffy* to wholesalers, who, in turn, will sell our *neffy* to retailors and other customers. We expect to use a third-party logistics provider for key services related to logistics, warehousing and inventory management, distribution, contract administration, order management and chargeback processing and accounts receivable management. We also plan to explore other non-traditional distribution channels including telemedicine.

To target markets outside of the United States, we have entered into strategic partnerships with several pharmaceutical companies to obtain regulatory approval and market *neffy*. These include Alfresa Pharma for Japan and Pediatrix Therapeutics for China. We intend to pursue strategic partnerships for the commercialization of *neffy* in additional regions outside of the United States, subject to FDA approval of *neffy*. We anticipate that in certain markets additional clinical trials of *neffy* may be required to obtain regulatory approval and/or ensure market access.

Competition

Our industry is highly competitive and subject to rapid technological changes. Our potential competitors include large pharmaceutical and biotechnology companies, specialty pharmaceutical and generic drug companies, academic institutions, government agencies and research institutions. Many of our potential competitors have substantially greater financial, technical, commercial and human resources than we do and significantly more experience in the discovery, development and regulatory approval of product candidates and the commercialization of those products. We believe that the key competitive factors that will affect the development and commercial success of *neffy* and the other product candidates that we may develop are their efficacy, safety and tolerability profile, convenience in dosing, product labeling, value and price, in addition to whether there are alternative therapies approved for other indications and prescribed for off-label use and the availability of reimbursement from the government and other third parties. Our commercial opportunity could be reduced if our competitors have products which are better in one or more of these categories.

We expect that, if approved, *neffy* would compete with a number of existing products and other product candidates that target Type I allergic reactions, including certain products that are or may become generic products. Additionally, the development of new treatment methods for the diseases we are targeting could render our current or future product candidates non-competitive or obsolete.

We anticipate that, if approved, *neffy* will compete primarily against epinephrine intra-muscular injectable products, for the emergency treatment of Type I allergic reactions including EpiPen and its generics, which are marketed by Viatris, Inc. and Teva Pharmaceuticals, Inc., respectively; Adrenaclick, which is marketed by Amneal Pharmaceuticals, Inc.; Auvi-Q, which is marketed by Kaleo, Inc.; and Symjepi, which is marketed by Sandoz, Inc., a Novartis division.

We are not aware of any other company that has a “no needle, no injection” epinephrine product candidate in clinical development in the United States that has demonstrated PKs bracketed by the approved injection products for all pharmacokinetic parameters requested by the FDA. We are also not aware of any “no needle, no injection” epinephrine product candidate for the pediatric population that is in clinical development.

We are aware of several companies developing higher dose intranasal candidates including Bryn Pharma, Hikma Pharmaceuticals, Inc. (previously INSYS Therapeutics, Inc.), Nasus Pharma and Orexo AB. Amphastar Pharmaceuticals, Inc. is reported to be developing an intranasal candidate, but has not disclosed its dose. Aquestive Therapeutics is developing a sublingual candidate based on a prodrug of epinephrine.

Manufacturing and Supply

We do not own or operate manufacturing facilities for the production of *neffy*, nor do we have plans to develop our own manufacturing operations for clinical materials or commercial products in the foreseeable future. We currently depend on third-party contract manufacturing organizations (“CMOs”) for all of our required raw materials, drug substance and drug product for our preclinical research and clinical trials.

We currently rely on suppliers for raw materials including drug substance and multiple manufacturers for our product candidates and expect to rely on third-party suppliers and manufacturers for the commercial supply of any approved products. We currently employ internal resources and third-party consultants as needed to manage our CMOs. These CMOs offer a comprehensive range of contract manufacturing and packaging services and have successfully handled the scale up of *neffy* in preparation for commercialization.

neffy is presented as a nasal spray in aqueous solution with epinephrine as the active pharmaceutical ingredient (“API”) filled into glass vials and closed with a rubber stopper and assembled into the unit dose sprayer device. Over time, epinephrine is oxidized and loses potency resulting in a finite shelf-life, and the *neffy* solution inside the unit dose sprayer changes to an amber to brown color.

Epinephrine is the API used in *neffy*. We intend to use Cambrex Profarmco (“Cambrex”) as one of our commercial sources for epinephrine API. Cambrex holds a U.S. drug master file for epinephrine produced at its facility in Italy, and its manufacturing process is fully validated. We have entered into a commercial supply agreement with Cambrex, and while we believe that Cambrex has sufficient capacity to satisfy our long-term requirements, there are several sources of API available, and we intend to launch with a second source of API and are in the process of qualifying this second API source.

Dodecyl maltoside or Intravail is purchased through our license agreement with Aegis Therapeutics, Inc. from two manufacturers, Dr. Reddy Laboratories and Inalco, which are based in India and Italy, respectively.

The unit dose sprayer device used to delivery drug product in *neffy* is produced by Aptar Pharma (“Aptar”). Aptar produces devices in France and we believe Aptar has sufficient capacity to satisfy our long-term requirements. The patent for the Aptar unit dose nasal spray device expired in early 2020, and we believe there will be generic supplies available soon after launch.

Manufacturing drug product for *neffy* is conducted by Renaissance Pharmaceuticals, Inc. ("Renaissance Pharma"), which has been actively involved in supporting the manufacture of *neffy* devices in our clinical development. We intend to use its facility in Lakewood, New Jersey as our primary source for drug product manufacturing and final packaging. We have entered into a commercial supply agreement with Renaissance Pharma, and believe they have sufficient capacity to satisfy our long-term requirements, although we are evaluating alternating sourcing options.

Ongoing stability studies demonstrate that *neffy* is stable at room temperature for at least 18 months, based on stability data from the 2.0 mg dose of *neffy* for 12 months and the 1.0 mg dose of *neffy* for 24 months, and we plan to continue to conduct ongoing registration stability studies that we anticipate will enable us to indicate on our label, if approved, that *neffy* is stable at room temperature for 18 months at 25ºC. We have also conducted studies indicating that *neffy* is also stable at temperature excursions including 40ºC for up to six months, and at 50ºC for up to three months.

Intellectual Property

We strive to protect our intranasal epinephrine product candidates by seeking, maintaining, and defending our patent rights in the United States and internationally. Our policy is to pursue, maintain and defend patent rights in strategic areas, whether developed internally or licensed from third parties, and to protect the technology, inventions and improvements that are commercially important to the development of our business. We also rely on trade secrets that may be important to the development of our business.

We co-own or exclusively license the patents and patent applications relating to our intranasal epinephrine product candidates. As of December 31, 2022, our patent portfolio consisted of issued patents and pending patent applications that we co-own or exclusively license from Aegis Therapeutics LLC in the United States and other countries throughout the world. In total, as of that date, our patent portfolio consisted of four issued U.S. patents, one granted Australian patent, one granted Japanese patent, one granted Chinese patent, one granted patent in South Korea, one granted European patent, three granted United Kingdom patents, three pending U.S. non-provisional patent applications, and over fifteen pending foreign patent applications directed to intranasal epinephrine formulations and methods of their use. These issued patents and pending patent applications are expected to expire as early as 2038, absent any patent term adjustments or patent term extensions for regulatory delay.

In addition to patent protection, we also rely on trademark registration, trade secrets, know how, and other proprietary information to develop and maintain our competitive position. We seek trademark protection in the United States and in certain other jurisdictions where available and when we deem appropriate. We currently have registrations for our "*neffy*" mark in the United States as well as in foreign jurisdictions, including the United Kingdom, European Union, and Japan.

Our commercial success will depend in part on obtaining and maintaining patent protection and trade secret protection of our current and future product candidates and the methods used to develop and manufacture them, as well as successfully defending these patents against third-party challenges. Our ability to stop third parties from making, using, selling, offering to sell or importing our products depends on the extent to which we have rights under valid and enforceable patents or trade secrets that cover these activities. We cannot be sure that patents will be granted with respect to any of our pending patent applications or with respect to any patent applications filed by us in the future, nor can we be sure that any of our existing patents or any patents that may be granted to us in the future will be commercially useful in protecting our product candidates and processes. For this and more comprehensive risks related to our intellectual property, please see "*Risk Factors—Risks Related to Our Intellectual Property.*"

The term of individual patents depends upon the legal term of the patents in the countries in which they are obtained. In most countries in which we file, the patent term is 20 years from the earliest date of filing a non-provisional patent application. In the United States, the patent term of a patent that covers an FDA-approved drug may also be eligible for patent term extension, which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process. The Drug Price Competition and Patent Term Restoration Act of 1984 (the "Hatch-Waxman Act") permits a patent term extension of up to five years beyond the expiration of the patent. The length of the patent term extension is related to the length of time the drug is under regulatory review. Patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent applicable to an approved drug may be extended and only those claims covering the approved drug, a method for using it, or a method for manufacturing it may be extended. Similar provisions are available in Europe and other foreign jurisdictions to extend the term of a patent that covers an approved drug. In the future, if and when our products receive FDA approval, we expect to apply for patent term extensions on patents covering those products. We plan to seek patent term extensions to any of our issued patents in any jurisdiction where these are available, however there is no guarantee that the applicable authorities, including the FDA in the United States, will agree with our assessment of whether such extensions should be granted, and if granted, the length of such extensions. For more information regarding the risks related to our intellectual property, see "*Risk Factors—Risks Related to Our Intellectual Property.*"

We also seek to protect our intellectual property in part by entering into confidentiality agreements with companies with whom we share proprietary and confidential information in the course of business discussions, and by having confidentiality terms in our agreements with our employees, consultants, scientific advisors, clinical investigators, and other collaborators and contractors and also by requiring our employees, commercial contractors, and certain consultants and investigators, to enter into invention assignment agreements that grant us ownership of any discoveries or inventions made by them while in our employ. However, such confidentiality agreements and invention assignment agreements can be breached, and we may not have adequate remedies for any such breach. For more information regarding the risks related to our intellectual property, see "*Risk Factors—Risks Related to Our Intellectual Property.*"

The patent positions of specialty pharmaceutical companies like ours are generally uncertain and involve complex legal, scientific and factual questions. Our commercial success will also depend in part on not infringing upon the proprietary rights of third parties. It is uncertain whether the issuance of any third-party patent would require us to alter our development or commercial strategies, or our drugs or processes, obtain licenses or cease certain activities. Our breach of any license agreements or our failure to obtain a license to proprietary rights required to develop or commercialize our future products may have a material adverse impact on us. If third parties prepare and file patent applications in the United States that also claim technology to which we have rights, we may have to participate in interference or derivation proceedings in the U.S. Patent and Trademark Office (the "USPTO") to determine priority of invention. For more information, see "*Risk Factors—Risks Related to Our Intellectual Property.*"

Our Collaboration and Licensing Agreements

License Agreement with Aegis

In June 2018, we entered into a license agreement with Aegis Therapeutics, LLC ("Aegis"), which was amended in July 2020 and January 2021. Pursuant to the agreement, Aegis granted us an exclusive, worldwide, sublicensable license under patents and know-how relating to the INTRAVAIL drug delivery technology to research, develop, make (subject to Aegis supplying the INTRAVAIL drug delivery technology to us under a supply agreement), use, sell, offer for sale, import, and otherwise commercialize products incorporating epinephrine compounds ("Aegis Licensed Compounds"), including the *neffy* nasal spray. During the term of the agreement, we are required to use commercially reasonable efforts to obtain regulatory approval for products containing one or more Aegis Licensed Compounds and using the excipient (including INTRAVAIL) ("Aegis Licensed Products") and to thereafter maximize sales of the Aegis Licensed Products, and Aegis may not directly or indirectly exploit an Aegis Licensed Product or Aegis Licensed Compound or derivatives thereof without our consent.

Under the agreement, Aegis received an upfront license fee of $50,000 and is entitled to receive development milestone payments of up to $3.95 million in aggregate and commercialization milestone payments up to $16.0 million in the aggregate for each Aegis Licensed Product. We made a $0.5 million milestone payment to Aegis upon the achievement of a regulatory milestone during 2019, and a $1.0 million payment to Aegis upon the FDA's acceptance of our US NDA filing, which occurred in the third quarter of 2022. We will be required to pay Aegis a milestone payment of $2.5 million contingent upon the FDA approval of the first Aegis Licensed Product and a milestone payment of $5.0 million contingent upon first commercial sale of the first Aegis Licensed Product. Additionally, Aegis is entitled to receive a low- to mid-single-digit percentage royalty, subject to reductions under certain conditions including due to generic competition or below threshold levels of profitability in specific countries around the world, on net sales of all Aegis Licensed Products during the applicable royalty term, which commences on the first commercial sale of a Aegis Licensed Product in a country and ends upon the later of the expiration of all licensed patents covering such Aegis Licensed Product in such country or 15 years after the date of the first commercial sale of the Aegis Licensed Product in such country ("Aegis Royalty Term").

The agreement will continue until the expiration of the last-to-expire Aegis Royalty Term, unless sooner terminated. We have the right to terminate the agreement at any time after a specified notice period to Aegis. Either party may terminate the agreement for uncured material breach of the other party, or upon notice for insolvency-related events of the other party that are not discharged within a defined time period.

Collaboration and License Agreement with Alfresa

In April 2020, we entered into a collaboration and license agreement with Alfresa Pharma Corporation ("Alfresa"). Pursuant to the agreement, we granted Alfresa (i) an exclusive, sublicensable license under our patents relating to *neffy* to develop, use and import epinephrine compositions ("Alfresa Licensed Compositions") and related products ("Alfresa Licensed Products") in Japan (the "Alfresa Territory") and to promote, distribute, offer for sale and sell Alfresa Licensed Products in the Alfresa Territory, and (ii) a non-exclusive, sublicensable license to manufacture and commercialize Alfresa Licensed Products under the license described in clause (i), under our technology to make and have made Alfresa Licensed Compositions and Alfresa Licensed Products in and outside the Alfresa Territory solely for the purpose of exercising the license described in clause (i) in the Alfresa Territory. We expressly reserved all rights to practice and grant licenses under our technology outside the scope of the licenses granted to Alfresa, including the right to manufacture Alfresa Licensed Compositions and Alfresa Licensed Products in the Alfresa Territory. During the term of the agreement, (1) we and Alfresa are obligated to use commercially reasonable efforts to develop a Alfresa Licensed Product throughout the Alfresa Territory, and (2) Alfresa is obligated to use commercially reasonable efforts to (A) seek pricing and reimbursement approval, (B) seek and maintain regulatory approval for the Alfresa Licensed Products through the Alfresa Territory, and (C) market, promote and otherwise commercialize Alfresa Licensed Products in the field throughout the Alfresa Territory.

Under the agreement, we received a one-time upfront payment of $2.0 million and earned $5 million upon the achievement of a clinical milestone during 2021. We are eligible to receive regulatory milestones of up to $8.0 million in the aggregate. Further, we are eligible to receive a negotiable transfer price expected to be in the low double-digit percentage on net sales subject to the regulatory approval to commercialize *neffy* in Japan. We share the cost of any additional clinical studies required for approval of *neffy* in Japan. Additionally, Alfresa is obligated to either (i) enter into a commercial supply agreement with us pursuant to which we will supply drug product for commercial sale at an agreed upon transfer price, or (ii) if Alfresa elects to manufacture its own supply of drug product, pay us a royalty payment on the net sales of drug product in the Alfresa Territory in an amount equal to monetary value we would receive by supplying drug product to Alfresa at the transfer price.

The agreement will continue until the later of (i) expiration of the last-to-expire valid claim of our patents or joint patent with Alfresa covering the composition, method of manufacture or method of use in the field of any Alfresa Licensed Product in the Alfresa Territory, and (ii) 10 years after the first commercial sale of any Alfresa Licensed Product in the Alfresa Territory. Alfresa has the right to terminate the agreement (1) at any time after a specified notice period to us, or (2) upon notice to us if a binding decision is rendered invalidating any of our patents. Either party may terminate the agreement for uncured material breach of the other party, or upon notice for insolvency-related events of the other party that are not discharged within a defined time period.

Collaboration and Distribution Agreement with Pediatrix

In March 2021, we entered into a collaboration and distribution agreement with Pediatrix Therapeutics ("Pediatrix"). Pursuant to the agreement, we granted Pediatrix (i) an exclusive, royalty-bearing, sublicensable license under our patents relating to *neffy* to develop, use, register and import epinephrine compositions ("Pediatrix Licensed Compositions") and related products ("Pediatrix Licensed Products") in China, Macau, Hong Kong and Taiwan (the "Pediatrix Territory") and to promote, offer for sale and sell Pediatrix Licensed Products in the Pediatrix Territory; and (ii) an exclusive, royalty-bearing, sublicensable license to manufacture Pediatrix Licensed Compositions and Pediatrix Licensed Products solely for the purpose of exercising the license described in clause (i) in the Pediatrix Territory. We expressly reserved all rights to practice and grant licenses under our technology outside the scope of the licenses granted to Pediatrix. During the term of the agreement, Pediatrix is obligated to use commercially reasonable efforts to (1) develop the Pediatrix Licensed Products throughout the Pediatrix Territory, (2) prepare, obtain, maintain and renew all necessary regulatory approvals for the Pediatrix Licensed Products in the Pediatrix Territory, and (3) market, promote and otherwise commercialize the Pediatrix Licensed Products throughout the Pediatrix Territory.

Under the agreement, we received a one-time upfront payment of $3.0 million and are eligible to receive a regulatory milestone payment of $4.0 million and net sales milestone payments of up to $80.0 million in the aggregate. We will receive a per unit supply price for any sale of commercial supply to Pediatrix. Additionally, we are eligible to receive a tiered royalty on the net sales of all Pediatrix Licensed Products during the applicable royalty term, which is less than one percent below a minimum annual sales threshold, and increasing to low-to-mid double-digit percentages above the minimum annual sales threshold, subject to reductions under certain conditions including due to generic competition. Pediatrix's obligation to pay us royalties continues on a Pediatrix Licensed Product-by- Pediatrix Licensed Product and region-by-region basis in the Pediatrix Territory, until the latest of (i) expiration of the last-to-expire valid claim of our patents covering such Licensed Product in such region; (ii) the expiration of all regulatory exclusivities that cover such Licensed Product in such region; or (iii) ten years after the first commercial sale of such Pediatrix Licensed Product in such region (the "Pediatrix Royalty Term").

The agreement will continue until the expiration of the last-to-expire Pediatrix Royalty Term. Pediatrix has the right to terminate the agreement at any time after a specified notice period to us. Either party may terminate the agreement for uncured material breach of the other party, or upon notice for insolvency-related events of the other party that are not discharged within a defined time period.

Manufacturing Agreement with Renaissance

In September 2020, we entered into a manufacturing agreement with Renaissance Lakewood, LLC ("Renaissance"). Pursuant to the agreement, Renaissance agreed to manufacture for, and provide to us, *neffy* nasal unit dose sprays ("Renaissance Products"). We are obligated to provide Renaissance with certain supplies to manufacture the Renaissance Products and to purchase from Renaissance a mid double-digit percentage of our annual aggregate Renaissance Product requirements in the EU, and a high double-digit percentage of our annual aggregate Renaissance Product requirements in the U.S. The agreement contains conventional commercial pharmaceutical manufacturing provisions including certain minimum purchase amounts to be determined in the future based on forecast needs and minimum batch size projections. We may also request Renaissance perform certain services related to the Renaissance Product, for which we will pay reasonable compensation to Renaissance.

The initial term of the agreement commenced on the date it was entered into and continues (a) for Renaissance Product designated for commercial sale in the U.S. until the earlier of the fifth anniversary of the (i) target U.S. launch date and (ii) the initial U.S. launch date ("U.S. Initial Term"), and (b) for Renaissance Product designated for commercial sale in the EU and other countries, the earlier of the fifth anniversary of (i) the target EU launch date and (ii) the initial EU launch date ("EU Initial Term"), in each case unless earlier terminated by one of the parties. The U.S. Initial Term and EU Initial Term automatically renew for successive two-year terms ("Renewal Term"). Either party may elect not to renew the U.S. Renewal Term and/or the EU Renewal Term by providing the requisite prior notice to the other party. Either party may terminate the agreement (1) for uncured material breach of the other party, (2) upon notice for insolvency-related events of the other party that are not discharged within a defined time period, (3) on a product-by-product basis if the manufacture, distribution or sale would materially contravene any applicable law, (4) by providing the requisite notice if (a) we have not submitted a regulatory filing for any Renaissance Product in the U.S. on or before June 30, 2022, (b) the authorization and approval to distribute or sell Renaissance Product in the U.S. is not granted on or before the target U.S. launch date, (c) the authorization and approval representing more than a targeted number of units of Renaissance Product sold in the U.S. during the last calendar year is withdrawn by the FDA, or (d) we decided in our sole discretion to cease commercializing the Renaissance Product in the U.S., (5) in the case of a force majeure event that continues for six months or more, or (6) a violation by the other party of trade control or anti-corruption laws.

Government Regulation and Product Approval

As a pharmaceutical company that operates in the United States, we are subject to extensive regulation. Government authorities in the United States (at the federal, state and local level) and in other countries extensively regulate, among other things, the research, development, testing, manufacturing, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of drug products such as those we are developing. Product candidates that we develop must be approved by the FDA, before they may be legally marketed in the United States 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 United States, although there can be important differences. Additionally, some significant aspects of regulation in Europe are addressed in a centralized way, but country-specific regulation remains essential in many respects.

Regulation of Combination Products in the United States

neffy is comprised of drug and delivery device components that would normally be subject to different regulatory frameworks by the FDA and frequently regulated by different centers at the FDA. These products are known as combination products. Under the Federal Food, Drug and Cosmetic Act ("FDCA"), the FDA is charged with assigning a center with primary jurisdiction, or a lead center, for review of a combination product. The determination of which center will be the lead center is based on the "primary mode of action" of the combination product. Thus, if the primary mode of action of a drug-device combination product is attributable to the drug product, the FDA center responsible for premarket review of the drug product would have primary jurisdiction for the combination product.

A combination product with a primary mode of action attributable to the drug component, such as *neffy*, generally would be reviewed and approved pursuant to the drug approval processes set forth in the FDCA. In reviewing the NDA for such a product, however, FDA reviewers would consult with their counterparts in the device center to ensure that the device component of the combination product – the sprayer - met applicable requirements regarding safety, effectiveness, durability and performance. In addition, under FDA regulations, combination products such as *neffy* are subject to cGMP requirements applicable to both drugs and devices, including the Quality System Regulations applicable to medical devices.

U.S. Drug Development Process

In the United States, the FDA regulates drugs under the FDCA, and implementing regulations. A new drug must be approved by the FDA through the NDA process before it may be legally marketed in the United States. Drugs are also subject to other federal, state and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to administrative or judicial sanctions. FDA sanctions could include, among other actions, refusal to approve pending applications, withdrawal of an approval, a clinical hold, warning letters, product recalls or withdrawals from the market, product seizures, total or partial suspension of production or distribution injunctions, fines, refusals of government contracts, restitution, disgorgement or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us. The process required by the FDA before a drug may be marketed in the United States generally involves the following:

- completion of extensive preclinical laboratory tests, preclinical animal studies and formulation studies in accordance with applicable regulations, including the FDA's Good Laboratory Practice ("GLP") regulations and other applicable regulations;
- submission to the FDA of an investigational new drug ("IND"), which must become effective before human clinical trials may begin;
- approval by an independent institutional review board ("IRB") at each clinical site before each trial may be initiated;
- performance of adequate and well-controlled human clinical trials in accordance with applicable regulations, including the FDA's good clinical practice ("GCP") regulations to establish the safety and efficacy of the proposed drug for its proposed indication;
- submission to the FDA of an NDA after completion of all pivotal trials;
- a determination by the FDA within 60 days of its receipt of an NDA to file the NDA for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities where the drug is produced to assess compliance with cGMP requirements to assure that the facilities, methods and controls are adequate to preserve the drug's identity, strength, quality and purity;
- potential FDA audit of the preclinical and/or clinical trial sites that generated the data in support of the NDA to assess compliance with GCP regulations;
- satisfactory completion of an FDA advisory committee review, if applicable; and
- FDA review and approval of the NDA prior to any commercial marketing or sale of the drug in the United States.

Before testing any compounds with potential therapeutic value in humans, the product candidate enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies, to assess the potential safety and activity of the product candidate. The conduct of the preclinical tests must comply with federal regulations and requirements including GLP requirements. The sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. An IND is a request for authorization from the FDA to administer an investigational drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for human trials. Some preclinical testing may continue even after the IND is submitted. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA raises concerns or questions regarding the proposed clinical trials and places the IND on clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may also impose clinical holds on a product candidate at any time before or during clinical trials due to safety concerns or non-compliance.

Clinical trials involve the administration of the product candidate to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control, in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, subject selection and exclusion criteria and the parameters to be used to monitor subject safety and assess efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the IND. Further, each clinical trial must be reviewed and approved by an independent IRB at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial subject or his or her legal representative and must monitor the clinical trial until completed. There are also requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries.

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

- Phase 1. The drug is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion, the side effects associated with increasing doses and if possible, to gain early evidence of effectiveness. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.

- Phase 2. The drug is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases or conditions and to determine dosage tolerance, optimal dosage and dosing schedule. Multiple Phase 2 clinical trials may be conducted to obtain information prior to beginning larger and more expensive Phase 3 clinical trials.

- Phase 3. The drug is administered to an expanded patient population to further evaluate dosage and clinical efficacy at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall benefit/risk ratio of the product and provide an adequate basis for product approval. Generally, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of an NDA.

Post-approval studies, or Phase 4 clinical trials, may be conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, FDA may mandate the performance of Phase 4 trials. In certain instances, the FDA may mandate the performance of Phase 4 clinical trials as a condition of approval of an NDA.

During the development of a new drug, sponsors are given opportunities to meet with the FDA at certain points. These points may be prior to submission of an IND, at the end of Phase 2, and before an NDA is submitted. Meetings at other times may be requested. These meetings can provide an opportunity for the sponsor to share information about the data gathered to date, for the FDA to provide advice, and for the sponsor and the FDA to reach agreement on the next phase of development. Sponsors typically use the meetings at the end of the Phase 2 trial to discuss Phase 2 clinical results and present plans for the pivotal Phase 3 clinical trials that they believe will support approval of the new drug.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA and the investigators for serious and unexpected AEs or any finding from tests in laboratory animals that suggests a significant risk for human subjects. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA, the IRB, or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether or not a trial may move forward at designated check points based on access to certain data from the trial.

Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the drug as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, must develop methods for testing the identity, strength, quality and purity of the final drug. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

U.S. Review and Approval Processes

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, preclinical studies and clinical trials, along with descriptions of the manufacturing process, analytical tests conducted on the chemistry of the drug, proposed labeling and other relevant information are submitted to the FDA as part of an NDA requesting approval to market the product. Data may come from company-sponsored clinical trials intended to test the safety and effectiveness of a use of a product, or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and effectiveness of the investigational drug product to the satisfaction of the FDA. The submission of an NDA is subject to the payment of substantial user fees; a waiver of such fees may be obtained under certain limited circumstances.

In addition, the Pediatric Research Equity Act ("PREA") requires a sponsor to conduct pediatric clinical trials for most drugs, for a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration. Under PREA, original NDAs and supplements must contain a pediatric assessment unless the sponsor has received a deferral or waiver. The required assessment must evaluate the safety and effectiveness of the product for the claimed indications in all relevant pediatric subpopulations and support dosing and administration for each pediatric subpopulation for which the product is safe and effective. The sponsor or FDA may request a deferral of pediatric clinical trials for some or all of the pediatric subpopulations. A deferral may be granted for several reasons, including a finding that the drug is ready for approval for use in adults before pediatric clinical trials are complete or that additional safety or effectiveness data need to be collected before the pediatric clinical trials begin. The FDA must send a non-compliance letter to any sponsor that fails to submit the required assessment, keep a deferral current or fails to submit a request for approval of a pediatric formulation. Unless otherwise required by regulation, the Pediatric Research Equity Act does not apply to any drug for an indication for which orphan designation has been granted. However, if only one indication for a product has orphan designation, a pediatric assessment may still be required for any applications to market that same product for the non-orphan indication(s).

The FDA reviews all NDAs submitted before it accepts them for filing and may request additional information rather than accepting an NDA for filing. The FDA must make a decision on accepting an NDA for filing within 60 days of receipt. Once the submission is accepted for filing, the FDA begins an in-depth review of the NDA. Under the PDUFA guidelines that are currently in effect, the FDA has a goal of ten months from the date of "filing" of a standard NDA for a new molecular entity to review and act on the submission. This review typically takes twelve months from the date the NDA is submitted to FDA because the FDA has approximately two months to make a "filing" decision after it the application is submitted The FDA does not always meet its PDUFA goal dates for standard and priority NDAs, and the review process is often significantly extended by FDA requests for additional information or clarification.

After the NDA submission is accepted for filing, the FDA reviews the NDA to determine, among other things, whether the proposed product is safe and effective for its intended use and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, strength, quality and purity. The FDA may refer applications for novel drug products or drug products which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions and typically follows the advisory committee's recommendations.

Before approving an NDA, the FDA will inspect the facilities at which the product is manufactured. The FDA will not approve the product 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 may inspect one or more clinical sites to assure compliance with GCP requirements. After the FDA evaluates the application, manufacturing process and manufacturing facilities, it may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete and the application will not be approved in its present form. A Complete Response Letter usually describes all of the specific deficiencies in the NDA identified by the FDA. The Complete Response Letter may require additional clinical data and/or (an) additional pivotal Phase 3 clinical trial(s), and/or other significant and time-consuming requirements related to clinical trials, preclinical studies or manufacturing. If a Complete Response Letter is issued, the applicant may either resubmit the NDA, addressing all of the deficiencies identified in the letter, or withdraw the application. Even if such data and information are submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling or may condition the approval of the NDA on other changes to the proposed labeling, development of adequate controls and specifications, or a commitment to conduct one or more post-market studies or clinical trials. For example, the FDA may require Phase 4 testing, which involves clinical trials designed to further assess a drug safety and effectiveness, and may require testing and surveillance programs to monitor the safety of approved products that have been commercialized. The FDA may also determine that a risk evaluation and mitigation strategy ("REMS") is necessary to assure the safe use of the drug. If the FDA concludes a REMS is needed, the sponsor of the NDA must submit a proposed REMS; the FDA will not approve the NDA without an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools.

Fast Track Designation

The FDA has a number of programs intended to expedite the development or review of products that meet certain criteria. For example, the FDA has a fast track designation program that is intended to expedite or facilitate the process for reviewing new drug products that meet certain criteria. Specifically, new drugs are eligible for fast track designation if they are intended to treat a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. Fast track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a fast track product has opportunities for more frequent interactions with the applicable FDA review team during product development and, once an NDA is submitted, the product candidate may be eligible for priority review. With regard to a fast track product, the FDA may consider for review sections of the NDA on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the NDA, the FDA agrees to accept sections of the NDA and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the NDA.

Any product submitted to the FDA for approval, including a product with a fast track designation, may also be eligible for other types of FDA programs intended to expedite development and review, such as priority. A product is eligible for priority review if it is designed to treat a serious condition, and if approved, would provide a significant improvement in the treatment, diagnosis or prevention of a serious condition compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug designated for priority review in an effort to facilitate the review. The FDA endeavors to review applications with priority review designations within six months of the filing date as compared to ten months for review of new molecular entity NDAs under its current PDUFA review goals.

Fast track designation and priority review do not change the standards for approval but may expedite the development or approval process. Even if a product qualifies for one of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened. In addition, such designations or shortened review periods may not provide a material commercial advantage.

Post-Approval Requirements

Any drug products manufactured or distributed pursuant to FDA approvals are subject to continuing regulation by the FDA, including, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information, product sampling and distribution requirements, and complying with FDA promotion and advertising requirements. After approval, most changes to the approved product, such as adding new indications or other labeling claims, are subject to prior FDA review and approval. There also are continuing, annual program fees for any marketed products.

In addition, quality control and manufacturing procedures must continue to conform to applicable manufacturing requirements after approval to ensure the long-term stability of the drug product. cGMP regulations require among other things, quality control and quality assurance as well as the corresponding maintenance of records and documentation and the obligation to investigate and correct any deviations from cGMP. Drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. In addition, changes to the manufacturing process are strictly regulated, and depending on the significance of the change, may require prior FDA approval before being implemented. Other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

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

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters, or untitled letters;
- clinical holds on clinical studies;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA also may require post-marketing testing, known as Phase 4 testing, and surveillance to monitor the effects of an approved product. Discovery of previously unknown problems with a product or the failure to comply with applicable FDA requirements can have negative consequences, including adverse publicity, judicial or administrative enforcement, warning letters from the FDA, mandated corrective advertising or communications with doctors, and civil or criminal penalties, among others. Newly discovered or developed safety or effectiveness data may require changes to a product's approved labeling, including the addition of new warnings and contraindications, and also may require the implementation of other risk management measures.

The FDA closely regulates the marketing, labeling, advertising and promotion of drug products. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe, in their independent professional medical judgment, legally available products for uses that are not described in the product's labeling and that differ from those tested and approved by the FDA. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products. The federal government has levied large civil and criminal fines against companies for alleged improper promotion of off-label use and has enjoined companies from engaging in off-label promotion. The FDA and other regulatory agencies have also required that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. However, companies may share truthful and not misleading information that is otherwise consistent with a product's FDA-approved labelling.

Hatch-Waxman Act

Section 505 of the FDCA describes three types of marketing applications that may be submitted to the FDA to request marketing authorization for a new drug. A Section 505(b)(1) NDA is an application that contains full reports of investigations of safety and efficacy. A 505(b)(2) NDA is an application that contains full reports of investigations of safety and efficacy but where at least some of the information required for approval comes from investigations that were not conducted by or for the applicant and for which the applicant has not obtained a right of reference or use from the person by or for whom the investigations were conducted. This regulatory pathway enables the applicant to rely, in part, on the FDA's prior findings of safety and efficacy for an existing product, or published literature, in support of its application. Section 505(j) establishes an abbreviated approval process for a generic version of approved drug products through the submission of an Abbreviated New Drug Application ("ANDA"). An ANDA provides for marketing of a generic drug product that has the same active ingredients, dosage form, strength, route of administration, labeling, performance characteristics and intended use, among other things, to a previously approved product. ANDAs are termed "abbreviated" because they are generally not required to include preclinical (animal) and clinical (human) data to establish safety and efficacy. Instead, generic applicants must scientifically demonstrate that their product is bioequivalent to, or performs in the same manner as, the innovator drug through in vitro, in vivo, or other testing. The generic version must deliver the same amount of active ingredients into a subject's bloodstream in the same amount of time as the innovator drug and can often be substituted by pharmacists under prescriptions written for the reference listed drug. In seeking approval for a drug through an NDA, applicants are required to list with the FDA each patent with claims that cover the applicant's drug or a method of using the drug. Upon approval of a drug, each of the patents listed in the application for the drug is then published in the FDA's Approved Drug Products with Therapeutic Equivalence Evaluations, commonly known as the Orange Book. Drugs listed in the Orange Book can, in turn, be cited by potential competitors in support of approval of an ANDA or 505(b)(2) NDA.

Upon submission of an ANDA or a 505(b)(2) NDA, an applicant must certify to the FDA that (1) no patent information on the drug product that is the subject of the application has been submitted to the FDA; (2) such patent has expired; (3) the date on which such patent expires; or (4) such patent is invalid or will not be infringed upon by the manufacture, use or sale of the drug product for which the application is submitted. Generally, the ANDA or 505(b)(2) NDA cannot be approved until all listed patents have expired, except where the ANDA or 505(b)(2) NDA applicant challenges a listed patent through the last type of certification, also known as a paragraph IV certification. If the applicant does not challenge the listed patents or indicates that it is not seeking approval of a patented method of use, the ANDA or 505(b)(2) NDA application will not be approved until all of the listed patents claiming the referenced product have expired. If the ANDA or 505(b)(2) NDA applicant has provided a Paragraph IV certification to the FDA, the applicant must send notice of the Paragraph IV certification to the NDA and patent holders once the application has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the paragraph IV certification. If the paragraph IV certification is challenged by an NDA holder or the patent owner(s) asserts a patent challenge to the paragraph IV certification, the FDA may not approve that application until the earlier of 30 months from the receipt of the notice of the paragraph IV certification, the expiration of the patent, when the infringement case concerning each such patent was favorably decided in the applicant's favor or settled, or such shorter or longer period as may be ordered by a court. This prohibition is generally referred to as the 30-month stay. In instances where an ANDA or 505(b)(2) NDA applicant files a paragraph IV certification, the NDA holder or patent owner(s) regularly take action to trigger the 30-month stay, recognizing that the related patent litigation may take many months or years to resolve. Thus, approval of an ANDA or 505(b)(2) NDA could be delayed for a significant period of time depending on the patent certification the applicant makes and the reference drug sponsor's decision to initiate patent litigation.

The Hatch-Waxman Act establishes periods of regulatory exclusivity for certain approved drug products, during which the FDA cannot approve (or in some cases accept) an ANDA or 505(b)(2) application that relies on the branded reference drug. For example, the holder of an NDA, including a 505(b)(2) NDA, may obtain five years of exclusivity upon approval of a new drug containing new chemical entities that have not been previously approved by the FDA. A drug is a new chemical entity if the FDA has not previously approved any other new drug containing the same active moiety, which is the molecule or ion responsible for the therapeutic activity of the drug substance. During the exclusivity period, the FDA may not accept for review an ANDA or a 505(b)(2) NDA submitted by another company that contains the previously approved active moiety. However, an ANDA or 505(b)(2) NDA may be submitted after four years if it contains a certification of patent invalidity or non-infringement. The Hatch-Waxman Act also provides three years of marketing exclusivity to the holder of an NDA (including a 505(b)(2) NDA) for a particular condition of approval, or change to a marketed product, such as a new formulation for a previously approved product, if one or more new clinical studies (other than bioavailability or bioequivalence studies) was essential to the approval of the application and was conducted/sponsored by the applicant. This three-year exclusivity period protects against FDA approval of ANDAs and 505(b)(2) NDAs for the condition of the new drug's approval. As a general matter, the three year exclusivity does not prohibit the FDA from approving ANDAs or 505(b)(2) NDAs for generic versions of the original, unmodified drug product. Five-year and three-year exclusivity will not delay the submission or approval of a full NDA; however, an applicant submitting a full NDA would be required to conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and efficacy.

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

Other Healthcare Laws

In the United States, we are subject to a number of federal and state healthcare regulatory laws that restrict business practices in the healthcare industry. These laws include, but are not limited to, federal and state anti-kickback laws, false claims laws, data privacy and security laws, and other healthcare fraud and abuse laws, such as transparency laws regarding payments or other items of value provided to healthcare providers.

The U.S. federal Anti-Kickback Statute prohibits, among other things, any person or entity from knowingly and willfully offering, paying, soliciting, receiving or providing any remuneration, directly or indirectly, overtly or covertly, to induce or in return for purchasing, leasing, ordering, or arranging for or recommending the purchase, lease, or order of any good, facility, item or service reimbursable, in whole or in part, under Medicare, Medicaid or other federal healthcare programs. The term "remuneration" has been broadly interpreted to include anything of value. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other hand. Although there are a number of statutory exceptions and regulatory safe harbors protecting certain common activities from prosecution or other regulatory sanctions, the exceptions and safe harbors are drawn narrowly and practices that involve remuneration that are alleged to be intended to induce prescribing, purchases, or recommendations may be subject to scrutiny if they do not qualify for an exception or safe harbor. Failure to meet all of the requirements of a particular applicable statutory exception or regulatory safe harbor does not make the conduct per se illegal under the federal healthcare program anti-kickback statute. Instead, the legality of the arrangement will be evaluated on a case-by-case basis based on a cumulative review of all its facts and circumstances. Several courts have interpreted the statute's intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the federal healthcare program anti-kickback statute has been violated. Additionally, the intent standard under the federal anti-kickback statute was amended by the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the "ACA") to a stricter standard such that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. In addition, the ACA codified case law that a claim including items or services resulting from a violation of the federal healthcare program anti-kickback statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act.

The federal false claims, including the civil False Claims Act, prohibit, among other things, any person or entity from knowingly presenting, or causing to be presented, a false, fictitious or fraudulent claim for payment to, or approval by, the federal government, knowingly making, using, or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government, or knowingly making a false statement to avoid, decrease or conceal an obligation to pay money to the U.S. federal government. A claim includes "any request or demand" for money or property presented to the U.S. government. Actions under the civil False Claims Act may be brought by the Attorney General or as a qui tam action by a private individual in the name of the government. Moreover, a claim including items or services resulting from a violation of the U.S. federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act.

In addition, the federal civil monetary penalties law, subject to certain exceptions, prohibits, among other things, the offer or transfer of remuneration, including waivers of copayments and deductible amounts (or any part thereof), to a Medicare or state healthcare program beneficiary if the person knows or should know it is likely to influence the beneficiary's selection of a particular provider, practitioner or supplier of services reimbursable by Medicare or a state healthcare program.

Health Insurance Portability and Accountability Act of 1996 ("HIPAA") created additional federal criminal statutes that prohibit, among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the U.S. federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

In addition, HIPAA, as amended by Health Information Technology for Economic and Clinical Health Act of 2009 ("HITECH"), imposes certain requirements on covered entities, which include certain healthcare providers, health plans and healthcare clearinghouses, and their business associates and covered subcontractors that receive or obtain protected health information in connection with providing a service on behalf of a covered entity relating to the privacy, security and transmission of individually identifiable health information.

The federal Physician Payments Sunshine Act requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to CMS information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), other health care professionals (such as physicians assistants and nurse practitioners), and teaching hospitals, as well as information regarding ownership and investment interests held by physicians and their immediate family members.

Similar state and local laws and regulations may also restrict business practices in the pharmaceutical industry, such as state anti-kickback and false claims laws, which may apply to business practices, including but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers, or by patients themselves; 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 and other potential referral sources; state laws and regulations that require drug manufacturers to file reports relating to pricing information and marketing expenditures or which require tracking gifts and other remuneration and items of value provided to physicians, other healthcare providers and entities; and state and local laws that require the registration of pharmaceutical sales representatives.

Violations of any of these laws and other applicable healthcare fraud and abuse laws may be punishable by criminal and civil sanctions, including significant fines and civil monetary penalties, the possibility of exclusion from federal healthcare programs (including Medicare and Medicaid), disgorgement and corporate integrity agreements, which impose, among other things, rigorous operational and monitoring requirements on companies. Similar sanctions and penalties, as well as imprisonment, also can be imposed upon executive officers and employees of such companies.

Coverage and Reimbursement

Sales of any pharmaceutical product depend, in part, on the extent to which such product will be covered by third-party payors, such as federal, state and foreign government healthcare programs, commercial insurance and managed healthcare organizations, and the level of reimbursement for such product by third-party payors. In the United States, no uniform policy exists for coverage and reimbursement for pharmaceutical products among third-party payors. Therefore, decisions regarding the extent of coverage and amount of reimbursement to be provided are made on a plan-by-plan basis. The process for determining whether a third-party payor will provide coverage for a product typically is separate from the process for setting the price of such product or for establishing the reimbursement rate that the payor will pay for the product once coverage is approved. There is significant uncertainty related to the insurance coverage and reimbursement of newly approved products. Some third-party payors require pre-approval of coverage for new drugs before they will reimburse healthcare providers who use such therapies. Generally, third-party payors limit coverage and reimbursement for new medication prior to a formal review by the payors' pharmacy and therapeutics committees. As such, several third-party payors have indicated that our products may be subject to denial or limited coverage prior to formal review. There may be significant delays in obtaining reimbursement for newly-approved drugs, and coverage may be more limited than the purposes for which the drug or therapeutic biologic is approved by the FDA or similar foreign regulatory authorities. Additionally, we may need to conduct expensive pharmaco-economic studies to demonstrate the medical necessity and cost-effectiveness of our product candidates. There can be no assurance that our product candidates will be considered medically necessary or cost-effective.

Third-party payors may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the FDA-approved products for a particular indication, or place products at certain formulary levels that result in lower reimbursement levels and higher cost-sharing obligation imposed on patients. One third-party payor's decision to cover a particular medical product or service does not ensure that other payors will also provide coverage for the medical product or service and the level of coverage and reimbursement can differ significantly from payor to payor. As a result, the coverage determination process will often require us to provide scientific and clinical support for the use of our products to each payor separately and can be a time-consuming process, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Additionally, a third-party payor's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained, less favorable coverage policies and reimbursement rates may be implemented in the future.

Moreover, as a condition of participating in, and having products covered under, certain federal healthcare programs, such as Medicare and Medicaid, we are subject to federal laws and regulations that require pharmaceutical manufacturers to calculate and report certain price reporting metrics to the government, such as Medicaid Average Manufacturer Price ("AMP"), and Best Price, Medicare Average Sales Price, the 340B Ceiling Price, and Non-Federal AMP reported to the Department of Veteran Affairs, and with respect to Medicaid, pay statutory rebates on utilization of manufacturers' products by Medicaid beneficiaries.

In international markets, reimbursement and healthcare payment systems vary significantly by country, and many countries have instituted price ceilings on specific products and therapies. For example, the European Union provides options for its member states to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. A member state may approve a specific price for the medicinal product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the medicinal product on the market. Pharmaceutical products may face competition from lower-priced products in foreign countries that have placed price controls on pharmaceutical products. Furthermore, there can be no assurance that a product will be considered medically reasonable and necessary for a specific indication, that a product will be considered cost-effective by third-party payors, that an adequate level of reimbursement will be established even if coverage is available or that the third-party payors' reimbursement policies will not adversely affect the ability to sell a product profitably.

Healthcare Reform

In the United States and certain foreign jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes to the healthcare system. For example, implementation of the ACA substantially changed the way healthcare is financed by both governmental and private insurers in the United States and significantly affected the pharmaceutical industry. The ACA, among other things, increased the minimum level of Medicaid rebates payable by manufacturers of brand name drugs; required collection of rebates for drugs paid by Medicaid managed care organizations; required manufacturers to participate in a coverage gap discount program, under which they must agree to offer point-of-sale discounts (increased to 70 percent, effective as of January 1, 2019) off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D; imposed a non-deductible annual fee on pharmaceutical manufacturers or importers who sell certain "branded prescription drugs" to specified federal government programs, implemented a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected expanded the types of entities eligible for the 340B drug discount program; expanded eligibility criteria for Medicaid programs; created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research; and established a Center for Medicare Innovation at CMS to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending.

Since its enactment, there have been judicial, administrative, executive, and Congressional legislative challenges to certain aspects of the ACA. For example, on June 17, 2021, the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Further, prior to the U.S. Supreme Court ruling, on January 28, 2021, President Biden issued an executive order to initiate a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. In addition, on August 16, 2022, President Biden signed the Inflation Reduction Act of 2022 ("IRA") into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and creating a new manufacturer discount program. It is unclear how such challenges and the healthcare reform measures of the Biden administration will impact the ACA.

Other legislative changes have been proposed and adopted since the ACA was enacted, including aggregate reductions of Medicare payments to providers of 2% per fiscal year pursuant to the Budget Control Act of 2011which went into effect on April 1, 2013, and due to subsequent legislative amendments, will remain in effect until 2031, unless additional Congressional action is taken. Under current legislation, the actual reduction in Medicare payments will vary from 1% in 2022 to up to 4% in the final fiscal year of this sequester. In addition, on January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. Congress is considering additional health reform measures.

Moreover, there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several U.S. Presidential executive orders, congressional inquiries, and proposed and enacted legislation designed, among other things, to bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs and reform government program reimbursement methodologies for pharmaceutical products. For example, at the federal level, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, the U.S. Department of Health and Human Services ("HHS") released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. In addition, the IRA, among other things, (i) directs HHS to negotiate the price of certain high-expenditure, single-source drugs and biologics covered under Medicare, and subject drug manufacturers to civil monetary penalties and a potential excise tax by offering a price that is not equal to or less than the negotiated "maximum fair price" for such drugs and biologics under the law, and (ii) imposes rebates with respect to certain drugs and biologics covered under Medicare Part B or Medicare Part D to penalize price increases that outpace inflation. The IRA permits HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years. These provisions will take effect progressively starting in fiscal year 2023, although they may be subject to legal challenges. It is currently unclear how the IRA will be implemented but is likely to have a significant impact on the pharmaceutical industry. Further, the Biden administration released an additional executive order on October 14, 2022, directing HHS to submit a report on how the Center for Medicare and Medicaid Innovation can be further leveraged to test new models for lowering drug costs for Medicare and Medicaid beneficiaries. It is unclear whether this executive order or similar policy initiatives will be implemented in the future. In addition, the American Taxpayer Relief Act of 2021, effective January 1, 2024, would eliminate the statutory cap on rebate amounts owed by drug manufacturers under the Medicaid Drug Rebate Program ("MDRP"), which is currently capped at 100% of the AMP for a covered outpatient drug.

Individual states in the United States have also become increasingly active in implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures and, in some cases, mechanisms to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine which drugs and suppliers will be included in their healthcare programs. Furthermore, there has been increased interest by third-party payors and governmental authorities in reference pricing systems and publication of discounts and list prices.

We expect additional state and federal healthcare reform measures to be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services.

Data Privacy and Security Laws

Numerous state, local, federal and foreign laws, including consumer protection laws and regulations related to data privacy, security, and protection, govern the collection, dissemination, use, access to, confidentiality, and security of personal information, including health-related information. Such obligations may include, without limitation, HIPAA, the Federal Trade Commission Act, the California Consumer Privacy Act of 2018 ("CCPA"), the Canadian Personal Information Protection and Electronic Documents Act, Canada's Anti-Spam Legislation, the European Union's General Data Protection Regulation 2016/679 ("EU GDPR"), and the EU GDPR as it forms part of United Kingdom ("UK") law by virtue of section 3 of the European Union (Withdrawal) Act 2018 ("UK GDPR").HIPAA, as amended by HITECH, imposes obligations, including mandatory contractual terms, on certain covered healthcare providers, health plans, and healthcare clearinghouses and their respective business associates and covered subcontractors that perform services for them that involve the use, or disclosure of, individually identifiable health information with respect to safeguarding the privacy, security and transmission of individually identifiable health information. In addition, certain state and non-U.S. laws, such as the CCPA, the CPRA and the GDPR, govern the privacy and security of personal information, including health-related information in certain circumstances, some of which are more stringent than HIPAA and many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. Failure to comply with these laws, where applicable, can result in the imposition of significant civil and/or criminal penalties and private litigation. Privacy and security laws, regulations, and other obligations are constantly evolving, may conflict with each other to make compliance efforts more challenging, and can result in investigations, proceedings, or actions that lead to significant penalties and restrictions on data processing.

In addition, Congress and various other states have enacted or are considering new laws and regulations regarding the privacy and security of heath and other personal information to which we may become subject. Further, all 50 states have passed laws regulating the actions that a business must take if it experiences a data breach, such as prompt disclosure to affected customers. In addition to data breach notification laws, some states have enacted statutes and rules requiring businesses to reasonably protect certain types of personal information they hold or to otherwise comply with certain specified data security requirements for personal information. We intend to continue to protect all personal information in our control and to comply with all applicable laws regarding the protection of such information.

The CCPA and EU GDPR are examples of the increasingly stringent and evolving regulatory frameworks related to personal data processing that may increase our compliance obligations and exposure for any noncompliance. For example, the CCPA regulates the processing of personal information of California residents and increases the privacy and security obligations of covered companies handling such personal information, including requiring covered companies to provide new disclosures to California residents, and affords such residents new abilities to opt-out of certain sales of personal information. The CCPA provides for civil penalties for violations, as well as a private right of action for certain data breaches that result in the loss of personal information that may increase the likelihood of, and risks associated with, data breach litigation. Moreover, the California Privacy Rights Act, or the CPRA, – a consumer privacy ballot initiative that amends and expands the CCPA became effective on January 1, 2023, and expands the CCPA. The CPRA affords California residents significantly more control over their personal information, imposes heightened compliance obligations on covered companies, and establishes a new enforcement agency dedicated to consumer privacy. While aspects of the CCPA and CPRA and its interpretation remain to be determined in practice, they create further uncertainty and may result in additional costs and expenses in an effort to comply.

Foreign data privacy and security laws (including but not limited to the EU GDPR and UK GDPR) impose significant and complex compliance obligations on entities that are subject to those laws. As one example, the EU GDPR applies to any company established in the EEA and to companies established outside the EEA that process personal data in connection with the offering of goods or services to data subjects in the EEA or the monitoring of the behavior of data subjects in the EEA. These obligations may include limiting personal data processing to only what is necessary for specified, explicit, and legitimate purposes; requiring a legal basis for personal data processing; requiring the appointment of a data protection officer in certain circumstances; increasing transparency obligations to data subjects; requiring data protection impact assessments in certain circumstances; limiting the collection and retention of personal data; increasing rights for data subjects; formalizing a heightened and codified standard of data subject consents; requiring the implementation and maintenance of technical and organizational safeguards for personal data; mandating notice of certain personal data breaches to the relevant supervisory authority(ies) and affected individuals; and mandating the appointment of representatives in the UK and/or the EU in certain circumstances.

The U.S. Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act of 1977 ("FCPA") prohibits any U.S. individual or business from paying, offering, or authorizing payment or offering of anything of value, directly or indirectly, to any foreign official, political party or candidate for the purpose of influencing any act or decision of the foreign entity in order to assist the individual or business in obtaining or retaining business. The FCPA also obligates companies whose securities are listed in the United States to comply with accounting provisions requiring the company to maintain books and records that accurately and fairly reflect all transactions of the corporation, including international subsidiaries, and to devise and maintain an adequate system of internal accounting controls for international operations.

Europe / Rest of World Government Regulation

In addition to regulations in the United States, we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our products. Whether or not we or our potential collaborators obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of an application for a clinical trial authorization ("CTA") much like the IND prior to the commencement of human clinical trials. In the EU, for example, a CTA must be submitted to each country's national health authority and an application made to an independent ethics committee, much like the FDA and IRB, respectively. Once the CTA is approved in accordance with a country's requirements and a favorable ethics committee opinion has been issued, clinical trial development may proceed.

The requirements and process governing the conduct of clinical trials are to a significant extent harmonized at the EU level, but could vary from country to country. In all cases, the clinical trials must be conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

To obtain regulatory approval of an investigational drug or biological product under EU regulatory systems, we must submit a marketing authorization application either under the so-called centralized or national authorization procedures. The application used to file an NDA in the United States is similar to that required in the EU, but the exact requirements for authorization may vary.

Centralized Procedure. The centralized procedure provides for the grant of a single marketing authorization by the European Commission following a favorable opinion by the EMA that is valid in all EU member states, as well as Iceland, Liechtenstein and Norway. The centralized procedure is compulsory for medicines produced by specified biotechnological processes, products designated as orphan medicinal products, and products with a new active substance indicated for the treatment of specified diseases, such as HIV/AIDS, cancer, diabetes, neurodegenerative disorders or autoimmune diseases, other immune dysfunctions and viral diseases. The centralized procedure is optional for other products that represent a significant therapeutic, scientific or technical innovation, or whose authorization would be in the interest of public health or which contain a new active substance for indications other than those specified to be compulsory.

National Authorization Procedures. There are also two other possible routes to authorize medicinal products in several EU countries, which are available for investigational medicinal products that fall outside the scope of the centralized procedure:

- Decentralized procedure. Using the decentralized procedure, an applicant may apply for simultaneous authorizations in more than one EU Member State of medicinal products that have not yet been authorized in any EU Member State and that do not fall within the mandatory scope of the centralized procedure.

- Mutual recognition procedure. In the mutual recognition procedure, a medicine is first authorized in one EU Member State, in accordance with the national procedures of that country. Following this, further marketing authorizations can be sought from other EU countries in a procedure whereby the countries concerned agree to recognize the validity of the original, national marketing authorization.

The EU also provides opportunities for market exclusivity. For example, upon receiving marketing authorization, new chemical entities generally receive eight years of data exclusivity and an additional two years of market exclusivity. If granted, data exclusivity prevents regulatory authorities in the EU from referencing the innovator's data to assess a generic or biosimilar application. During the additional two-year period of market exclusivity, a generic or biosimilar marketing authorization can be submitted, and the innovator's data may be referenced, but no generic or biosimilar product can be marketed until the expiration of the market exclusivity. However, there is no guarantee that a product will be considered by the EU's regulatory authorities to be a new chemical entity, and products may not qualify for data exclusivity.

The EMA grants orphan drug designation to promote the development of products for the treatment, prevention or diagnosis of life-threatening or chronically debilitating conditions affecting not more than five in 10,000 people in the EU. In addition, orphan drug designation can be granted if the drug is intended for a life threatening or chronically debilitating condition in the EU and without incentives it is unlikely that sales of the drug in the EU would be sufficient to justify the investment required to develop the drug. Orphan drug designation is only available if there is no other satisfactory method approved in the EU of diagnosing, preventing or treating the condition, or if such a method exists, the proposed orphan drug will be of significant benefit to patients. Orphan drug designation provides opportunities for free or reduced-fee protocol assistance, fee reductions for marketing authorization applications and other post-authorization activities and ten years of market exclusivity following drug approval, which can be extended to 12 years if trials are conducted in accordance with an agreed-upon pediatric investigational plan. The exclusivity period may be reduced to six years if the designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

In the EU, early access mechanisms for innovative medicines (such as compassionate use programs and named patient supplies), pricing and reimbursement, and promotion and advertising, amongst other things, are subject to national regulations and oversight by national competent authorities and therefore significantly vary from country to country.

Sanctions for non-compliance with the aforementioned requirements, which may include administrative and criminal penalties, are generally determined and enforced at national level. However, under the EU financial penalties regime, the EMA can investigate and report on alleged breaches of the EU pharmaceutical rules by holders of a marketing authorization for centrally authorized medicinal products and the European Commission could adopt decisions imposing significant financial penalties on infringing marketing authorization holders.

The United Kingdom left the EU on January 31, 2020. Following the transition period which ended on December 31, 2020, Brexit could materially impact the regulatory regime with respect to the development, manufacture, importation, approval and commercialization of our product candidates in the United Kingdom in the coming years.

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

If we or our potential collaborators fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Corporate Information

Our corporate headquarters are located at 11682 El Camino Real, Suite 120, San Diego, California 92130, and our telephone number is (858) 771-9307. Our corporate website address is www.ars-pharma.com. Information contained on, or accessible through, our website shall not be deemed incorporated into and is not a part of this Annual Report on Form 10-K. Our periodic and current reports are available on our website, free of charge, as soon as reasonably practicable after filing. We have included our website in this Annual Report on Form 10-K solely as an inactive textual reference.

On November 8, 2022 (the "Closing Date"), Silverback Therapeutics, Inc., a Delaware corporation ("Silverback"), now known as ARS Pharmaceuticals, Inc., completed its reverse merger (the "Merger") with privately-held ARS Pharmaceuticals, Inc. ("ARS Pharma"), in accordance with the terms of the agreement and plan of merger and reorganization, dated July 21, 2022, as amended on August 11, 2022 and October 25, 2022 (the "Merger Agreement"), whereby Sabre Merger Sub, Inc. ("Merger Sub"), a Delaware corporation and wholly-owned subsidiary of Silverback, merged into ARS Pharma, with ARS Pharma surviving as Silverback's wholly-owned subsidiary. Pursuant to the Merger Agreement, Silverback changed its name to ARS Pharmaceuticals, Inc. See Item 7- Management's Discussion and Analysis of Financial Condition and Results of Operations of this Annual Report and Note 3- Merger and Related Transactions of our financial statements for the year ended December 31, 2022 included in Item 8 of this Annual Report for more information regarding the Merger.

Employees

As of December 31, 2022, we had seventeen full-time employees and three part-time employees. Of these employees, two held Ph.D. or M.D. degrees. None of our employees are represented by labor unions or covered by collective bargaining agreements. We consider our relationship with our employees to be good.

Item 1A. Risk Factors

We operate in a dynamic and rapidly changing environment that involves numerous risks and uncertainties. Certain factors may have a material adverse effect on our business, financial condition and results of operations, and you should carefully consider them. Accordingly, in evaluating our business, we encourage you to consider the following discussion of risk factors, in its entirety, in addition to other information contained in this Annual Report and our other public filings with the SEC. Other events that we do not currently anticipate or that we currently deem immaterial may also affect our results of operations and financial condition.

Risks Related to Our Financial Position and Need for Capital

We are a clinical-stage biopharmaceutical company and have incurred significant losses since our inception. We anticipate that we will continue to incur significant losses for the foreseeable future.

Investment in biopharmaceutical product development is highly speculative because it entails substantial upfront capital expenditures and significant risk that any potential product candidate will fail to demonstrate adequate effect or an acceptable safety profile, gain regulatory approval and become commercially viable. Our only product candidate, *neffy*, is in the clinical stage of development. We have no products approved for commercial sale and have not generated any revenue from product sales to date, and we will continue to incur significant research and development and other expenses related to our clinical development and ongoing operations. As a result, we are not profitable and have incurred losses in each period since our inception. Since our inception, we have devoted substantially all of our efforts and financial resources to organizing and staffing our company, business planning, raising capital, performing research and development activities, and providing general and administrative support for these operations. Our financial condition and operating results, including net losses, may fluctuate significantly from quarter to quarter and year to year. Accordingly, you should not rely upon the results of any quarterly or annual periods as indications of future operating performance. Additionally, net losses and negative cash flows have had, and will continue to have, an adverse effect on Our stockholders' equity and working capital. Our net losses were approximately $34.7 million and $20.2 million for the years ended December 31, 2022 and 2021, respectively. As of December 31, 2022, we had an accumulated deficit of $76.9 million. We expect to continue to incur significant losses for the foreseeable future, and we expect these losses to increase as we continue our research and development of, and seek regulatory approvals and prepare for commercialization for our product candidate, *neffy*, an investigational, new formulation of epinephrine, for the emergency treatment of Type I allergic reactions and potential additional indications.

We anticipate that our expenses will increase substantially if and as we:

- continue to develop and conduct nonclinical studies and clinical trials for *neffy* for the emergency treatment of Type I allergic reactions and potential additional indications;
- seek regulatory approvals in the United States, the EU and other geographic regions for *neffy* for the emergency treatment of Type I allergic reactions and other indications that successfully complete clinical development;
- seek to identify additional product candidates;
- initiate and continue research, preclinical and clinical development efforts for any future product candidates;
- experience any delays or encounter any issues with any of the above, including but not limited to failed studies, negative or mixed clinical trial results, safety issues or other regulatory challenges, the risk of which in each case may be exacerbated by COVID-19 or other health epidemic or pandemic;
- add clinical, scientific, operational, financial and management information systems and personnel, including personnel to support our product candidate development and potential future commercialization efforts and help us comply with our obligations as a public company;
- maintain, expand and protect our intellectual property portfolio;
- establish or expand our sales, marketing, distribution, manufacturing, supply chain and other commercial infrastructure in the future to commercialize any products for which we may obtain regulatory approval; and
- acquire or in-license other product candidates and technologies.

Our expenses could increase beyond our expectations if we are required by the FDA, the EMA or other regulatory authorities to perform clinical trials or conduct nonclinical studies in addition to those that we currently expect, or if there are any delays in completing our clinical trials or the development of *neffy*, or if we choose to develop any future product candidates.

We have never generated revenue from product sales and may never be profitable.

Our ability to become and remain profitable depends on our ability to generate significant revenue from product sales. We do not expect to generate significant revenue, if any, unless and until we, either alone or with a collaborator, are able to obtain regulatory approval for, and successfully commercialize, *neffy* for its initial indication and potential additional indications. Successful commercialization of *neffy* will require achievement of many key milestones, which vary by jurisdiction and may include demonstrating safety and efficacy in clinical trials, and obtaining regulatory approval for *neffy*. If *neffy* is approved, we, or any of our current or future licensing and collaboration partners must also comply with post-approval requirements, such as those relating to marketing and manufacturing. Finally, obtaining adequate coverage and reimbursement for *neffy* from private or government payors will be crucial to *neffy*'s commercial success. Because of the uncertainties and risks associated with these activities, we are unable to accurately and precisely predict the timing and amount of revenues, the extent of any further losses or if or when we might achieve profitability. We and any current and future licensing and collaboration partners may never succeed in these activities and, even if we do, or any current or future licensing and collaboration partners do, we may never generate revenues that are large enough for us to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis.

Our failure to become and remain profitable may depress the market price of our common stock and could impair our ability to raise capital, expand our business or continue our operations.

We have a limited operating history and only one current product candidate, neffy, which is in the clinical stage of development and has no commercial sales, which may make it difficult to evaluate the prospects for our future viability.

We are a biopharmaceutical company founded in 2015 as ARS Pharmaceuticals, Inc., and our operations to date have been limited to organizing, staffing and financing our company, raising capital, and conducting research and development activities, including preclinical and nonclinical studies and clinical trials, for our only product candidate, neffy. We have not yet demonstrated an ability to generate product revenues, obtain regulatory approvals, manufacture a commercial product, or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. Accordingly, you should consider our prospects in light of the costs, uncertainties, delays and difficulties frequently encountered by companies in clinical development, especially clinical-stage biopharmaceutical companies such as us. Any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing pharmaceutical products.

We may encounter unforeseen expenses, difficulties, complications, delays and other known or unknown factors in achieving our business objectives. We are preparing to transition from a company with a development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

We may need additional funding, and if we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development activities or commercialization efforts.

Our operations have consumed significant amounts of cash since inception. Based upon our current operating plan, we believe that our cash and cash equivalents will fund our operating and capital expenses for at least three years. We expect our spending levels to increase in connection with seeking regulatory approval and preparing for commercialization of *neffy* for the emergency treatment of Type I allergic reactions. In addition, if we obtain regulatory approval for the marketing of *neffy*, we expect to incur significant expenses related to commercial launch, product sales, medical affairs, marketing, manufacturing and distribution. Further, we expect to incur additional costs associated with operating as a public company. Even if our nonclinical and clinical development of *neffy* is successful and we are able to gain marketing approval for *neffy* for the emergency treatment of Type I allergic reactions in the timeframe we anticipate, we may require significant additional amounts of cash in order to launch and commercialize *neffy* for this indication in the United States or for any additional indications for which *neffy* receives regulatory approval. In addition, other unanticipated costs may arise in the course of our development efforts. Because the outcome of our ongoing and anticipated clinical trials and timeframe for regulatory approvals for *neffy* is highly uncertain, we cannot reasonably estimate the actual amounts of cash necessary to successfully complete the development and commercialization of *neffy* for any indication we are pursuing.

Our future capital requirements depend on many factors, including:

- the scope, progress, results and costs of researching and developing *neffy* for the emergency treatment of Type I allergic reactions and potential additional indications, as well as any future product candidates we may develop;
- the timing of, and the costs involved in, obtaining regulatory approval for the marketing of *neffy* for the emergency treatment of Type I allergic reactions and potential additional indications, and any future product candidates we may develop and pursue;
- the number of future product candidates that we may pursue and their development requirements, if any;
- if approved, the costs of commercialization activities for *neffy* for any approved indications, or the similar cost of any other product candidate that receives regulatory approval to the extent such costs are not the responsibility of any current or future licensing and collaboration partners, including the costs and timing of establishing product sales, marketing, distribution and manufacturing capabilities;
- subject to receipt of regulatory approval, revenue received from commercial sales of *neffy* for any approved indications or from future product candidates, if any;
- the amount and timing of potential royalty and milestone payments to our current or future licensing and collaboration partners;
- the receipt of licensing fees, royalties and potential milestone payments under our current or future out-licensing arrangements;
- the extent to which we in-licenses or acquire rights to other products, product candidates or technologies;
- our headcount growth and associated costs as we expand our personnel, including personnel to support our product candidate development and potential future commercialization efforts and help us comply with our obligations as a public company;
- the costs of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights, including enforcing and defending intellectual property related claims; and
- the ongoing costs of operating as a public company.

We cannot be certain that additional funding will be available on acceptable terms, or at all. The global credit and financial markets have experienced extreme volatility and disruptions, including diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates, inflation, bank failures and uncertainty about economic stability. If the equity and credit markets deteriorate, it may make any necessary debt or equity financing more difficult, more costly or more dilutive.

We believe that our existing cash and cash equivalents will be sufficient to fund our planned operations for at least three years. This estimate may prove to be wrong, and we could use our available capital resources sooner than we currently expect. Further, changing circumstances, some of which may be beyond our control, could cause us to consume capital significantly faster than we currently anticipate, and we may need to seek additional funds sooner than planned.

We have no committed source of additional capital other than potential milestone payments and royalties under our collaboration and licensing agreements. If we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or potential commercialization of *neffy* for additional indications. We may need to seek licensing and collaboration partners for *neffy* for commercialization in additional indications on terms that are less favorable than might otherwise be available or relinquish or license on unfavorable terms our rights to *neffy* in markets where we otherwise would seek to pursue development or commercialization ourselves. Any of the above events could significantly harm our business, prospects, financial condition, and results of operations.

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

We expect our expenses to increase in connection with our planned operations. Based upon our current operating plan, we believe that our cash and cash equivalents will fund our operating and capital expenses for at least three years. However, unless and until we can generate a substantial amount of revenue from *neffy*, we may seek to finance our future cash needs through public or private equity offerings, royalty-based or debt financings, collaborations, licensing arrangements or other sources, or any combination of the foregoing. In addition, we may seek additional capital due to favorable market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans.

To the extent that we raise additional capital through the sale of common stock, convertible securities or other equity securities, stockholders' interests may be diluted, and the terms of these securities could include liquidation or other preferences and anti-dilution protections that could adversely affect our stockholders' rights. In addition, new debt financing, if available, may result in fixed payment obligations and may involve agreements that include restrictive covenants that further limit our ability to take specific actions, such as incurring additional debt, making capital expenditures, creating liens, redeeming stock or declaring dividends, that could adversely impact our ability to conduct our business. In addition, securing financing could require a substantial amount of time and attention from our management and may divert a disproportionate amount of their attention away from day-to-day activities, which may adversely affect their ability to oversee the development and potential future commercialization of *neffy*.

If we raise additional funds through collaborations or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams or product candidates or grant licenses on terms that may not be favorable to us.

Changes in tax law could adversely affect our business and financial condition.

The rules dealing with U.S. federal, state and local income taxation are constantly under review by persons involved in the legislative process and by the Internal Revenue Service and the U.S. Treasury Department. Changes to tax laws (which changes may have retroactive application) could adversely affect us or holders of our common stock. In recent years, many such changes have been made and changes are likely to continue to occur in the future. Future changes in tax laws could have a material adverse effect on our business, cash flow, financial condition, realization of tax assets or results of operations.

Risks Related to the Development of *neffy* or Any Future Product Candidates

We currently depend on the success of neffy, which is our only current product candidate. If we are unable to obtain regulatory approval for, and successfully commercialize, neffy, or experiences significant delays in doing so, our business will be materially harmed.

We currently only have one product candidate, *neffy*, and our business and future success depends entirely on our ability to develop, obtain regulatory approval for, and then successfully commercialize, *neffy*, which is currently in clinical development for the emergency treatment of Type I allergic reactions in adults and children age 4 to 18 years. This may make an investment in our company riskier than similar companies that have multiple product candidates in active development that may be able to better sustain failure of a lead product candidate.

We currently have no products approved for marketing and are investing the majority of our efforts and financial resources in the development of our sole product candidate, *neffy*, for the emergency treatment of Type I allergic reactions and potential other indications. Successful continued development and ultimate regulatory approval of *neffy* for our initial indication and potential additional indications is critical to the future success of our business. We will need to successfully complete our clinical development of *neffy* for the emergency treatment of Type I allergic reactions and other indications. The future regulatory and commercial success of *neffy* and any future product candidates is subject to a number of risks, including the following:

- successful completion of nonclinical studies and clinical trials;
- successful patient enrollment in clinical trials;
- successful data from our nonclinical studies and clinical trials that support an acceptable risk-benefit profile of *neffy* or any future product candidates in the intended populations and indications;
- satisfaction of applicable regulatory requirements, including to satisfy applicable rules governing combination products;
- potential unforeseen safety issues or adverse side effects;
- receipt and maintenance of marketing approvals from applicable regulatory authorities;
- remaining in compliance with post-marketing regulatory requirements;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for *neffy* or any future product candidates;
- making arrangements or maintaining existing arrangements with third-party manufacturers, or establishing manufacturing capabilities, for both clinical and commercial supplies of *neffy* or any future product candidates;
- entry into collaborations to further the development of *neffy* or any future product candidates;
- establishing sales, marketing and distribution capabilities and launching commercial sales of any approved products, whether alone or in collaboration with others;
- successfully launching commercial sales of *neffy* or any future product candidates, if and when approved;
- acceptance of *neffy* or any future product candidates, if and when approved, by patients, the medical community and third-party payors;
- obtaining and maintaining third-party coverage and adequate reimbursement;
- products, following approval, maintaining a continued acceptable safety profile;
- effectively competing with other therapies;
- ensuring that we promote and distribute our products consistent with all applicable healthcare laws; and
- enforcing and defending intellectual property rights and claims.

Many of these risks are beyond our control, including the risks related to clinical development, the regulatory submission and review process, potential threats to our intellectual property rights and the manufacturing, marketing and sales efforts of any current or future collaboration partner. If we are unable to develop, receive regulatory approval for, or successfully commercialize *neffy* for the indications we are developing it for, or if we experience delays as a result of any of these risks or otherwise, our business will be materially harmed.

In addition, of the large number of products in development in the pharmaceutical industry, only a small percentage result in the submission of an NDA to the FDA or a MAA to the EMA, and even fewer are approved for marketing and commercialization. Furthermore, even if we receive regulatory approval to market *neffy* for any indication, any such approval may be subject to limitations on the indications or uses or the patient populations for which we may market the product. Accordingly, even if we are able to obtain the requisite financing to continue to fund our development activities, we cannot assure you that we will successfully develop or commercialize *neffy* for any indication. If we or any of our current or future licensing and collaboration partners are unable to develop, or obtain regulatory approval for, or, if approved, successfully commercialize *neffy* for its initial indication or potential additional indications, we may not be able to generate sufficient revenue to continue our business. In addition, our failure to satisfy other regulatory requirements could adversely affect our development efforts for *neffy* in other indications.

The denial of regulatory approval for neffy could mean that we need to delay or even cease operations, and a delay in obtaining such approval would delay commercialization of neffy and adversely impact our ability to generate revenue, business and results of operations.

If we are not successful in commercializing *neffy*, or are significantly delayed in doing so, our business will be materially harmed, and we may need to curtail or cease operations. We currently have no pharmaceutical products approved for marketing, and we may never obtain regulatory approval to market and commercialize *neffy* for any indication. The research, testing, manufacturing, labeling, approval, sale, marketing and distribution of pharmaceutical products are subject to extensive regulation by the FDA, the EMA, and other regulatory agencies in the United States, EU and other countries, and such regulations differ from country to country. We are not permitted to market *neffy* until we receive approval or marketing authorization from the relevant regulatory authority. The FDA, the EMA or any other foreign regulatory agency can delay, limit or deny approval to market *neffy* for many reasons, including:

- our inability to demonstrate to the satisfaction of the FDA, the EMA or any other applicable foreign regulatory agency that *neffy* is safe and effective for the requested indication;
- our inability to gain agreement from applicable foreign regulatory authorities that *neffy* is appropriate for approval under applicable regulatory pathways;
- the FDA's, the EMA's or any other applicable foreign regulatory agency's disagreement with the interpretation of data from nonclinical and clinical studies and trials;
- our inability to demonstrate that the clinical and other benefits of *neffy* outweigh any safety or other perceived risks;
- our inability to enroll an adequate number of patients in and successfully complete our ongoing and any future clinical trials, including our pediatric clinical study EPI-10;
- the FDA's, the EMA's or any other applicable foreign regulatory agency's requirement for additional nonclinical or clinical studies or trials, including studies to satisfy applicable rules governing combination products;
- the FDA's, the EMA's or any other applicable foreign regulatory agency's having differing requirements for the trial protocols used in our clinical trials;
- the FDA's, the EMA's or any other applicable foreign regulatory agency's non-approval of the formulation, labeling and/or the specifications of *neffy*;
- the FDA's, the EMA's or any other applicable foreign regulatory agency's failure to accept the manufacturing processes or third-party manufacturers with which we contract; or
- the potential for approval policies or regulations of the FDA, the EMA or any other applicable foreign regulatory agencies to significantly change in a manner rendering our clinical data insufficient for approval.

Of the large number of pharmaceutical products in development, only a small percentage successfully complete the FDA, the EMA or other regulatory approval processes and are commercialized.

Even if we eventually complete clinical testing and receives approval of an NDA, MAA or other foreign marketing authorization for *neffy*, the FDA, the EMA or other applicable foreign regulatory agency may grant approval contingent on the performance of costly additional clinical trials, which may be required after approval. The FDA, the EMA or other applicable foreign regulatory agency may also approve *neffy* for a more limited indication and/or a narrower patient population than we originally request, and the FDA, the EMA or any other applicable foreign regulatory agency may not approve the labeling that we believe is necessary or desirable for the successful commercialization of *neffy*. Any delay in obtaining, or inability to obtain, applicable regulatory approvals would delay or prevent commercialization of *neffy* and would materially adversely impact our business and prospects.

We have never commercialized a product and may experience delays or unexpected costs or difficulties in obtaining regulatory approval for neffy for its initial indication or potential additional indications.

We have never obtained regulatory approval for, or commercialized, a pharmaceutical product. It is possible that the FDA and the EMA may refuse to accept any or all of our submitted or planned NDAs and MAAs for substantive review or may conclude after review of our data that an application is insufficient to obtain regulatory approval for *neffy* or any future product candidates. For example, the EMA required us to submit our preclinical dog anaphylaxis study results during the review process of our prior 1.0 mg dose of *neffy* MAA submission. If the FDA and the EMA do not initially approve any of our submitted or planned NDAs or MAAs, such regulatory authorities may require that we conduct additional costly clinical, nonclinical or manufacturing validation studies before they will reconsider future applications. Depending on the extent of these or any other required studies, approval of any NDA, MAA or other application that we submit may be significantly delayed, possibly for several years, or may require us to expend more resources than we have available. Any failure or delay in obtaining regulatory approvals would prevent us from commercializing *neffy* for any indication or any other product candidate, generating revenues and achieving and sustaining profitability. It is also possible that additional studies, if performed and completed, may not be considered sufficient by the FDA or EMA to approve any NDA, MAA or other application that we submit. For example, the FDA has indicated that the ongoing pediatric clinical trial, EPI-10, would be sufficient to support a submission of our NDA for pediatric approval of a 2.0 mg dose of *neffy* for children weighing more than 30 kg, and to support a separate submission for pediatric approval of a 1mg dose of *ne*ffy for children weighing between 15 and 30 kg; however, the FDA has not reviewed our complete clinical data, to date, and therefore there is no guarantee that the FDA will determine that the NDA currently under review by the FDA for approval of a 2.0 mg dose of *neffy* for children weighing more than 30 kg or any future NDA is sufficient for issuing a marketing approval of *neffy* for the emergency treatment of Type I allergic reactions in children. If any of these outcomes occur, we may be forced to abandon the development of *neffy* or any future product candidates, which would materially adversely affect our business and could potentially cause us to cease operations. We face similar risks for applications in other foreign jurisdictions. In addition, difficulties in obtaining approval of *neffy* for the emergency treatment of Type I allergic reactions, could adversely affect our efforts to seek approval from regulatory authorities for *neffy* for use in other potential indications.

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

We, and any current and future licensing and collaboration partners, are not permitted to commercialize, market, promote or sell any product candidate in the United States or the EU without obtaining regulatory approval from the FDA or the EMA, respectively. Regulatory authorities in other jurisdictions may have similar requirements. The time required to obtain approval by the FDA, the EMA and other comparable foreign regulatory authorities is unpredictable, but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including substantial discretion of such regulatory authorities. In addition, approval policies, regulations, or the type and amount of preclinical and clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. To date, other than the NDA for *neffy* that we submitted to the FDA in the third quarter of 2022 and our MAA for *neffy* that was filed and validated for review by the EMA in the fourth quarter of 2022, we have not submitted any product approval submissions for *neffy* or any other product candidate to the FDA, EMA or other comparable foreign regulatory authorities for *neffy* and there can be no assurance that we will receive such approval from such regulatory authorities after submitting any product approval application.

Clinical testing is expensive, difficult to design and implement, can take many years to complete and is inherently uncertain as to outcome. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. The clinical development of *neffy* or any future product candidates is susceptible to the risk of failure inherent at any stage of development, including failure to demonstrate safety or efficacy in a clinical trial or across a broad population of patients, the occurrence of adverse events that are severe or medically or commercially unacceptable, failure to comply with protocols or applicable regulatory requirements, and determination by the FDA, the EMA or any other comparable foreign regulatory authority that a product candidate may not continue development or is not approvable. Additionally, our expenses could increase if it is required by the FDA, the EMA or any other comparable foreign regulatory authority to perform clinical trials or studies in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of *neffy* for additional indications. It is possible that even if *neffy* or any future product candidate has a beneficial effect, that effect will not be detected during clinical evaluation as a result of one or more of a variety of factors, including the size, duration, design, measurements, conduct or analysis of our clinical trials. Conversely, as a result of the same factors, our clinical trials may indicate an apparent positive effect of *neffy* or any future product candidate that is greater than the actual positive effect, if any. Similarly, in our clinical trials we may fail to detect toxicity of or intolerability caused by *neffy* or any future product candidate, or mistakenly believe that *neffy* or any future product candidates are toxic or not well-tolerated when that is not in fact the case.

neffy and any future product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA, the EMA or other comparable foreign regulatory authorities may disagree as to the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA, the EMA or other comparable foreign regulatory authorities that a product candidate is safe and effective for its proposed indication and, if necessary, that a product candidate and any active components thereof are safe and effective for the proposed indication;
- the FDA, the EMA or other comparable foreign regulatory authorities may find deficiencies with regards to the formulation components or specifications of *neffy*, including, without limitation, with respect to appearance, identity, impurities, or particle size;
- the results of clinical trials may not meet the level of evidence or criteria required by the FDA, the EMA or other 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, the EMA and comparable authorities in other countries may disagree with our interpretation of data from clinical trials or nonclinical studies and may require additional trials or studies to support marketing approval;
- the data collected from clinical trials of *neffy* or any future product candidates may not be sufficient to support the submission of an NDA or other submission to the FDA or to obtain regulatory approval in the United States, the EU or elsewhere;
- the FDA, the EMA or other comparable foreign regulatory authorities may find deficiencies with clinical trial sites or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA, the EMA or other comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of clinical trial results may result in us failing to obtain regulatory approval to market *neffy* or any future product candidate we develop, which would significantly harm our business, results of operations and prospects. Although we have successfully completed a pre-NDA meeting with the FDA, there is no assurance that the endpoints and trial designs used for the approval of a new formulation of epinephrine for the emergency treatment of Type I allergic reactions will be acceptable for *neffy*. The FDA, the EMA and other comparable foreign authorities have substantial discretion in the approval process and determining when or whether regulatory approval will be obtained for any product candidate that we develop. Even if we believe the data collected from current or future clinical trials of *neffy* or any future product candidates are promising, such data may not be sufficient to support approval by the FDA, the EMA or any other regulatory authority.

There can be no assurance that the FDA and other regulatory agencies, including the EMA, will not require additional clinical trials or studies to support an application for the marketing of *neffy* in the emergency treatment of Type I allergic reactions or any other indication. This may be the case particularly as these regulatory authorities may consult with one another or as we may be required to apprise the respective agencies of studies we are conducting of *neffy* in conjunction with our requests for marketing approval or in response to requests and updates from the respective agency.

However, the FDA may not be able to continue its current pace and approval timelines could be extended, including where a pre-approval inspection or an inspection of clinical sites is required and due to the COVID-19 pandemic and travel restrictions the FDA is unable to complete such required inspections during the review period.

With respect to new sites or facilities in the European Economic Area ("EEA"), which have never had a current Good Manufacturing Practices ("cGMP") inspection or authorization, the EMA has stated that a distant assessment may be conducted in order to evaluate if the site could be authorized without an on-site pre-approval inspection. If an approval is granted, it should be indicated that the certificate has been granted on the basis of a distant assessment and an on-site inspection should be conducted when circumstances permit. If a cGMP certificate cannot be granted as a result of the distant assessment, a clock-stop in the regulatory approval process will be imposed until an on-site inspection is possible. In addition, even if we were to obtain approval, regulatory authorities may approve *neffy* or any future product candidates for fewer or more limited indications, may not approve the price we intend to charge for our products, may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Any of the foregoing scenarios could materially harm the commercial prospects for *neffy* or any future product candidates.

If the FDA does not conclude that neffy or any future product candidates satisfy the requirements for the Section 505(b)(2) regulatory approval pathway, or if the requirements for such product candidates under Section 505(b)(2) are not as we expect, the approval pathway for those product candidates will likely take significantly longer, cost significantly more and entail significantly greater complications and risks than anticipated, and in either case may not be successful.

While we believe that we will have the necessary supporting data to submit a marketing application under Section 505(b)(2) of the Federal Food, Drug and Cosmetic Act ("Section 505(b)(2)") regulatory pathway to the FDA for *neffy* for the emergency treatment of Type I allergic reactions for adults and children greater than 30 kg in weight, and upon completion of our ongoing pediatric study, EPI-10, for children between 15 and 30 kg in weight, there can be no assurance that the FDA will agree that the Section 505(b)(2) pathway is appropriate or will approve any such application or any future application for additional indication or future product candidates.

The Hatch Waxman Act added Section 505(b)(2) to the FDCA. Section 505(b)(2) permits the filing of an NDA where at least some of the information required for approval comes from studies that were not conducted by or for the applicant and for which the applicant has not obtained a right of reference. Section 505(b)(2), if available to us, would allow an NDA we submit to the FDA to rely in part on data in the public domain or the FDA's prior conclusions regarding the safety and effectiveness of approved compounds, which could expedite the development program for our future product candidates by potentially decreasing the amount of nonclinical and/or clinical data that we would need to generate in order to obtain FDA approval. This pathway does not, however, expedite the FDA review process timelines.

If the FDA does not allow us to pursue the Section 505(b)(2) regulatory pathway as anticipated, we may need to conduct additional nonclinical studies and/or clinical trials, provide additional data and information, and meet additional standards for regulatory approval. If this were to occur, the time and financial resources required to obtain FDA approval for *neffy* or any future product candidate, and complications and risks associated with such product candidates, would likely substantially increase. Moreover, inability to pursue the Section 505(b)(2) regulatory pathway could result in new competitive products reaching the market more quickly than any product candidates we develop, which could adversely impact our competitive position and prospects. Even if we are allowed to pursue the Section 505(b)(2) regulatory pathway, we cannot assure you that *neffy* or any future product candidates we develop will receive the requisite approval for commercialization.

In addition, notwithstanding the approval of a number of products by the FDA under Section 505(b)(2), certain pharmaceutical companies and others have objected to the FDA's interpretation of Section 505(b)(2). If the FDA's interpretation of Section 505(b)(2) is successfully challenged, the FDA may change its Section 505(b)(2) policies and practices, which could delay or even prevent the FDA from approving any NDA that we submit under Section 505(b)(2). In addition, the pharmaceutical industry is highly competitive, and Section 505(b)(2) NDAs are subject to certain requirements designed to protect the patent rights of sponsors of previously approved drugs that are referenced in a Section 505(b)(2) NDA. These requirements may give rise to patent litigation and mandatory delays in approval of our NDAs for up to 30 months or longer depending on the outcome of any litigation. It is not uncommon for a manufacturer of an approved product to file a citizen petition with the FDA seeking to delay approval of, or impose additional approval requirements for, pending competing products. If successful, such petitions can significantly delay, or even prevent, the approval of a new product. Even if the FDA ultimately denies such a petition, the FDA may substantially delay approval while it considers and responds to the petition. In addition, even if we are able to utilize the Section 505(b)(2) regulatory pathway, there is no guarantee this would ultimately lead to streamlined product development or earlier approval. Finally, a competitor might receive FDA approval before *neffy* and obtain non-patent market exclusivity, which could delay approval of *neffy*.

We may incur unexpected costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of neffy or any future product candidates.

To obtain the requisite regulatory approvals to market and commercialize *neffy* and any future product candidates, we must demonstrate through extensive nonclinical studies and clinical trials that such product candidates are safe and effective for their intended use in humans. Nonclinical and clinical testing are expensive and can take many years to complete, and their outcome is inherently uncertain. Failure can occur at any time during the clinical trial process and our future clinical trial results may not be successful.

We may experience delays in completing our clinical trials or nonclinical studies and initiating or completing additional studies or clinical trials. We may also experience numerous unforeseen events during our clinical trials that could delay or prevent our ability to receive marketing approval or commercialize *neffy* or any future product candidates we develop, including:

- regulators, or IRBs or other reviewing bodies may not authorize us or our investigators to commence a clinical trial, or to conduct or continue a clinical trial at a prospective or specific trial site;
- we may not reach an agreement on acceptable terms with prospective 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;
- a delay in receiving study or clinical trial material from outside the United States;
- the number of subjects or patients required for clinical trials of *neffy* in an indication or any future product candidate may be larger than we anticipate, enrollment in these clinical trials may be insufficient or slower than we anticipate, and the number of clinical trials being conducted at any given time may be high and result in fewer available patients for any given clinical trial, or patients may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors, including those manufacturing *neffy* or any future product candidates or conducting clinical trials on our behalf, may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- we may have to amend clinical trial protocol(s) submitted to regulatory authorities or conduct additional studies to reflect changes in regulatory requirements or guidance, which we may be required to resubmit to an IRB and regulatory authorities for re-examination;
- unforeseen safety events may occur during the course of a clinical trial and these events may result in the temporary suspension or termination of a clinical trial, or require urgent safety measures or restrictions to protect human subjects during the conduct of a clinical trial;
- regulators, IRBs or other reviewing bodies may fail to approve or subsequently find fault with the manufacturing processes or facilities of third-party manufacturers with which we have entered and may enter into agreement for clinical and commercial supplies, or the supply or quality of *neffy* or any future product candidate or other materials necessary to conduct clinical trials of *neffy* or any future product candidates may be insufficient, inadequate or not available at an acceptable cost, or we may experience interruptions in supply; and
- the potential for approval policies or regulations of the FDA, the EMA or any other applicable foreign regulatory agencies to significantly change in a manner rendering our clinical data insufficient for approval.

Regulators, IRBs of the institutions in which clinical trials are being conducted, or data monitoring committees may suspend or terminate a clinical trial 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 other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to appear to demonstrate a benefit from using a drug, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial.

Negative or inconclusive impressions of the results from our earlier clinical trials of *neffy* for the emergency treatment of Type I allergic reactions or any other clinical trial or nonclinical studies in animals that we have conducted, could mandate repeated or additional nonclinical studies or clinical trials and could delay marketing approvals or result in changes to or delays in nonclinical studies or clinical trials of *neffy* for other indications. While data from our studies of *neffy* demonstrated nasally delivered epinephrine reached blood levels comparable to those of already approved epinephrine injectable products, we do not know whether any future clinical trials or studies that we may conduct will demonstrate adequate efficacy and safety necessary to result in obtaining regulatory approval to market *neffy* for its initial indication or potential additional indications, or any future product candidate. If later stage clinical trials, including our ongoing pediatric clinical study, EPI-10, do not produce favorable results that meet regulatory authority criteria, our ability to obtain regulatory approval for *neffy* for the emergency treatment of Type I allergic reactions or potential additional indications, or any future product candidate, may be adversely impacted.

Our failure to successfully initiate and complete clinical trials of *neffy* for the emergency treatment of Type I allergic reactions or potential additional indications and to demonstrate the efficacy and safety of *neffy*, necessary to obtain regulatory approval to market *neffy* would significantly harm our business. Our product candidate development costs will also increase if we experience delays in testing or regulatory approvals and we may be required to obtain additional funds to complete clinical trials. We cannot assure you that our clinical trials will begin as planned or be completed on schedule, if at all, or that we will not need to restructure our trials after they have begun. Significant clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize *neffy* or any future product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize such product candidates, which may harm our business and results of operations. In addition, many of the factors that cause, or lead to, delays of clinical trials may ultimately lead to the denial of regulatory approval of *neffy* or any future product candidate.

The results of early-stage clinical trials and preclinical studies may not be predictive of future results. Initial data in our clinical trials may not be indicative of results obtained when these trials are completed or in later stage trials.

The results of preclinical studies may not be predictive of the results of clinical trials, and the results of any early-stage clinical trials we commence may not be predictive of the results of the later-stage clinical trials. In addition, initial data in clinical trials may not be indicative of results obtained when such trials are completed. There can be no assurance that any of our ongoing, planned or future clinical trials will ultimately be successful or support further clinical development or regulatory approval of *neffy* or any future product candidates. There is a high failure rate for drugs and biologics candidates proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving promising results in earlier studies, and any such setbacks in our clinical development could have a material adverse effect on our business and operating results.

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

From time to time, we may publish interim topline or preliminary data from our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Preliminary or topline results also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could significantly harm our reputation and business prospects.

neffy or any future product candidate may cause undesirable side effects, adverse events, or have other properties that could delay or prevent its regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following regulatory approval, if obtained.

Undesirable side effects or adverse events caused by *neffy*, or any future product candidate, could cause us or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA, the EMA or comparable foreign regulatory authorities. Although our clinical studies to date have demonstrated that *neffy* is well-tolerated by patients with no serious treatment-related adverse events, and reported adverse events generally no more severe than grade 1 and comparable with injection products, and with no meaningful pain or irritation based on formal scoring, results of our ongoing or future clinical trials for *neffy* or any future product candidate could reveal a high and unacceptable severity and prevalence of side effects, adverse events, or unexpected characteristics. Many compounds that initially showed promise in clinical or earlier stage testing are later found to cause undesirable or unexpected side effects or adverse events that prevented further development of the compound.

If unacceptable side effects or adverse events arise in the development of *neffy* or any future product candidates, we, the FDA, the EMA or comparable foreign regulatory authorities, the IRBs, or independent ethics committees at the institutions in which our trials are conducted, or the independent safety monitoring committee could suspend or terminate our clinical trials or regulatory authorities could order us to cease clinical trials or deny approval of *neffy* or any future product candidates for any or all targeted indications. Treatment-emergent side effects and adverse events that are deemed to be drug-related could also affect subject recruitment or the ability of enrolled subjects to complete the trial or result in potential product liability claims. Undesirable side effects or adverse events in one of our clinical trials for *neffy* in one indication could adversely affect enrollment in clinical trials, regulatory approval and commercialization of *neffy* in other indications. Additionally, there may be negative findings regarding components of *neffy* or future product candidates by other parties. Any negative findings by third parties may impact the future approvability or labeling of *neffy* or other product candidates we may develop. In addition, all side effects and adverse events may not be appropriately recognized or managed by the treating medical staff. Inadequate training in recognizing or managing the potential side effects and adverse events of *neffy* or any future product candidates could result in patient injury or death. Any of these occurrences may harm our business, financial condition and prospects significantly.

In addition, clinical trials of *neffy* are conducted in carefully defined sets of patients who have agreed to enter into clinical trials. Consequently, it is possible that our clinical trials, or those of any future collaborator, may indicate an apparent positive effect of *neffy* or a future product candidate that is greater than the actual positive effect, if any, or alternatively fail to identify undesirable side effects.

Finally, *neffy* is comprised of epinephrine and Intravail® that is delivered via an intranasal device. Intra-muscular injection of epinephrine has been approved by the FDA and other regulatory authorities for the emergency treatment of Type I allergic reactions. In addition, Intravail® has previously been included in the formulations of FDA approved products such as VALTOCO® and TOSYMRA® nasal sprays. The intranasal apparatus we use to deliver *neffy* has been used to deliver several drugs approved by the FDA and other regulatory authorities, including VALTOCO®, TOSYMRA® and NARCAN®. Even if *neffy* were to receive marketing approval or be commercialized, we would continue to be subject to the risks that the FDA, EMA or similar regulatory authorities could revoke approval of intra-muscular epinephrine injection products, other drug formulations containing Intravail® or utilizing the same intranasal apparatus, or that efficacy, manufacturing or supply issues could arise with epinephrine API, Intravail® or our intranasal apparatus. This could result in our own products being removed from the market or being less commercially successful.

The increasing use of social media platforms presents new risks and challenges.

Social media is increasingly being used to communicate about our clinical development activities and the indications *neffy* is being developed to treat, and we intend to utilize appropriate social media in connection with our commercialization efforts following regulatory approval of *neffy*, if any. Social media practices in the biotechnology and biopharmaceutical industries continue to evolve and regulations and regulatory guidance relating to such use are evolving and not always clear. This evolution creates uncertainty and risk of noncompliance with regulations applicable to our business, resulting in potential regulatory actions against us, along with the potential for litigation related to off-label marketing or other prohibited activities and heightened scrutiny by the FDA, the Federal Trade Commission ("FTC"), the SEC and other regulators. For example, patients may use social media channels to comment on their experience in an ongoing clinical trial or to report an alleged side effect or adverse event. If such disclosures occur, there is a risk that trial enrollment may be adversely impacted, that we may fail to monitor and comply with applicable adverse event reporting obligations or that we may not be able to defend our business or the public's legitimate interests in the face of the political and market pressures generated by social media due to restrictions on what we may say about our product candidates. There is also a risk of inappropriate disclosure of sensitive or confidential information or negative or inaccurate posts or comments about us on any social networking website. In addition, we may encounter attacks on social media regarding us, our management, *neffy* or future product candidates. If any of these events were to occur or we otherwise fail to comply with applicable regulations, we could incur liability, face regulatory actions or incur other harm to our business.

If we fail to develop and commercialize neffy for additional indications or fail to discover, develop and commercialize other product candidates, we may be unable to grow our business and our ability to achieve our strategic objectives would be impaired.

Although the development and commercialization of *neffy* for the emergency treatment of Type I allergic reactions is our current primary focus, as part of our longer-term growth strategy, we plan to evaluate *neffy* for use in other indications and may develop other product candidates. We intend to evaluate internal opportunities from *neffy* and may do so for other potential product candidates or choose to in-license or acquire other product candidates as well as commercial products to treat other indications like Type I allergic reactions. These other potential product candidates will require additional, time-consuming development efforts prior to commercial sale, including preclinical studies, clinical trials and approval by the FDA, the EMA and/or other applicable foreign regulatory authorities. All product candidates are prone to the risks of failure that are inherent in pharmaceutical product development, including the possibility that the product candidate will not be shown to be sufficiently safe and effective for approval by regulatory authorities. In addition, we cannot assure you that any such products that are approved will be manufactured or produced economically, successfully commercialized or widely accepted in the marketplace or be more effective than other commercially available alternatives.

Research activities to identify product candidates require substantial technical, financial and human resources, whether or not any product candidates are ultimately identified. Our research activities may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development for many reasons, including the following:

- the research methodology used may not be successful in identifying potential product candidates;
- competitors may develop alternatives that render our potential product candidates obsolete;
- product candidates that we develop may nevertheless be covered by third parties' patents or other exclusive rights;
- a product candidate may, on further study, be shown to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria;
- a product candidate may not be capable of being produced in commercial quantities at an acceptable cost, or at all; and
- a product candidate may not be accepted as safe and effective by patients, the medical community or third-party payors.

If we are unsuccessful in identifying and developing *neffy* for additional indications or other product candidates, its potential for growth and achieving its strategic objectives may be impaired.

Even if neffy is approved for the emergency treatment of Type I allergic reactions, there remains significant uncertainty as to whether neffy will be successfully developed and ultimately approved for any other indication we are exploring or pursuing.

As part of our longer-term growth strategy, we plan to evaluate and potentially develop *neffy* for other indications. Our programs for such other indications are at a very early stage and there remains significant uncertainty as to whether *neffy* will be successfully developed and ultimately approved for any other indication we are exploring or pursuing. Even if *neffy* is approved for the emergency treatment of Type I allergic reactions, there will remain significant uncertainty regarding whether *neffy* will be successfully developed or approved for any other indication. If we are unable to successfully develop, or if regulatory authorities do not approve, *neffy* for any other indication, our potential for growth and achieving our strategic objectives may be impaired.

We may not be successful in our efforts to expand our pipeline by identifying additional indications for which to investigate neffy in the future. We may expend our limited resources to pursue a particular indication or formulation for neffy and fail to capitalize on product candidates, indications or formulations that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we are focused on specific indications for *neffy*. As a result, we may fail to generate additional clinical development opportunities for *neffy* for a number of reasons, including, that *neffy* may in certain indications, on further study, be shown to have harmful side effects, limited to no efficacy or other characteristics that suggest it is unlikely to receive marketing approval and achieve market acceptance in such additional indications. In addition, we may forgo or delay pursuit of opportunities with other indications that could have had greater commercial potential or likelihood of success. Furthermore, research activities to identify additional indications for *neffy* require substantial technical, financial and human resources. We may not be able to develop *neffy* for any additional indications based on resource allocation decisions and other reasons. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development activities for specific indications may not yield any commercially viable products.

Additionally, we may pursue in-licenses or acquisitions of development-stage assets or programs, which entails additional risk to us. Identifying, selecting and acquiring promising product candidates requires substantial technical, financial and human resources expertise. Efforts to do so may not result in the actual acquisition or license of a particular product candidate, potentially resulting in a diversion of our management's time and the expenditure of our resources with no resulting benefit.

For example, if we are unable to identify programs that ultimately result in approved products, we may spend material amounts of our capital and other resources evaluating, acquiring and developing products that ultimately do not provide a return on our investment.

Competitive products may reduce or eliminate the commercial opportunity for neffy for its current or future indications. If our competitors develop technologies or product candidates more rapidly than us, or their technologies or product candidates are more effective or safer than ours, our ability to develop and successfully commercialize neffy may be adversely affected.

The clinical and commercial landscape for the emergency treatment of Type I allergic reactions is highly competitive and subject to significant technological change. We face competition with respect to our current indications for *neffy* and will face competition with respect to any future indications of *neffy* or other product candidates that we may seek to develop or commercialize in the future from large pharmaceutical and biotechnology companies, specialty pharmaceutical and generic drug companies, academic institutions, government agencies and research institutions. If approved, we anticipate that *neffy* will compete primarily against epinephrine intra-muscular injectable products, for the emergency treatment of Type I allergic reactions including EpiPen® and its generics, which is marketed by Viatris, Inc. and Teva Pharmaceuticals, Inc.; Adrenaclick®, which is marketed by Amneal Pharmaceuticals, Inc.; Auvi-Q®, which is marketed by Kaleo, Inc.; and Symjepi®, which is marketed by Sandoz, Inc., a Novartis division. Several other companies are also clinically developing larger dose intranasal epinephrine product candidates that may compete with *neffy*, including Bryn Pharma, Nasus Pharma and Hikma Pharmaceuticals, Inc. (previously INSYS Therapeutics, Inc.), Amphastar Pharmaceuticals is developing an intranasal candidate with an undisclosed dose, and Aquestive Therapeutics is developing a sublingual candidate based on a prodrug of epinephrine. If *neffy* is approved for other indications, it would also compete with a range of other therapeutic treatments that are well established or in development.

Many of our potential competitors have substantially greater financial, technical, commercial and human resources than we do and significantly more experience in the discovery, development and regulatory approval of product candidates and the commercialization of those products. Accordingly, our competitors may be more successful than we may be in obtaining regulatory approval for therapies and achieving widespread market acceptance. Our competitors' products may be more effective, safer, or more effectively marketed and sold, than any product candidate we may commercialize and may render *neffy* or any future product candidates obsolete or non-competitive before we can recover development and commercialization expenses. In addition, our competitors may succeed in developing, acquiring or licensing technologies and drug products that are more effective or less costly than *neffy* or any future product candidates that we may develop, which could render such product candidates obsolete and noncompetitive.

If we obtain approval for *neffy* or any other future product candidate, we may face competition based on many different factors, including the efficacy, safety and tolerability of our products, the ease with which our products can be administered, the timing and scope of regulatory approvals for these products, the availability and cost of manufacturing, marketing and sales capabilities, price, reimbursement coverage and patent position. Such competitors could also recruit our employees, which could negatively impact our level of expertise and our ability to execute our business plan.

In addition, our competitors may obtain patent protection, regulatory exclusivities or regulatory approval and commercialize products more rapidly than we do, which may impact future approvals or sales of any of our product candidates that receive regulatory approval. If the FDA or the EMA approves the marketing and commercial sale of *neffy* or any future product candidate, we will also be competing with respect to marketing capabilities and manufacturing efficiency. We expect competition among products will be based on product efficacy and safety, the timing and scope of regulatory approvals, availability of supply, marketing and sales capabilities, product price, reimbursement coverage by government and private third-party payors, regulatory exclusivities and patent position. Our profitability and financial position will suffer if our product candidates receive regulatory approval but cannot compete effectively in the marketplace.

Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites, as well as in acquiring technologies complementary to, or necessary for, our activities.

If the FDA, the EMA or other comparable foreign regulatory authorities approve generic versions of neffy or any future product candidate of ours that receives regulatory approval, or such authorities do not grant our products appropriate periods of non-patent exclusivity before approving generic versions of such products, the sales of such products could be adversely affected.

In the United States, once an NDA is approved, the product covered thereby becomes a "reference listed drug" in the FDA's publication, "Approved Drug Products with Therapeutic Equivalence Evaluations," or the Orange Book. Manufacturers may seek approval of generic versions of reference listed drugs through submission of ANDAs in the United States. In support of an ANDA, a generic manufacturer generally must show that its product has the same active ingredient(s), dosage form, strength, route of administration, and adequate labeling as the reference listed drug and that the generic version is bioequivalent to the reference listed drug, meaning, in part, that it is absorbed in the body at the same rate and to the same extent. Generic products may be significantly less costly to bring to market than the reference listed drug and companies that produce generic products are generally able to offer them at lower prices. Moreover, third-party insurers require, and many states allow or require, substitution of therapeutically equivalent generic drugs at the pharmacy level even if the branded drug is prescribed. Thus, following the introduction of a generic drug, a significant percentage of the sales of any branded product or reference listed drug may be lost to the generic product.

The FDA may not finally approve an ANDA for a generic product or a Section 505(b)(2) NDA of a competitor until any applicable period of non-patent exclusivity for the reference listed drug has expired. The FDCA provides a period of five years of non-patent exclusivity for a new drug containing a new chemical entity ("NCE"). For the purposes of this provision, an NCE is a drug that contains no active moiety that has previously been approved by the FDA in any other NDA. An active moiety is the molecule or ion responsible for the physiological or pharmacological action of the drug substance. Specifically, in cases where such exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification that a patent covering the listed drug is invalid, unenforceable or will not be infringed by the generic product. In that case, the applicant may submit its application four years following approval of the listed drug and seek to launch its generic product even if we still have patent protection for our product unless an infringement suit is timely filed by the NDA or patent holder in which case the FDA cannot approve the ANDA or a Section 505(b)(2) NDA for 30 months unless a court decision in favor of the generic manufacturer is issued earlier.

Competition that neffy or any future products, if approved, may face from competitor versions of such products could negatively impact our future revenue, profitability and cash flows and substantially limit our ability to obtain a return on our investments in those product candidates. Obtaining and maintaining regulatory approval of neffy or any future product candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of those product candidates in other jurisdictions.

Obtaining and maintaining regulatory approval of *neffy* and any future product candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction, while a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. For example, even if a regulatory authority, such as the EMA, grants marketing approval of *neffy*, comparable regulatory authorities in the United States and other foreign jurisdictions must also approve the manufacturing, marketing and promotion of *neffy* in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and greater than, those in the United States or the EU including additional nonclinical studies or clinical trials, as clinical trials conducted in one jurisdiction may not be accepted by regulatory authorities in other jurisdictions. In many jurisdictions outside the United States including certain jurisdictions in the EU, a product candidate must be approved for reimbursement before it can be approved for sale in that jurisdiction. In some cases, the price that we intend to charge for our products is also subject to approval.

We have submitted and plan to submit additional marketing applications in the United States and in the EU. Regulatory authorities in jurisdictions outside of the United States have requirements for approval of product candidates with which we must comply prior to marketing in those jurisdictions and such regulatory requirements can vary widely from country to country. Obtaining other regulatory approvals and compliance with other regulatory requirements could result in significant delays, difficulties and costs for us and could require additional nonclinical studies or clinical trials, which could be costly and time-consuming and could delay or prevent the introduction of our products in certain countries. The foreign regulatory approval process involves all of the risks associated with FDA approval. We do not have any product candidates approved for sale in any jurisdiction, including international markets, and we do not have experience in obtaining regulatory approval in either domestic or international markets. If we fail to comply with the regulatory requirements in international markets and/or obtain and maintain applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of *neffy* or any future product candidates will be harmed.

We received Fast Track designation for neffy in the United States and may in the future pursue Fast Track designation for other product candidates that we may develop, but we might not receive such future designations, and Fast Track designations may not lead to a faster development or regulatory review or approval process.

If the FDA determines that a product candidate is intended for the treatment of a serious or life-threatening condition and preclinical or clinical data demonstrate the potential to address an unmet medical need for this condition, the FDA may grant a product candidate Fast Track designation. Fast Track designation is intended to expedite or facilitate the process for reviewing new drug products meeting the specified criteria and gives the sponsor of a Fast Track product opportunities for more frequent interactions with the applicable FDA review team during product development and, once an NDA is submitted, the product candidate may be eligible for priority review. We were granted Fast Track designation for *neffy* for the treatment of Type I allergic reactions and may in the future request Fast Track designation for additional indications for *neffy* or for any future product candidates, however, we cannot assume that any such applications will meet the criteria for that designation. The FDA has broad discretion whether or not to grant this designation, so even if we believe a particular product candidate is eligible for this designation, we cannot assure you that the FDA would decide to grant it. Even if we do receive Fast Track Designation, we may not experience a faster development process, review or approval compared to conventional FDA procedures. The FDA may rescind the Fast Track designation if it believes that the designation is no longer supported by data from our clinical development activities.

We may seek priority review by the FDA for neffy or a future product candidate, and we may be unsuccessful. If we are successful, the designation may not actually lead to a faster development or regulatory review or approval process.

A priority review designation means that the goal for the FDA to review an application is six months, rather than the standard review period of ten months. We may in the future request priority review designation for *neffy* and any future product candidates, however, we cannot assume that any application for priority review will meet the criteria for that designation. A product is eligible for priority review if it is designed to treat a serious condition, and if approved, would provide a significant improvement in the treatment, diagnosis or prevention of a serious condition compared to marketed products. The FDA has broad discretion with respect to whether or not to grant priority review status to a product candidate, so even if we believe a particular product candidate is eligible for such designation or status, the FDA may decide not to grant it. Moreover, a priority review designation does not necessarily mean a faster development or regulatory review or approval process or necessarily confer any advantage with respect to approval compared to standard FDA review and approval. Receiving priority review from the FDA does not guarantee approval within the six-month review cycle or at all.

Product liability lawsuits against us or any of our current and future licensing and collaboration partners could divert our resources and attention, cause us to incur substantial liabilities and limit commercialization of neffy or any future product candidates.

We are exposed to potential product liability and professional indemnity risks that are inherent in the research, development, manufacturing, marketing and use of pharmaceutical products. Currently, we have no products that have been approved for commercial sale; however, the use of *neffy* by us and any current and future licensing and collaboration partners in clinical trials, and the sale of *neffy*, if approved, in the future, may expose us to liability claims. Product liability claims may be brought against us or our partners by participants enrolled in our clinical trials, patients, health care providers, pharmaceutical companies, our current and future licensing and collaboration partners or others using, administering or selling any of our future approved products. If we cannot successfully defend ourself against any such claims, we may incur substantial liabilities or be required to limit commercialization of *neffy* or any future product candidates. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for any of our future approved products;
- injury to our reputation;
- withdrawal of clinical trial participants;
- termination of clinical trial sites or entire trial programs;
- significant litigation costs, including with respect to potential class action lawsuits;
- substantial monetary awards to, or costly settlements with, patients or other claimants;
- product recalls or a change in the indications for which they may be used;
- loss of revenue;
- diversion of management and scientific resources from our business operations; and
- the inability to commercialize *neffy* or any future product candidates.

Although the clinical trial process is designed to identify and assess potential side effects and adverse events, clinical development does not always fully characterize the safety and efficacy profile of a new drug, and it is always possible that a drug, even after regulatory approval, may exhibit unforeseen side effects. If *neffy* was to cause adverse events or side effects during clinical trials or after approval, we may be exposed to substantial liabilities. Physicians and patients may not comply with any warnings that identify known potential adverse effects, side effects, and patients who should not use *neffy* or any of our future product candidates. If any of our current or future product candidates, including *neffy*, are approved for marketing and commercial sale, we will be highly dependent upon consumer perceptions of us and the safety and quality of our products. We could be adversely affected if we are subject to negative publicity associated with illness or other adverse effects resulting from patients' use or misuse of our products or any similar products distributed by other companies.

Although we maintain product liability insurance coverage in the amount of up to $5.0 million in the aggregate, including clinical trial liability, this insurance may not fully cover potential liabilities that we may incur. The cost of any product liability litigation or other proceeding, even if resolved in our favor, could be substantial. We will need to increase our insurance coverage if we commercialize *neffy* or any future product candidate that receives regulatory approval. In addition, insurance coverage is becoming increasingly expensive. If we are unable to maintain sufficient insurance coverage at an acceptable cost or to otherwise protect against potential product liability claims, it could prevent or inhibit the development and commercial production and sale of *neffy* or any future product candidates, which could harm our business, financial condition, results of operations and prospects.

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 harm our business.

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

We maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees, but this insurance may not provide adequate coverage against potential liabilities. However, we do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us.

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

Our business activities may be subject to the FCPA and similar anti-bribery and anti-corruption laws of other countries in which we may operate, as well as U.S. and certain foreign export controls, trade sanctions, and import laws and regulations. Compliance with these legal requirements could limit our ability to compete in foreign markets and subject us to liability if we violate them.

If we further expand our operations outside of the United States, we must dedicate additional resources to comply with numerous laws and regulations in each jurisdiction in which we plan to operate. Our business activities may be subject to the Foreign Corrupt Practices Act ("FCPA") and similar anti-bribery or anti-corruption laws, regulations or rules of other countries in which we operate. The FCPA generally prohibits companies and their employees and third-party intermediaries from offering, promising, giving or authorizing the provision of anything of value, either directly or indirectly, to a non-U.S. government official in order to influence official action or otherwise obtain or retain business. The FCPA also requires public companies to make and keep books and records that accurately and fairly reflect the transactions of the corporation and to devise and maintain an adequate system of internal accounting controls. Our business is heavily regulated and therefore involves significant interaction with public officials, including officials of non-U.S. governments. Additionally, in many other countries, hospitals owned and operated by the government, and doctors and other hospital employees would be considered foreign officials under the FCPA. Recently the SEC and Department of Justice have increased their FCPA enforcement activities with respect to biotechnology and pharmaceutical companies. There is no certainty that all of our employees, agents or contractors, or those of our affiliates, will comply with all applicable laws and regulations, particularly given the high level of complexity of these laws. Violations of these laws and regulations could result in fines, criminal sanctions against us, our officers or employees, disgorgement, and other sanctions and remedial measures, and prohibitions on the conduct of our business. Any such violations could include prohibitions on our ability to offer *neffy* or any future product candidates in one or more countries and could materially damage our reputation, brand, international activities, ability to attract and retain employees, and business, prospects, operating results and financial condition.

In addition, *neffy* and any of our future product candidates and activities may be subject to U.S. and foreign export controls, trade sanctions and import laws and regulations. Governmental regulation of the import or export of *neffy* or any future product candidates, or our failure to obtain any required import or export authorization for *neffy* or any future product candidates, when applicable, could harm our international sales and adversely affect our revenue. Compliance with applicable regulatory requirements regarding the export of *neffy* or any future product candidates may create delays in the introduction of our product candidates in international markets or, in some cases, prevent the export of our product candidates to some countries altogether. Furthermore, U.S. export control laws and economic sanctions prohibit the shipment of certain products and services to countries, governments, and persons targeted by U.S. sanctions. If we fail to comply with export and import regulations and such economic sanctions, penalties could be imposed, including fines and/or denial of certain export privileges. Moreover, any new export or import restrictions, new legislation or shifting approaches in the enforcement or scope of existing regulations, or in the countries, persons, or products targeted by such regulations, could result in decreased use of *neffy* or any future product candidates by, or in our decreased ability to export *neffy* or any future product candidates to existing or potential customers with international operations. Any decreased use of *neffy* or any future product candidates or limitation on our ability to export or sell access to *neffy* or any future product candidates would likely adversely affect our business.

Cyber-attacks or other failures in our telecommunications or information technology systems, or those of our licensing and collaboration partners, CROs, third-party logistics providers, distributors or other contractors or consultants, could result in information theft, data corruption and significant disruption of our business operations.

We, our licensing and collaboration partners, our CROs, third-party logistics providers, distributors and other contractors and consultants utilize information technology ("IT") systems and networks to process, transmit and store electronic information in connection with our business activities. As use of digital technologies has increased, cyber incidents, including third parties gaining access to employee accounts using stolen or inferred credentials, computer malware, viruses, spamming or other means, and deliberate attacks and attempts to gain unauthorized access to computer systems and networks, have increased in frequency and sophistication. Cyber-attacks also could include phishing attempts or e-mail fraud to cause payments or information to be transmitted to an unintended recipient. These threats pose a risk to the security of our, our licensing and collaboration partners', our CROs', third-party logistics providers', distributors' and other contractors' and consultants' systems and networks, and the confidentiality, availability and integrity of our data. There can be no assurance that we will be successful in preventing cyber-attacks or successfully mitigating their effects. Similarly, there can be no assurance that our licensing and collaboration partners, CROs, third-party logistics providers, distributors and other contractors and consultants will be successful in protecting our clinical and other data that is stored on their systems. Any cyber-attack, data breach or destruction or loss of data could result in a violation of applicable U.S. and international privacy, data protection and other laws, and subject us to litigation and governmental investigations and proceedings by federal, state and local regulatory entities in the United States and by international regulatory entities, resulting in exposure to material civil and/or criminal liability. Further, our general liability insurance and corporate risk program may not cover all potential claims to which we are exposed and may not be adequate to indemnify us for all liability that maybe imposed; and could have a material adverse effect on our business and prospects. For example, the loss of clinical trial data from completed, ongoing or future clinical trials for *neffy* or any of our future product candidates could result in delays in our development and regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, we may suffer reputational harm or face litigation or adverse regulatory action as a result of cyber-attacks or other data security breaches and may incur significant additional expense to implement further data protection measures.

Risks Related to Our Dependence on Third Parties

We intend to rely completely on third parties to manufacture and distribute our supply of neffy and intend to rely on third parties to manufacture and distribute any future product candidates.

We do not currently have, nor do we plan to acquire, the infrastructure or capability to manufacture or distribute commercial quantities of *neffy*. Our ability to commercially supply *neffy*, if approved, depends, in part, on the ability of third-party manufacturers to supply and manufacture *neffy*, the raw materials, API and other important components related to the manufacture of *neffy*, including Intravail® and our nasal sprayer apparatus. We also intend to rely on third parties to label and package the finished product. These third-party manufacturers may have limited experience manufacturing *neffy*, the raw materials and API for *neffy* to be supplied to patients in the United States. While we will work with our third-party suppliers and manufacturers to optimize the manufacturing process for *neffy* and any future product candidates, if approved, we cannot guarantee that such efforts will be successful. If we fail to develop and maintain supply relationships with these third parties, we may be unable to successfully commercialize *neffy* or any future product candidate, if approved.

We have entered into a commercial supply agreement with Renaissance Lakewood LLC ("Renaissance"), which has been actively involved in supporting the manufacture of *neffy* in our clinical development, and we intend to rely on Renaissance as the primary source for drug product manufacturing and final packaging. Unless and until we can secure an alternative source for drug product manufacturing and final packaging, our dependence on Renaissance will subject us to the possible risks of shortages, interruptions and price fluctuations if *neffy* is approved for commercialization.

We may be unable to maintain or establish required agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

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

We do not have complete control over all aspects of the manufacturing process of, and are dependent on, our contract manufacturing partners for compliance with cGMP regulations for manufacturing both active drug substances and finished drug products. Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA and other foreign regulatory authorities, this could affect the review of the NDA submitted for *neffy* or post-approval sales. In addition, other than to conduct audits, we do not have control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of neffy or any future product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain marketing approvals for or commercialize neffy or any future product candidate. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including fines, injunctions, civil penalties, application review delays, suspension or withdrawal of approvals, license revocation, import alerts, seizures or recalls of product candidates or drugs, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of neffy or any of our future product candidates or drugs and harm our business and results of operations. Our current and anticipated future dependence upon others for the manufacture of *neffy* or any future product candidates or drugs may adversely affect our future profit margins and our ability to commercialize *neffy* or any future product candidate that receives marketing approval on a timely and competitive basis.

We rely on third parties to conduct our nonclinical studies and clinical trials. If these third parties do not successfully carry out their contractual duties, comply with applicable regulatory requirements or meet expected deadlines, our development programs and our ability to seek or obtain regulatory approval for or commercialize neffy or any future product candidates may be delayed.

We are dependent on third parties to conduct our nonclinical studies and any clinical trials. Specifically, we have used and relied on, and intend to continue to use and rely on, medical institutions, clinical investigators, CROs and consultants to conduct our nonclinical studies and past clinical trials in accordance with our clinical protocols and regulatory requirements. These CROs, investigators and other third parties play a significant role in the conduct and timing of these studies and trials. While we have and will have agreements governing the activities of our third-party contractors, we have limited influence over their actual performance. Nevertheless, we are responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable protocol and legal, regulatory and scientific standards, and our reliance on our CROs and other third parties does not relieve us of our regulatory responsibilities. We and our CROs are required to comply with GCP requirements, which are regulations and guidelines enforced by the FDA and comparable foreign regulatory authorities for all of our product candidates in clinical development. Regulatory authorities enforce these GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or any of our CROs or trial sites 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. In addition, our clinical trials must be conducted with products produced under cGMP regulations. Our failure to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process.

There is no guarantee that any of our CROs, investigators or other third parties will devote adequate time and resources to such trials or studies or perform as contractually required. If any of these third parties fail to meet expected deadlines, adhere to our clinical protocols or meet regulatory requirements, or otherwise performs in a substandard manner, our clinical trials may be extended, delayed or terminated. In addition, many of the third parties with whom we contract may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other development activities that could harm our competitive position. In addition, principal investigators for our clinical trials are expected to serve as scientific advisors or consultants to us from time to time and may receive cash or equity compensation in connection with such services. If these relationships and any related compensation result in perceived or actual conflicts of interest, or the FDA concludes that the financial relationship may have affected the interpretation of the study, the integrity of the data generated at the applicable clinical trial site may be questioned and the utility of the clinical trial itself may be jeopardized, which could result in the delay or rejection by the FDA of any NDA we submit. Any such delay or rejection could prevent us from commercializing *neffy* or any future product candidates.

Our CROs have the right to terminate their agreements with us in the event of an uncured material breach. In addition, some of our CROs have an ability to terminate their respective agreements with us if it can be reasonably demonstrated that the safety of the subjects participating in our clinical trials warrants such termination, if we make a general assignment for the benefit of our creditors or if we are liquidated. If any of our relationships with these third parties terminate, we may not be able to enter into arrangements with alternative third parties on commercially reasonable terms or at all. Switching or adding additional CROs, investigators and other third parties involves additional cost and requires our management's time and focus. In addition, there is a natural transition period when a new CRO commences work. As a result, delays occur, which can materially impact our ability to meet our desired clinical development timelines. Though we carefully manage our relationships with our CROs, investigators and other third parties, there can be no assurance that we will not encounter challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition and prospects.

We are dependent on international third-party licensees and assignees for the development and commercialization of neffy in several countries outside the United States. The failure of these third parties to meet their contractual, regulatory or other obligations could adversely affect our business.

We have entered into exclusive licensing and collaboration agreements for the development and commercialization of *neffy* with Alfresa Pharma in Japan and Pediatrix Therapeutics in China, Macau, Hong Kong and Taiwan. As a result, we are dependent on these parties to achieve regulatory approval of *neffy* for marketing in these countries and for the commercialization of *neffy*, if approved. The timing and amount of any milestone and royalty payments we may receive under these agreements, as well as the commercial success of *neffy* in those regions outside of the United States, will depend on, among other things, the efforts, allocation of resources and successful commercialization of *neffy* by Alfresa Pharma and Pediatrix Therapeutics. We also depend on such licensing and collaboration partners to comply with all applicable laws relative to the development and commercialization of *neffy* in those countries. They may take actions or fail to take actions that result in safety issues with *neffy* in their licensed territory, and such safety issues could negatively impact *neffy* in countries outside of the licensed territory. We do not control the individual efforts of our licensing and collaboration partners and have limited ability to terminate these agreements or have assigned assets returned to us if such licensing and collaboration partners do not perform as anticipated.

The failure of our licensing and collaboration partners to devote sufficient time and effort to the development and commercialization of *neffy*; to meet their obligations to us, including for future royalty and milestone payments; to adequately deploy business continuity plans in the event of a crisis; to adequately respond to the adverse impact of military action, sanctions and market disruptions; and/or to satisfactorily resolve significant disagreements with us or address other factors could have an adverse impact on our financial results and operations. In addition, if these third parties violate, or are alleged to have violated, any laws or regulations during the performance of their obligations for us, including with respect to safety, patient and data privacy, antitrust, and bribery and corruption, it is possible that we could suffer financial and reputational harm or other negative outcomes, including possible legal consequences and liabilities. We may not be successful in enforcing the terms and conditions of our licensing and collaboration agreements in court or via agreed upon dispute resolution mechanisms, and even if we were to prevail in any such dispute, the remedies may not be adequate to compensate us for the losses. Any termination, breach or expiration of any of these licensing or collaboration agreements could have a material adverse effect on our financial position by reducing or eliminating the potential for us to receive license fees, milestones and royalties. In such an event, we may be required to devote additional efforts and to incur additional costs associated with pursuing regulatory approval and commercialization of neffy. Alternatively, we may attempt to identify and transact with a new assignee or licensee, but there can be no assurance that we would be able to identify a suitable partner or transact on terms that are favorable to us. For example, in February 2023, we terminated the Recordati License and Supply Agreement, which eliminated the potential for us to receive milestone and royalty payments from Recordati under the Recordati License and Supply Agreement. We intend to pursue strategic partnerships for the commercialization of *neffy* in additional regions outside of the United States, subject to FDA approval of *neffy*, including the regions previously licensed to Recordati, but there can be no assurance that we would be able to identify a suitable partner or transaction on terms that are favorable to us. In addition, under the termination agreement with Recordati (the "Termination Agreement"), we are obligated to pay certain milestone and royalty payments to Recordati.

We may seek to enter into additional collaborations, licenses and other similar arrangements for neffy or any future product candidate and may not be successful in doing so, and even if we are, we may relinquish valuable rights and may not realize the benefits of such relationships.

We may seek to enter into collaborations, joint ventures, licenses and other similar arrangements for the development or commercialization of *neffy* in other geographic regions or of any future product candidates, due to capital costs required to develop or commercialize *neffy* or any future product candidate or manufacturing constraints. Such collaborative efforts may not be profitable. We may not be successful in our efforts to establish or maintain such collaborations for *neffy* or any future product candidates because our research and development pipeline may be insufficient, our product candidates may be deemed to be at too early of a stage of development for collaborative effort or third parties may not view our product candidates as having the requisite potential to demonstrate safety and efficacy or significant commercial opportunity. In addition, we face significant competition in seeking appropriate strategic partners, and the negotiation process can be time-consuming and complex. We may have to relinquish valuable rights to our future revenue streams, research programs or product candidates, or grant licenses on terms that may not be favorable to us, as part of any such arrangement, and such arrangements may restrict us from entering into additional agreements with other potential licensing and collaboration partners. We cannot be certain that, following a collaboration, license or strategic transaction, we will achieve an economic benefit that justifies such transaction.

Even if we are successful in our efforts to establish such collaborations, the terms that we agree upon may not be favorable to us, and we may not be able to maintain such collaborations if, for example, the development or approval of *neffy* or any future product candidate is delayed, the safety of *neffy* or any future product candidate is questioned or the sales of an approved product candidate are unsatisfactory.

In addition, any potential future collaborations may be terminable by our strategic partners, and we may not be able to adequately protect our rights under these agreements. Furthermore, strategic partners may negotiate for certain rights to control decisions regarding the development and commercialization of *neffy* or any future product candidate, if approved, and may not conduct those activities in the same manner as we do. Any termination of collaborations we enter into in the future, or any delay in entering into collaborations related to *neffy* or any future product candidate, could delay the development and commercialization of *neffy* or any future product candidate and reduce their competitiveness if they reach the market, which could have a material adverse effect on our business, financial condition and results of operations.

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

Because we currently rely on third parties to manufacture *neffy* and to perform quality testing, we must, at times, share our proprietary information, including trade secrets and know-how, with them. We seek to protect our proprietary information, in part, by entering into confidentiality agreements, and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our current and future licensing and collaboration partners, advisors, employees 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 proprietary information. Despite the contractual provisions employed when working with third parties, the need to share trade secrets, know-how and other proprietary information increases the risk that such proprietary information become known by our competitors, are intentionally or inadvertently incorporated into the technology of others or are disclosed or used in violation of these agreements. We rely, in part, on trade secrets, know-how and other proprietary information to develop and maintain our competitive position and a competitor's discovery of our proprietary information or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks Related to Commercialization of *neffy* or Any Future Product Candidates

We currently have limited marketing, sales or distribution infrastructure. If we are unable to fully develop our sales, marketing and distribution capability on our own or through collaborations with marketing partners, we may not be successful in commercializing our product candidates.

We are currently building our marketing, sales or distribution capabilities. As a company we have not commercialized or marketed any products to date. If *neffy* is approved for the emergency treatment of Type I allergic reactions or other future indications or any future product candidate is approved, we will need to expand our sales and marketing organization, on our own and in collaboration with third parties, and add further technical expertise and supporting distribution capabilities to commercialize the approved product in key territories, which will require substantial additional resources. Some or all of these costs may be incurred in advance of any approval of *neffy* or any future product candidate. There are risks involved with both establishing our own sales, marketing and distribution capabilities and entering into arrangements with third parties to perform these services. For example, recruiting and training a commercial organization is expensive and time consuming and could delay any product launch. If the commercial launch of *neffy* or any future product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly and our investment would be lost if we cannot retain or reposition our sales and marketing personnel. Any failure or delay in the development of our or third parties' internal sales, marketing and distribution capabilities would adversely impact the commercialization of *neffy* and any future product candidates.

Factors that may inhibit our efforts to commercialize *neffy* or any future product candidate on its own include:

- our inability to recruit and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to or persuade adequate numbers of allergists, pediatricians and other physicians to prescribe any future products;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines;
- the availability of adequate coverage by and reimbursement from third-party payors; and
- unforeseen costs and expenses associated with building out an independent sales and marketing organization.

We entered into exclusive licensing and collaboration agreements for the development and commercialization of *neffy* with Alfresa Pharma in Japan and Pediatrix Therapeutics in China, Macau, Hong Kong and Taiwan. These licensing and collaboration partners have direct sales forces and established distribution systems to serve as an alternative to our own sales force and distribution systems. We may enter into additional licensing and collaboration agreements in other territories for the commercialization of *neffy* or any future product candidates, however, we may be unable to enter into such agreements on favorable terms, if at all. Our product revenue may be lower than if we directly marketed or sold our products, if approved. In addition, any revenue we receive will depend in whole or in part upon the efforts of these third parties, which may not be successful and are generally not within our control.

We also compete with many companies that currently have extensive, experienced and well-funded sales, distribution and marketing operations to recruit, hire, train and retain marketing and sales personnel. We also face competition in our search for third parties to assist us with the sales and marketing efforts of *neffy* and any future product candidates, if approved. Without an internal team or the support of a third-party to perform marketing and sales functions, we may be unable to compete successfully against these more established companies.

If we do not expand our sales and marketing capabilities successfully, on our own and in collaboration with third parties, we will not be successful in commercializing *neffy* or any future product candidates. If we are not successful in commercializing any approved products, our future product revenue will suffer and we may incur significant additional losses.

Furthermore, our efforts to educate patients, caregivers, allergists, pediatricians and other physicians, and payors on the benefits of *neffy* or any future product candidates may require more resources than we anticipate and may never be successful. Even if *neffy* or any future product candidates are approved, if we are unable to successfully market our products successfully, we will not be able to generate significant revenues from such products, if approved.

The market for neffy and any future product candidates we may develop may be smaller than we expect.

We have focused our development of *neffy* for the emergency treatment of Type I allergic reactions. We base our market opportunity estimates on a variety of factors, including our estimates of the number of people who have experienced severe Type I allergic reactions and are at risk of anaphylaxis, the continued growth rate of our patient population, the number of those in our patient population who we expect will fill a prescription for *neffy*, including those that currently do not fill prescriptions for epinephrine intra-muscular injectable devices or whose prescriptions have lapsed, the estimated increase in per patient device acquisition of *neffy* as compared to epinephrine intra-muscular injectable devices and the net sales of epinephrine intra-muscular injectable devices. These estimates are based on many assumptions and may prove incorrect, and new studies or market research may reduce our estimated patient population and potential device sales. If we are unable to advance neffy, including with respect to the emergency treatment of Type I allergic reactions and other potential indications, or any future product candidates with attractive market opportunities or if our market opportunities are smaller than we expected, our future product revenues may be smaller than anticipated, which would adversely affect our business, financial condition, results of operations and prospects.

Any of our current and future product candidates for which we, or any current or future licensing and collaboration partners, obtain regulatory approval in the future will be subject to ongoing obligations and continued regulatory review, which may result in significant additional expense. If approved, neffy and any future product candidates could be subject to post-marketing restrictions or withdrawal from the market and we, or any current or future licensing and collaboration partners, may be subject to substantial penalties if we, or they, fail to comply with regulatory requirements or if we, or they, experience unanticipated problems with our products following approval.

neffy or any future product candidates for which we, or any current or future licensing and collaboration partners, obtain regulatory approval, as well as the manufacturing processes, post-approval studies, labeling, post-approval pharmacovigilance monitoring, advertising and promotional activities for such product, among other things, will be subject to ongoing requirements of and review by the FDA, the EMA and other applicable regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, requirements relating to manufacturing, quality control, quality assurance and corresponding maintenance of records and documents, requirements regarding the distribution of samples to physicians and recordkeeping. For certain commercial prescription drug products, manufacturers and other parties involved in the supply chain must also meet chain of distribution requirements and build electronic, interoperable systems for product tracking and tracing and for notifying the FDA of counterfeit, diverted, stolen and intentionally adulterated products or other products that are otherwise unfit for distribution in the United States. We and our contract manufacturers will also be subject to user fees and periodic inspection by regulatory authorities to monitor compliance with these requirements and the terms of any product approval we may obtain. Even if regulatory approval of a product candidate is granted, the approval may be subject to limitations on the indications or uses for which the product may be marketed or to the conditions of approval, including the requirement in the United States to implement a Risk Evaluation and Mitigation Strategy or the inclusion of a Boxed Warning, which highlights a specific life-threatening safety risk.

The FDA, the EMA and other regulatory authorities may also impose requirements for costly post-marketing studies or clinical trials and surveillance to monitor the safety or efficacy of a product. For example, the FDA and other agencies, including the Department of Justice, closely regulate and monitor the post-approval marketing and promotion of products to ensure that they are manufactured, marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. Regulatory authorities impose stringent restrictions on manufacturers' communications regarding off-label use. However, companies generally may share truthful and not misleading information that is otherwise consistent with a product's approved labeling. If we, or any current or future licensing and collaboration partners, do not market *neffy* or any of our future product candidates for which we, or they, receive regulatory approval for only their approved indications, we, or they, may be subject to warnings or enforcement action for off-label marketing if it is alleged that we are doing so. Violation of laws and regulations relating to the promotion and advertising of prescription drugs may lead to investigations or allegations of violations of federal and state health care fraud and abuse laws and state consumer protection laws, including the False Claims Act and any comparable foreign laws. In the EU, the direct-to-consumer advertising of prescription-only medicinal products is prohibited. Violations of the rules governing the promotion of medicinal products in the EU could be penalized by administrative measures, fines and imprisonment. These laws may further limit or restrict the advertising and promotion of our products to the general public, and may also impose limitations on our promotional activities with health care professionals.

In addition, later discovery of previously unknown side effects, adverse events or other problems with our products or their manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on the manufacturing of such products;
- restrictions on the labeling or marketing of such products;
- restrictions on product distribution or use;
- requirements to conduct post-marketing studies or clinical trials;
- warning letters or untitled letters;
- withdrawal of the products from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of products;
- restrictions on coverage by third-party payors;
- fines, restitution or disgorgement of profits or revenues;
- exclusion from federal health care programs such as Medicare and Medicaid;
- suspension or withdrawal of regulatory approvals;
- refusal to permit the import or export of products;
- product seizure; or
- injunctions or the imposition of civil or criminal penalties.

Even if we, or any current or future licensing and collaboration partners, obtains regulatory approvals for neffy or any future product candidate, the terms of approvals and ongoing regulation of our products may limit how we manufacture and market our products, which could impair our ability to generate revenue.

Once regulatory approval has been granted, an approved product and its manufacturer and distributor are subject to ongoing review and extensive regulation. We, and any current and future licensing and collaboration partners, must therefore comply with requirements concerning advertising and promotion for *neffy* or any future product candidate for which we or they obtain regulatory approval. Promotional communications with respect to prescription drugs are subject to a variety of legal and regulatory restrictions and must be consistent with the information in the product's approved labeling. Thus, we and any current and future licensing and collaboration partners will not be able to promote any products we develop for indications or uses for which they are not approved.

In addition, manufacturers of approved products and those manufacturers' facilities are required to comply with extensive FDA, EMA and other foreign regulatory requirements, including ensuring that quality control and manufacturing procedures conform to cGMPs, which include requirements relating to quality control and quality assurance as well as the corresponding maintenance of records and documentation and reporting requirements. We, our contract manufacturers, any current and future licensing and collaboration partners and their contract manufacturers would be subject to periodic unannounced inspections by the FDA, the EMA and other foreign regulators to monitor and ensure compliance with cGMPs. Despite our efforts to inspect and verify regulatory compliance, one or more of our third-party manufacturing vendors may be found on regulatory inspection by the FDA, the EMA or other foreign regulators to be not in compliance with cGMP regulations, which may result in shutdown of the third-party vendor or invalidation of drug product lots or processes. In some cases, a product recall may be warranted or required, which would materially affect our ability to supply and market our drug products.

Accordingly, assuming we, or any current or future licensing and collaboration partners, receive regulatory approval for *neffy* or one or more future product candidates, we, and any current and future licensing and collaboration partners, and our and their contract manufacturers will continue to expend time, money and effort in all areas of regulatory compliance, including manufacturing, production, product surveillance and quality control.

If we, and any current and future licensing and collaboration partners, are not able to comply with post-approval regulatory requirements, we, and any current and future licensing and collaboration partners, could have the regulatory approvals for *neffy* or any future products withdrawn by regulatory authorities and our, or any current or future licensing and collaboration partners', ability to market any future products could be limited, which could adversely affect our ability to achieve or sustain profitability. Further, the cost of compliance with post-approval regulations may have a negative effect on our operating results and financial condition.

Even if neffy or any future product candidate of ours receives regulatory approval, it may fail to achieve the degree of market acceptance by allergists, pediatricians and other physicians, patients, caregivers, third-party payors and others in the medical community necessary for commercial success, in which case we may not generate significant revenues or become profitable.

We have never commercialized a product, and even if *neffy* for the treatment of any indication, or any future product candidate of ours, is approved by the appropriate regulatory authorities for marketing and sale, it may nonetheless fail to gain sufficient market acceptance by allergists, pediatricians and other physicians, patients, caregivers, third-party payors and others in the medical community. Physicians may be reluctant to prescribe *neffy* in place of well-established epinephrine intra-muscular injectable devices. Further, patients and caregivers may be reluctant to switch unless their physicians recommend switching products or are required to switch due to lack of coverage and adequate reimbursement. In addition, even if we are able to demonstrate *neffy*'s or any future product candidate's safety and efficacy to the FDA, the EMA and other regulators, safety or efficacy concerns in the medical community may hinder market acceptance.

Efforts to educate patients, caregivers, the medical community and third-party payors on the benefits of *neffy* and any future product candidates may require more resources than we anticipate, including management time and financial resources, and may not be successful. If *neffy* or any future product candidate is approved but does not achieve an adequate level of market acceptance, we may not generate significant revenues and we may not become profitable. The degree of market acceptance of *neffy* and any future product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and safety of the product;
- the potential advantages of the product compared to competitive therapies and our ability to successfully publicize these advantages or highlight them in any marketing materials;
- the prevalence and severity of any side effects;
- our ability, or the ability of any current or future licensing or collaboration partners, to offer the product for sale at competitive prices;
- the product's convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try, and of physicians to prescribe, the product;
- limitations or warnings, including distribution or use restrictions contained in the product's approved labeling;
- the strength of sales, marketing and distribution support;
- changes in the standard of care for the targeted indications for the product; and
- availability and adequacy of coverage and reimbursement from government payors, managed care plans and other third-party payors.

Any failure by *neffy* or any future product candidate of ours that obtains regulatory approval to achieve market acceptance or commercial success would adversely affect our business prospects.

Recently enacted and future legislation may increase the difficulty and cost for us to obtain marketing approval of and commercialize neffy or any future product candidates and affect the prices we may obtain.

In the United States and some foreign jurisdictions, there have been, and we expect there will continue to be, a number of legislative and regulatory changes and proposed changes regarding the healthcare system, including cost-containment measures, that could reduce or limit coverage and reimbursement for newly approved drugs, prevent or delay marketing approval of *neffy* or any future product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell *neffy* or any future product candidates for which we obtain marketing approval.

For example, in 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the "ACA"), was signed into law. The ACA was intended, among other things, to broaden access to health insurance, reduce or constrain the growth of healthcare spending, enhance remedies against fraud and abuse, add new transparency requirements for the healthcare and health insurance industries, impose new taxes and fees on the health industry and impose additional health policy reforms. The ACA and subsequent regulations increased the Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program for both branded and generic drugs and revised the definition of "average manufacturer price" for reporting purposes, which could further increase the amount of Medicaid drug rebates to states. However, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap for single source and innovator multiple source drugs, beginning January 1, 2024. Further, the ACA imposed a significant annual fee on companies that manufacture or import branded prescription drug products, increased the number of entities eligible for discounts under the 340B program and included a discount on brand name drugs for Medicare Part D beneficiaries in the coverage gap, or "donut hole." Substantial provisions affecting compliance have also been enacted, which may require us to modify our business practices with healthcare practitioners.

Since its enactment, there have been judicial, executive and Congressional challenges to certain aspects of the ACA. For example, the Tax Cuts and Jobs Act of 2017 included a provision which repealed, effective January 1, 2019, the tax-based shared responsibility payment imposed by the ACA on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate." On June 17, 2021, the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the individual mandate was repealed by Congress. Prior to the U.S. Supreme Court ruling on January 28, 2021, President Biden issued an executive order that initiated a special enrollment period for purposes of obtaining health insurance coverage through the ACA marketplace. The executive order also instructed certain governmental agencies to review and reconsider their existing policies and rules that limit access to healthcare, including among others, reexamining Medicaid demonstration projects and waiver programs that include work requirements, and policies that create unnecessary barriers to obtaining access to health insurance coverage through Medicaid or the ACA. In addition, on August 16, 2022, President Biden signed the Inflation Reduction Act of 2022 ("IRA") into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and creating a new manufacturer discount program. It is possible that the ACA will be subject to judicial or Congressional challenges in the future. It is unclear how any such challenges, and the healthcare reform measures of the Biden administration will impact the ACA and our business.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA was enacted. These changes include aggregate reductions to Medicare payments to providers of up to two percent per fiscal year pursuant to the Budget Control Act of 2011, which went into effect on April 1, 2013, and due to subsequent legislative amendments, will remain in effect until 2031, unless additional Congressional action is taken. Under current legislation, the actual reduction in Medicare payments will vary from 1% in 2022 to up to 4% in the final fiscal year of this sequester. In addition, the American Taxpayer Relief Act of 2012 was signed into law which, among other things, further reduced Medicare payments to several types of providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Recently there has also been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several U.S. Presidential executive orders, congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. At the federal level, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, the U.S. Department of Health and Humans Services ("HHS") released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. In addition, the IRA, among other things, (i) directs HHS to negotiate the price of certain high-expenditure, single-source drugs and biologics covered under Medicare, and subject drug manufacturers to civil monetary penalties and a potential excise tax by offering a price that is not equal to or less than the negotiated "maximum fair price" for such drugs and biologics under the law, and (ii) imposes rebates with respect to certain drugs and biologics covered under Medicare Part B or Medicare Part D to penalize price increases that outpace inflation. The IRA permits HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years. These provisions will take effect progressively starting in fiscal year 2023, although they may be subject to legal challenges. It is currently unclear how the IRA will be implemented but is likely to have a significant impact on the pharmaceutical industry. Further, the Biden administration released an additional executive order on October 14, 2022, directing HHS to submit a report on how the Center for Medicare and Medicaid Innovation can be further leveraged to test new models for lowering drug costs for Medicare and Medicaid beneficiaries. It is unclear whether this executive order or similar policy initiatives will be implemented in the future.

At the state level, legislatures have become increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

These laws and the regulations and policies implementing them, as well as other healthcare reform measures that may be adopted in the future, may have a material adverse effect on our industry generally and on our ability to successfully develop and commercialize *neffy* or any future product candidates.

Governments outside the United States may impose strict price controls, which may adversely affect our revenues, if any.

In some countries, including certain Member States of the EU, the pricing of prescription drugs is, in part, subject to governmental control. Additional countries may adopt similar approaches to the pricing of prescription drugs. In such countries, pricing negotiations with governmental authorities can take considerable time after receipt of regulatory approval for a product. The EU provides options for the EU 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. EU Member States may approve a specific price for a product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other EU Member States allow companies to fix their own prices for drug products, but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. 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 coverage and reimbursement have been obtained. Reference pricing used by various countries and parallel distribution, or arbitrage between low-priced and high-priced countries, can further reduce prices. In some countries, we may be required to conduct a clinical study or other studies that compare the cost-effectiveness of *neffy* or any future product candidates to other available therapies in order to obtain or maintain reimbursement or pricing approval, which is time-consuming and costly. We cannot be sure that such prices and reimbursement will be acceptable to us. 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 pricing is set at unsatisfactory levels or if reimbursement of our products is unavailable or limited in scope or amount, our revenues from sales by us or our strategic partners and the potential profitability of *neffy* or any future product candidates in those countries would be negatively affected.

The successful commercialization of neffy or any future product candidates, if approved, will depend in part on the extent to which governmental authorities and health insurers establish coverage, adequate reimbursement levels and favorable pricing policies. Failure to obtain or maintain coverage and adequate reimbursement for our products could limit our ability to market those products and decrease our ability to generate revenue.

The availability of coverage and the adequacy of reimbursement by governmental healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors are essential for most patients to be able to afford prescription medications such as *neffy* or any future product candidates, if approved. Our ability to achieve coverage and acceptable levels of reimbursement for our products by third-party payors will have an effect on our ability to successfully commercialize those products. Accordingly, we will need to successfully implement a coverage and reimbursement strategy for any approved product candidate. Even if we obtain coverage for a given product by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require co-payments that patients find unacceptably high. We cannot be sure that coverage and reimbursement in the United States, the EU or elsewhere will be available for *neffy* or any future product candidate that we may develop, and any reimbursement that may become available may be decreased or eliminated in the future.

Third-party payors increasingly are challenging prices charged for biopharmaceutical products and services, and many third-party payors may refuse to provide coverage and reimbursement for particular drugs when an equivalent generic drug or a less expensive therapy is available. It is possible that a third-party payor may consider *neffy* or any future product candidate as substitutable and only offer to reimburse patients for the less expensive product. Even if we are successful in demonstrating improved efficacy or improved convenience of administration with *neffy* or any future product candidates, pricing of existing drugs may limit the amount we will be able to charge for *neffy* or any future product candidates. These payors may deny or revoke the reimbursement status of a given product or establish prices for new or existing marketed products at levels that are too low to enable us to realize an appropriate return on our investment in product development. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize or obtain a satisfactory financial return on *neffy* or any future product candidates that we may develop.

There is significant uncertainty related to third-party payor coverage and reimbursement of newly approved products. In the United States, third-party payors, including private and governmental payors, such as the Medicare and Medicaid programs, play an important role in determining the extent to which new drugs will be covered. Some third-party payors may require pre-approval of coverage for new or innovative devices or drug therapies before they will reimburse healthcare providers who use such therapies. There is significant uncertainty related to third-party payor coverage and reimbursement of newly approved products. In the United States, third-party payors, including private and governmental payors, such as the Medicare and Medicaid programs, play an important role in determining the extent to which new drugs will be covered. Some third-party payors may require pre-approval of coverage for new or innovative devices or drug therapies before they will reimburse healthcare providers who use such therapies. Generally, third-party payors limit coverage and reimbursement for new medication prior to a formal review by the payors' pharmacy and therapeutics committees. As such, several third-party payors have indicated that our products may be subject to denial or limited coverage prior to formal review. There may be significant delays in obtaining reimbursement for newly-approved drugs, and coverage may be more limited than the purposes for which the drug or therapeutic biologic is approved by the FDA or similar foreign regulatory authorities. Additionally, we may need to conduct expensive pharmaco-economic studies to demonstrate the medical necessity and cost-effectiveness of our product candidates. There can be no assurance that our product candidates will be considered medically necessary or cost-effective. It is difficult to predict at this time what third-party payors will decide with respect to the coverage and reimbursement for *neffy* or any future product candidates. Further, coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained, less favorable coverage policies and reimbursement rates may be implemented in the future. It is difficult to predict at this time what third-party payors will decide with respect to the coverage and reimbursement for *neffy* or any future product candidates. Further, coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained, less favorable coverage policies and reimbursement rates may be implemented in the future.

Obtaining and maintaining reimbursement status is time consuming, costly and uncertain. The Medicare and Medicaid programs increasingly are used as models for how private payors and other governmental payors develop their coverage and reimbursement policies for drugs. However, no uniform policy for coverage and reimbursement for products exists among third-party payors in the United States. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Furthermore, rules and regulations regarding reimbursement change frequently, in some cases at short notice, and we believe that changes in these rules and regulations are likely.

Outside the United States, international operations are generally subject to extensive governmental price controls and other market regulations, and we believe the increasing emphasis on cost-containment initiatives in Europe and other countries has and will continue to put pressure on the pricing and usage of *neffy* or any future product candidates. In many countries, the prices of medical products are subject to varying price control mechanisms as part of national health systems. Other countries allow companies to fix their own prices for medical products but monitor and control company profits. Additional foreign price controls or other changes in pricing regulation could restrict the amount that we are able to charge for *neffy* or any future product candidates. Accordingly, in markets outside the United States, the reimbursement for *neffy* or any future product candidates may be reduced compared with the United States and may be insufficient to generate commercially reasonable revenue and profits.

Moreover, increasing efforts by governmental and third-party payors in the United States and abroad to cap or reduce healthcare costs may cause such organizations to limit both coverage and the level of reimbursement for newly approved products and, as a result, they may not cover or provide adequate payment for *neffy* or any future product candidates. We expect to experience pricing pressures in connection with the sale of *neffy* or any future product candidates due to the trend toward managed healthcare, the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs and surgical procedures and other treatments, has become very intense. As a result, increasingly high barriers are being erected to the entry of new products.

Ongoing healthcare legislative and regulatory reform measures may have a material adverse effect on our business and results of operations.

Our relationships with customers, health care professionals and third-party payors may be subject to applicable healthcare laws, which could expose us to penalties, including administrative, civil or criminal penalties, damages, fines, imprisonment, exclusion from participation in federal healthcare programs such as Medicare and Medicaid, reputational harm, the curtailment or restructuring of our operations and diminished future profits and earnings.

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

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

- federal civil and criminal false claims laws, including the False Claims Act, prohibit any person from knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, or causing to be made, a false statement to get a false claim paid. Over the past few years, several pharmaceutical and other healthcare companies have been prosecuted under these laws for a variety of alleged promotional and marketing activities, including: allegedly providing free items and services, sham consulting fees and grants and other monetary benefits to prescribers; reporting to pricing services inflated average wholesale prices that were then used by federal programs to set reimbursement rates; engaging in off-label promotion that caused claims to be submitted to government healthcare programs for non-covered, off-label uses; and submitting inflated best price information to the Medicaid Drug Rebate Program to reduce liability for Medicaid rebates. In addition, the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal False Claims Act;

- federal civil monetary penalties laws impose civil fines for, among other things, the offering or transfer of remuneration to a Medicare or state healthcare program beneficiary if the person knows or should know it is likely to influence the beneficiary's selection of a particular provider, practitioner, or supplier of services reimbursable by Medicare or a state healthcare program, unless an exception applies;

- the federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA") which prohibits, among other things, 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, of any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless or the payor (e.g., public or private), willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services; like the federal Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;

- the federal Physician Payment Sunshine Act, which requires manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program (with certain exceptions) to report annually to the government information related to payments or other "transfers of value" made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), other healthcare professionals (such as physician assistants and nurse practitioners) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 ("HITECH"), and their respective implementing regulations, which impose obligations on "covered entities," including certain healthcare providers, health plans, and healthcare clearinghouses, as well as their respective "business associates" and their covered subcontractors 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;

- federal price reporting laws require manufactures to calculate and report complex pricing metrics to government programs, where such reported prices may be used in the calculation of reimbursement and/or discounts on approved products;

- federal and state consumer protection and unfair competition laws broadly regulate marketplace activities and activities that potentially harm consumers; and

- analogous state laws and regulations, such as state anti-kickback and false claims laws, that may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payors, including private insurers; some state laws that require biotechnology companies to comply with the industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government and may require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; some state laws that require biotechnology companies to report information on the pricing of certain drug products; and some state and local laws require the registration or pharmaceutical sales representatives.

Because of the breadth of these laws and the narrowness of available statutory exceptions and regulatory safe harbors, it is possible that some of our business activities, particularly any sales and marketing activities after *neffy* or any future product candidate has been approved for marketing in the United States, could be subject to legal challenge and enforcement actions. If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to significant penalties, including administrative, civil and criminal penalties, damages, fines, exclusion from governmental health care programs, a corporate integrity agreement or other agreement to resolve allegations of non-compliance, imprisonment, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our financial results.

We are subject to stringent and evolving U.S. and foreign laws, regulations, rules, contractual obligations, policies and other obligations related to data privacy and security. Our actual or perceived failure to comply with such obligations could lead to regulatory investigations or actions; litigation; fines and penalties; disruptions of our business operations; reputational harm; loss of revenue or profits; and other adverse business consequences.

In the ordinary course of business, we collect, receive, store, process, generate, use, transfer, disclose, make accessible, protect, secure, dispose of, transmit, and share (collectively, "process") personal data and other sensitive information, including proprietary and confidential business data, trade secrets, intellectual property, data we collect about trial participants in connection with clinical trials, sensitive third-party data, business plans, transactions, and financial information (collectively, "sensitive data").

Our data processing activities may subject us to numerous data privacy and security obligations, such as various laws, regulations, guidance, industry standards, external and internal privacy and security policies, contractual requirements, and other obligations relating to data privacy and security.

In the United States, federal, state, and local governments have enacted numerous data privacy and security laws, including data breach notification laws, personal data privacy laws, consumer protection laws (e.g., Section 5 of the Federal Trade Commission Act), and other similar laws (e.g., wiretapping laws). For example, the California Consumer Privacy Act of 2018 ("CCPA") applies to personal information of consumers, business representatives, and employees, and requires businesses to provide specific disclosures in privacy notices and honor requests of California residents to exercise certain privacy rights. The CCPA provides for civil penalties of up to $7,500 per violation and allows private litigants affected by certain data breaches to recover significant statutory damages. In addition, the California Privacy Rights Act of 2020 ("CPRA") expands the CCPA's requirements, including by adding a new right for individuals to correct their personal information and establishing a new regulatory agency to implement and enforce the law. Although the CCPA exempts some data processed in the context of clinical trials, the CCPA increases compliance costs and potential liability with respect to other personal data we maintain about California residents.

Other states, such as Virginia and Colorado, have also passed comprehensive privacy laws, and similar laws are being considered in several other states, as well as at the federal and local levels. While these states, like the CCPA, also exempt some data processed in the context of clinical trials, these developments may further complicate compliance efforts, and increase legal risk and compliance costs for us and the third parties upon whom we rely.

Outside the United States, an increasing number of laws, regulations, and industry standards may govern data privacy and security. For example, the European Union's General Data Protection Regulation ("EU GDPR") and the United Kingdom's GDPR ("UK GDPR"), impose strict requirements for processing personal data.

For example, under the EU GDPR, companies may face temporary or definitive bans on data processing and other corrective actions; fines of up to 20 million Euros or 4% of annual global revenue, whichever is greater; or private litigation related to processing of personal data brought by classes of data subjects or consumer protection organizations authorized at law to represent their interests.

In addition, we may be unable to transfer personal data from Europe and other jurisdictions to the United States or other countries due to data localization requirements or limitations on cross-border data flows. Europe and other jurisdictions have enacted laws requiring data to be localized or limiting the transfer of personal data to other countries. In particular, the EEA and the UK have significantly restricted the transfer of personal data to the United States and other countries whose privacy laws it believes are inadequate. Other jurisdictions may adopt similarly stringent interpretations of their data localization and cross-border data transfer laws. Although there are currently various mechanisms that may be used to transfer personal data from the EEA and UK to the United States in compliance with law, such as the EEA and UK's standard contractual clauses, these mechanisms are subject to legal challenges, and there is no assurance that we can satisfy or rely on these measures to lawfully transfer personal data to the United States. If there is no lawful manner for us to transfer personal data from the EEA, the UK, or other jurisdictions to the United States, or if the requirements for a legally-compliant transfer are too onerous, we could face significant adverse consequences, including the interruption or degradation of our operations, the need to relocate part of or all of our business or data processing activities to other jurisdictions at significant expense, increased exposure to regulatory actions, substantial fines and penalties, the inability to transfer data and work with partners, vendors and other third parties, and injunctions against our processing or transferring of personal data necessary to operate our business. Additionally, companies that transfer personal data out of the EEA and UK to other jurisdictions, particularly to the United States, are subject to increased scrutiny from regulators, individual litigants, and activities groups. Some European regulators have ordered certain companies to suspend or permanently cease certain transfers of personal data out of Europe for allegedly violating the GDPR's cross-border data transfer limitations.

Obligations related to data privacy and security are quickly changing, becoming increasingly stringent, and creating regulatory uncertainty. Additionally, these obligations may be subject to differing applications and interpretations, which may be inconsistent or conflict among jurisdictions. Preparing for and complying with these obligations requires us to devote significant resources and may necessitate changes to our services, information technologies, systems, and practices and to those of any third parties that process personal data on our behalf.

We may at times fail (or be perceived to have failed) in our efforts to comply with our data privacy and security obligations. Moreover, despite our efforts, our personnel or third parties on whom we rely may fail to comply with such obligations, which could negatively impact our business operations. If we or the third parties on which we rely fail, or are perceived to have failed, to address or comply with applicable data privacy and security obligations, we could face significant consequences, including but not limited to: government enforcement actions (e.g., investigations, fines, penalties, audits, inspections, and similar); litigation (including class-action claims); additional reporting requirements and/or oversight; bans on processing personal data; and orders to destroy or not use personal data. Any of these events could have a material adverse effect on our reputation, business, or financial condition, including but not limited to: loss of customers; interruptions or stoppages in our business operations (including clinical trials); inability to process personal data or to operate in certain jurisdictions; limited ability to develop or commercialize our products; expenditure of time and resources to defend any claim or inquiry; adverse publicity; or substantial changes to our business model or operations.

If our information technology systems or data, or those of third parties upon which we rely, are or were compromised, we could experience adverse consequences resulting from such compromise, including but not limited to regulatory investigations or actions; litigation; fines and penalties; disruptions of our business operations; reputational harm; loss of revenue or profits; and other adverse consequences.

In the ordinary course of our business, we and the third parties upon which we rely process sensitive data, and, as a result, we and the third parties upon which we rely face a variety of evolving threats, including but not limited to ransomware attacks, which could cause security incidents. Cyber-attacks, malicious internet-based activity, online and offline fraud, and other similar activities threaten the confidentiality, integrity, and availability of our sensitive data and information technology systems, and those of the third parties upon which we rely. Such threats are prevalent and continue to rise, are increasingly difficult to detect, and come from a variety of sources, including traditional computer "hackers," threat actors, "hacktivists," organized criminal threat actors, personnel (such as through theft or misuse), sophisticated nation states, and nation-state-supported actors.

Some actors now engage and are expected to continue to engage in cyber-attacks, including without limitation nation-state actors for geopolitical reasons and in conjunction with military conflicts and defense activities. During times of war and other major conflicts, we and the third parties upon which we rely may be vulnerable to a heightened risk of these attacks, including retaliatory cyber-attacks, which could materially disrupt our systems and operations, supply chain, and ability to produce, sell and distribute our services.

We and the third parties upon which we rely are subject to a variety of evolving threats, including but not limited to social-engineering attacks (including through phishing attacks), malicious code (such as viruses and worms), malware (including as a result of advanced persistent threat intrusions), denial-of-service attacks (such as credential stuffing), credential harvesting, personnel misconduct or error, ransomware attacks, supply-chain attacks, software bugs, server malfunctions, software or hardware failures, loss of data or other information technology assets, adware, telecommunications failures, earthquakes, fires, floods, and other similar threats.

In particular, severe ransomware attacks are becoming increasingly prevalent and can lead to significant interruptions in our operations, loss of sensitive data and income, reputational harm, and diversion of funds. Extortion payments may alleviate the negative impact of a ransomware attack, but we may be unwilling or unable to make such payments due to, for example, applicable laws or regulations prohibiting such payments.

Remote work has become more common and has increased risks to our information technology systems and data, as more of our employees utilize network connections, computers, and devices outside our premises or network, including working at home, while in transit and in public locations. Additionally, future or past business transactions (such as acquisitions or integrations) could expose us to additional cybersecurity risks and vulnerabilities, as our systems could be negatively affected by vulnerabilities present in acquired or integrated entities' systems and technologies. Furthermore, we may discover security issues that were not found during due diligence of such acquired or integrated entities, and it may be difficult to integrate companies into our information technology environment and security program.

In addition, our reliance on third-party service providers could introduce new cybersecurity risks and vulnerabilities, including supply-chain attacks, and other threats to our business operations. We rely on third-party service providers and technologies to operate critical business systems to process sensitive data in a variety of contexts, including, without limitation, cloud-based infrastructure, data center facilities, encryption and authentication technology, employee email, content delivery to customers, and other functions. We also rely on third-party service providers to provide other products, services, parts, or otherwise to operate our business. Our ability to monitor these third parties' information security practices is limited, and these third parties may not have adequate information security measures in place. If our third-party service providers experience a security incident or other interruption, we could experience adverse consequences. While we may be entitled to damages if our third-party service providers fail to satisfy their privacy or security-related obligations to us, any award may be insufficient to cover our damages, or we may be unable to recover such award. In addition, supply-chain attacks have increased in frequency and severity, and we cannot guarantee that third parties' infrastructure in our supply chain or our third-party partners' supply chains have not been compromised.

Any of the previously identified or similar threats could cause a security incident or other interruption that could result in unauthorized, unlawful, or accidental acquisition, modification, destruction, loss, alteration, encryption, disclosure of, or access to our sensitive data or our information technology systems, or those of the third parties upon whom we rely. A security incident or other interruption could disrupt our ability (and that of third parties upon whom we rely) to provide our services.

We may expend significant resources or modify our business activities (including clinical trials) to try to protect against security incidents. Additionally, certain data privacy and security obligations may require us to implement and maintain specific security measures or industry-standard or reasonable security measures to protect our information technology systems and sensitive data.

While we have implemented security measures designed to protect against security incidents, there can be no assurance that these measures will be effective. We take steps to detect and remediate vulnerabilities, but we may not be able to detect and remediate all vulnerabilities because the threats and techniques used to exploit the vulnerability change frequently and are often sophisticated in nature. Therefore, such vulnerabilities could be exploited but may not be detected until after a security incident has occurred. These vulnerabilities pose material risks to our business. Further, we may experience delays in developing and deploying remedial measures designed to address any such identified vulnerabilities.

Applicable data privacy and security obligations may require us to notify relevant stakeholders of security incidents. Such disclosures are costly, and the disclosure or the failure to comply with such requirements could lead to adverse consequences.

If we (or a third party upon whom we rely) experience a security incident or are perceived to have experienced a security incident, we may experience adverse consequences, such as government enforcement actions (for example, investigations, fines, penalties, audits, and inspections); additional reporting requirements and/or oversight; restrictions on processing sensitive data (including personal data); litigation (including class claims); indemnification obligations; negative publicity; reputational harm; monetary fund diversions; interruptions in our operations (including availability of data); financial loss; and other similar harms. Security incidents and attendant consequences may cause customers to stop using our services, deter new customers from using our services, and negatively impact our ability to grow and operate our business.

Our contracts may not contain limitations of liability, and even where they do, there can be no assurance that limitations of liability in our contracts are sufficient to protect us from liabilities, damages, or claims related to our data privacy and security obligations. We cannot be sure that our insurance coverage will be adequate or sufficient to protect us from or to mitigate liabilities arising out of our privacy and security practices, that such coverage will continue to be available on commercially reasonable terms or at all, or that such coverage will pay future claims.

In addition to experiencing a security incident, third parties may gather, collect, or infer sensitive information about us from public sources, data brokers, or other means that reveals competitively sensitive details about our organization and could be used to undermine our competitive advantage or market position.

Risks Related to Our Intellectual Property

Our commercial success depends on our ability to obtain and maintain sufficient intellectual property protection for our product candidates and other proprietary technologies.

Our commercial success will depend, in part, on our ability to obtain and maintain patent protection in the United States and other countries with respect to our product candidates. If we are unable to obtain or maintain patent protection with respect to our product candidates, and their uses, our business, financial condition, results of operations and prospects could be materially harmed.

We generally seek to protect our proprietary position by filing or in-licensing patents or patent applications in the United States and abroad related to our product candidates that are important to our business, as appropriate. Our pending and future patent applications cannot be enforced against third parties practicing the technology claimed in such applications unless, and until, patents issue from such applications, and then only to the extent the issued claims cover the technology. There can be no assurance that our patent applications will result in patents being issued or that issued patents will afford sufficient protection against competitors with similar technology, nor can there be any assurance that the patents issued will not be infringed, designed around or invalidated by third parties. Even issued patents may later be found invalid or unenforceable or may be modified or revoked in proceedings instituted by third parties before various patent offices or in courts. The degree of future protection for our proprietary rights is uncertain. Only limited protection may be available and may not adequately protect our rights or permit us to gain or keep any competitive advantage. This failure to obtain the intellectual property rights relating to our product candidates could have a material adverse effect on our financial condition and results of operations.

The patent application process is subject to numerous risks and uncertainties, and there can be no assurance that we or any of our potential future collaborators will be successful in protecting our product candidates by obtaining and defending patents. Obtaining and enforcing patents is expensive and time-consuming, and we may not be able to file and prosecute all necessary or desirable patent applications, or maintain and/or enforce patents that may issue based on our patent applications, at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development results before it is too late to obtain patent protection.

Although we enter into non-disclosure and confidentiality agreements with parties who have access to patentable aspects of our research and development output, such as our employees, corporate collaborators, outside scientific collaborators, CROs, contract manufacturers, consultants, independent contractors, advisors and other third parties, any of these parties may breach these agreements and disclose such results before a patent application is filed, thereby jeopardizing our ability to seek adequate patent protection.

If the scope of any patent protection we obtain is not sufficiently broad, or if we lose any of our patent protection, our ability to prevent our competitors from commercializing similar or identical product candidates would be adversely affected.

The patent position of pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation, resulting in court decisions, including United States Supreme Court decisions, which have increased uncertainties as to the ability to enforce patent rights in the future. In addition, the laws of foreign countries may not protect our rights to the same extent as the laws of the United States, or vice versa.

Further, we may not be aware of all third-party intellectual property rights potentially relating to our research programs and product candidates, or their intended uses, and as a result the potential impact of such third-party intellectual property rights upon the patentability of our own patents and patent applications, as well as the potential impact of such third-party intellectual property upon our freedom to operate, is highly uncertain. Because patent applications are maintained as confidential for a certain period of time, until the relevant application is published, we may be unaware of third-party patents that may be infringed by commercialization of any of our product candidates, and we cannot be certain that we were the first to file a patent application related to a product candidate or technology. Moreover, because patent applications can take many years to issue, there may be currently pending patent applications that may later result in issued patents that our product candidates may infringe. In addition, identification of third-party patent rights that may be relevant to our technology is difficult because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. There is also no assurance that there is not prior art of which we are aware, but which we do not believe is relevant to our business, which may, nonetheless, ultimately be found to limit our ability to make, use, sell, offer for sale or import our products that may be approved in the future, or impair our competitive position. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. As a result, the issuance, scope, validity, enforceability, and commercial value of our patent rights are highly uncertain.

Our patents or pending patent applications, or the patents or pending patent applications that we license, may be challenged in the courts or patent offices in the United States and other foreign jurisdictions. For example, we may be subject to a third-party pre-issuance submission of prior art to the USPTO or become involved in post-grant review procedures, derivations, reexaminations, or inter parties review proceedings, in the United States or oppositions or similar proceedings in foreign jurisdictions, challenging our patent rights. The legal threshold for initiating such proceedings may be low, so that even proceedings with a low probability of success might be initiated. An adverse determination in any such challenges may result in loss of exclusivity or in patent claims being narrowed, invalidated, or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and products.

Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our intellectual property may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

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

Patents are of national or regional effect. Although we co-own or exclusively license four issued United States patents, one granted Australia patent, one granted Japanese patent, one granted Chinese patent, one granted South Korea patent, one granted European patent, and three granted United Kingdom patents for *neffy* and pending patent applications in the United States, Europe, Japan, Australia, China, South Korea, and other foreign jurisdictions for *neffy*, filing, prosecuting and defending patents in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. 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 United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States or from selling or importing products made using our inventions in and into the United States 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 is not as strong as that in the United States. These competitor products may compete with our product candidates, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. As an example, European applications will soon have the option, upon grant of a patent, of becoming a Unitary Patent which will be subject to the jurisdiction of the Unitary Patent Court ("UPC"). The option of a Unitary Patent will be a significant change in European patent practice. As the UPC is a new court system, there is no precedent for the court, increasing the uncertainty. Proceedings to enforce our patent rights in foreign jurisdictions, whether or not successful, 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. Furthermore, while we intend to protect our intellectual property rights in our expected significant markets, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our product candidates. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate, which may have an adverse effect on our ability to successfully commercialize our product candidates in all of our expected significant foreign markets.

Various countries outside the United States have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. As a result, a patent owner may have limited remedies in certain circumstances, which could materially diminish the value of such patent. If we are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected. Accordingly, our efforts to protect or 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. Furthermore, while we intend to protect our intellectual property rights in our expected significant markets, we cannot ensure that we will be able to initiate or maintain similar efforts in all jurisdictions in which we may wish to market our product candidates. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate, which may have an adverse effect on our ability to successfully commercialize our product candidates in all of our expected significant foreign markets.

Further, the standards applied by the USPTO and foreign patent offices in granting patents are not always applied uniformly or predictably. As such, we do not know the degree of future protection that we will have on our technologies, products and product candidates. While we will endeavor to try to protect our technologies, products and product candidates with intellectual property rights such as patents, as appropriate, the process of obtaining patents is time-consuming, expensive and unpredictable.

Further, geo-political actions in the United States and in foreign countries could increase the uncertainties and costs surrounding the prosecution or maintenance of our patent applications or those of any current or future licensors and the maintenance, enforcement or defense of our issued patents or those of any current or future licensors. For example, the United States and foreign government actions related to Russia's invasion of Ukraine may limit or prevent filing, prosecution and maintenance of patent applications in Russia. Government actions may also prevent maintenance of issued patents in Russia. These actions could result in abandonment or lapse of the patents or patent applications that we own, co-own or exclusively license, resulting in partial or complete loss of patent rights in Russia. If such an event were to occur, it could have a material adverse effect on our business. In addition, a decree was adopted by the Russian government in March 2022, allowing Russian companies and individuals to exploit inventions owned by patentees that have citizenship or nationality in, are registered in, or have predominately primary place of business or profit-making activities in the United States and other countries that Russia has deemed unfriendly without consent or compensation. Consequently, we would not be able to prevent third parties from practicing the inventions that we own, co-own or exclusively license in Russia or from selling or importing products made using the inventions that we own, co-own or exclusively license in and into Russia. Accordingly, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents.

On September 16, 2011, the Leahy-Smith America Invents Act (the "Leahy-Smith Act") was signed into law in the United States. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications will be prosecuted and may also affect patent litigation. In particular, under the Leahy-Smith Act, the United States transitioned in March 2013 to a "first inventor to file" system in which, assuming that other requirements of patentability are met, the first inventor to file a patent application will be entitled to the patent regardless of whether a third party was first to invent the claimed invention. A third party that files a patent application in the USPTO after March 2013 but before we could therefore be awarded a patent covering any of our inventions even if we had made the invention before it was made by such 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 patents depends on whether the differences between our technology, or the technologies we license for our product candidates, and the prior art allow the technology we use for our product candidates to be patentable over the prior art. Since patent applications in the United States and most other countries are confidential for a period of time after filing or until issuance, we cannot be certain that we were the first to either file any patent application related to our product candidates or invent any of the inventions claimed in our patents or patent applications.

The Leahy-Smith Act also includes a number of significant changes that affect the way patent applications will be prosecuted and also may affect patent litigation. These include allowing third-party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by USPTO administered post-grant proceedings, including Post Grant Review, Inter Partes Review, and derivation proceedings. An adverse determination in any such submission or proceeding could reduce the scope or enforceability of, or invalidate, our patent rights, which could adversely affect our competitive position. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in United States federal courts 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 even though the same evidence would 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 our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. Thus, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

Changes in patent law in the United States and other jurisdictions 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 patents relating to our product candidates. Obtaining and enforcing patents in the pharmaceutical industry involves both technological and legal complexity and is therefore costly, time consuming and inherently uncertain. Changes in either the patent laws or interpretation of the patent laws, rules and regulations in the United States and other countries could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. We cannot predict the breadth of claims that may be allowed or enforced in the patents we own, co-own or license from third-parties. In addition, U.S. Congress or other foreign legislative bodies may pass patent reform legislation that is unfavorable to us.

Depending on decisions by the U.S. Congress, the U.S. federal courts, the USPTO, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to enforce the existing patents we own, co-own or license and patents we or our licensors might obtain in the future. For example, the U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained.

Depending on future actions by the U.S. Congress, the U.S. courts, the USPTO, or similar authorities in foreign jurisdictions, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to enforce the existing patents we own, co-own or license and patents that we or our licensors might obtain in the future.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or patent applications will be due to be paid to the USPTO and various foreign patent agencies at various stages over the lifetime of our patents and/or patent applications. We have systems in place to remind us to pay these fees, and we rely on our outside patent annuity service to pay these fees when due. In addition, the USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply with these provisions. In many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. If such an event were to occur, it could have a material adverse effect on our business. If we or our licensors fail to maintain the patents and patent applications covering our product candidates, our competitors might be able to enter the market, which would have a material adverse effect on our business, financial conditions, results of operations and growth prospects.

Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time and may adversely affect our anticipated future revenues and operating earnings.

We rely on patent, trademark, trade secret and other intellectual property protection in the discovery, development, manufacturing and sale of our product candidates. In particular, patent protection is important in the development and eventual commercialization of our product candidates. Patents covering our product candidates normally provide market exclusivity, which is important in order for our product candidates to become profitable.

Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years. In the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest U.S. non-provisional filing date. Various extensions may be available, but the life of a patent, and the protection it affords, is limited. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such product candidates might expire before or shortly after such product candidates are commercialized. Even if patents covering our product candidates are obtained, once the patent life has expired for a product, we may be open to competition from generic products. As a result, our patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

The patents we currently co-own or exclusively license for *neffy* are expected to expire as early as 2038, absent any patent term adjustments. The API in *neffy* is epinephrine, a generic API that is used in FDA-approved intra-muscular injectables. If *neffy* is approved by the FDA under the 505(b)(2) regulatory pathway, our U.S. patents for *neffy* will not be eligible for patent term restoration under the Drug Price Competition and Patent Term Restoration Act of 1984. While we are planning to seek additional patent coverage for *neffy*, there can be no assurances that such additional patent protection will be granted, or if granted, that these patents will not be infringed upon or otherwise held enforceable. Even if we are successful in obtaining a patent, patents have a limited lifespan. Without patent protection, we may be open to competition from generic versions of *neffy*.

We cannot ensure that patent rights relating to inventions described and claimed in our pending patent applications will issue or that patents based on our patent applications will not be challenged and rendered invalid and/or unenforceable.

We co-own or exclusively license patent applications in our portfolio relating to our product candidates that are pending at the patent offices in the United States, Europe, Japan, and other foreign jurisdictions, however, we cannot predict:

- if and when patents may issue based on the patent applications we own, co-own or exclusively license;
- the scope of protection of any patent issuing based on the patent applications we own, co-own or exclusively license;
- whether the claims of any patent issuing based on the patent applications we own, co-own or exclusively license will provide protection against competitors,
- whether or not third parties will find ways to invalidate or circumvent our patent rights;
- whether or not others will obtain patents claiming aspects similar to those covered by the patent applications we own, co-own or exclusively license;
- whether we will need to initiate litigation or administrative proceedings to enforce and/or defend our patent rights which will be costly whether we win or lose;
- whether the patent applications that we own, co-own or exclusively license will result in issued patents with claims that cover our product candidates or uses thereof; and/or
- whether we may experience patent office interruption or delays to our ability to timely secure patent coverage to our product candidates.

We cannot be certain that the claims in our pending patent applications directed to our product candidates will be considered patentable by the USPTO or by patent offices in foreign countries. One aspect of the determination of patentability of our inventions depends on the scope and content of the "prior art," information that was or is deemed available to a person of skill in the relevant art prior to the priority date of the claimed invention. There may be prior art of which we are not aware that may affect the patentability of our patent claims or, if issued, affect the validity or enforceability of a patent claim relevant to our business. There is no assurance that there is not prior art of which we are aware, but which we do not believe is relevant to our business, which may, nonetheless, ultimately be found to limit our ability to make, use, sell, offer for sale or import our products that may be approved in the future, or impair our competitive position. Even if the patents do issue based on the patent applications we own, co-own or exclusively license, third parties may challenge the validity, enforceability or scope thereof, which may result in such patents being narrowed, invalidated or held unenforceable. Furthermore, even if they are unchallenged, patents in our portfolio may not adequately exclude third parties from practicing relevant technology or prevent others from designing around our claims. If the breadth or strength of our intellectual property position with respect to our product candidates is threatened, it could dissuade companies from collaborating with us to develop, and threaten our ability to commercialize, our product candidates. In the event of litigation or administrative proceedings, we cannot be certain that the claims in any of our issued patents will be considered valid by courts in the United States or foreign countries.

We may not identify relevant third-party patents or may incorrectly interpret the relevance, scope or expiration of a third-party patent which might adversely affect our ability to develop and market our products.

As the pharmaceutical industry expands 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. There can be no assurance that our operations do not, or will not in the future, infringe existing or future third-party patents. Identification of third-party patent rights that may be relevant to our operations is difficult because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. We cannot guarantee that any of our patent searches or analyses, including the identification of relevant patents, the scope of patent claims or the expiration of relevant patents, are complete or thorough, nor can we be certain that we have identified each and every third-party patent and pending application in the United States and abroad that is relevant to our operations or necessary for the commercialization of our product candidates in any jurisdiction.

Numerous U.S. and foreign patents and pending patent applications exist in our market that are owned by third parties. Our competitors in both the United States and abroad, many of which have substantially greater resources and have made substantial investments in patent portfolios and competing technologies, may have applied for or obtained or may in the future apply for and obtain, patents that will prevent, limit or otherwise interfere with our ability to make, use and sell our products. We do not always conduct independent reviews of pending patent applications and patents issued to third parties. Patent applications in the United States and elsewhere are typically published approximately 18 months after the earliest filing for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Certain U.S. patent applications that will not be filed outside the U.S. can remain confidential until patents issue. In addition, patent applications in the United States and elsewhere can be pending for many years before issuance, or unintentionally abandoned patents or applications can be revived. Furthermore, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our technologies, our products or the use of our products. As such, there may be applications of others now pending or recently revived patents of which we are unaware. These patent applications may later result in issued patents, or the revival of previously abandoned patents, that will prevent, limit or otherwise interfere with our ability to make, use or sell our product candidates.

The scope of a patent claim is determined by an interpretation of the law, the written disclosure in a patent and the patent's prosecution history. Our interpretation of the relevance or the scope of a patent or a pending application may be incorrect, which may negatively impact our ability to market our products. We may incorrectly determine that our products are not covered by a third-party patent or may incorrectly predict whether a third party's pending application will issue with claims of relevant scope. Our determination of the expiration date of any patent in the United States or abroad that we consider relevant may be incorrect, which may negatively impact our ability to develop and market our product candidates. Our failure to identify and correctly interpret relevant patents may negatively impact our ability to develop and market our products.

We cannot provide any assurances that third-party patents do not exist which might be enforced against our current technology, including our research programs, product candidates, their respective methods of use, and manufacture thereof, and could result in either an injunction prohibiting our manufacture or future sales, or, with respect to our future sales, an obligation on our part to pay royalties and/or other forms of compensation to third parties, which could be significant.

If we are sued for infringing intellectual property rights of third parties, such litigation could be costly and time consuming and could prevent or delay us from developing or commercializing our product candidates.

Our commercial success depends, in part, on our ability to develop, manufacture, market and sell our product candidates without infringing the intellectual property and other proprietary rights of third parties. Third parties may allege that we have infringed or misappropriated their intellectual property. Litigation or other legal proceedings relating to intellectual property claims, with or without merit, is unpredictable and generally expensive and time consuming and, even if resolved in our favor, is likely to divert significant resources from our core business, including distracting our technical and management personnel from their normal responsibilities. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have a material adverse effect on our ability to compete in the marketplace.

There is a substantial amount of intellectual property litigation in the pharmaceutical industry, and we may become party to, or threatened with, litigation or other adversarial proceedings regarding intellectual property rights with respect to our products candidates. Third parties may assert infringement claims against us based on existing or future intellectual property rights. The pharmaceutical industry has produced a significant number of patents, and it may not always be clear to industry participants, including us, which patents cover various types of products or methods of use. The coverage of patents is subject to interpretation by the courts, and the interpretation is not always uniform. If we were sued for patent infringement, we would need to demonstrate that our product candidates, or of use either do not infringe the patent claims of the relevant patent or that the patent claims are invalid or unenforceable, and we may not be able to do this. Proving invalidity of third-party patents may be difficult and uncertain. Even if we are successful in these proceedings, we may incur substantial costs and the time and attention of our management and scientific personnel could be diverted in defending our rights in these proceedings, which could have a material adverse effect on our business and operations. In addition, we may not have sufficient resources to bring these actions to a successful conclusion.

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

We may become involved in lawsuits to protect or enforce our patents or other intellectual property, which could be expensive, time consuming and unsuccessful and could result in a court or administrative body finding our patents to be invalid or unenforceable.

Even if the patent applications we own, co-own or license are issued, third parties may challenge or infringe upon our patents. To counter infringement, we may be required to file infringement claims, which can be expensive and time-consuming. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including novelty, non-obviousness (or inventive step), written description or enablement. In addition, patent validity challenges may, under certain circumstances, be based upon non-statutory obviousness-type double patenting, which, if successful, could result in a finding that the claims are invalid for obviousness-type double patenting or the loss of patent term if a terminal disclaimer is filed to obviate a finding of obviousness-type double patenting. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld information material to patentability from the USPTO, or made a misleading statement, during prosecution.

Third parties may raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post-grant review, inter partes review, interference proceedings, derivation proceedings, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in the revocation or cancellation of or amendment to our patents in such a way that they no longer cover our current or future products or provide any competitive advantage. The outcome following legal assertions of invalidity and unenforceability is unpredictable. If a third party were to prevail on a legal assertion of invalidity or unenforceability, we could lose part or all of the patent protection on one or more of our current or future products, which could result in our competitors and other third parties using our technology to compete with us. Such a loss of patent protection could have a material adverse impact on our business, financial condition, results of operations, cash flows and prospects.

We are currently a party to an inter partes review of U.S. Patent No. 10,682,414 B2 that was instituted on February 14, 2022, and may, in the future, be a party to other intellectual property litigation or administrative proceedings that are very costly and time-consuming and could interfere with our ability to sell and market our products. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. In addition, any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise the funds necessary to continue our operations. In addition, patent holding companies that focus solely on extracting royalties and settlements by enforcing patent rights may target us, especially as we gain greater visibility and market exposure as a public company.

In an infringement proceeding, even one initiated by us, there is a risk that a court will decide that our patents are not valid and that we do not have the right to stop the other party from using the inventions they describe. There is also the risk that, even if the validity of such patents is upheld, the court will refuse to stop the other party on the ground that such other party's activities do not infringe our rights to these patents.

An adverse outcome in a litigation or proceeding involving our patents could limit our ability to assert our patents against competitors, affect our ability to receive royalties or other licensing consideration from our licensees, and may curtail or preclude our ability to exclude third parties from making, using and selling similar or competitive products. Any of these occurrences could have a material adverse effect on our business, financial condition, results of operations, cash flows and prospects.

Competitors may infringe our patents, trademarks, copyrights or other intellectual property that relate to our research programs and product candidates, their respective methods of use, manufacture and formulations thereof. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time consuming and divert the time and attention of our management and scientific personnel. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their patents, in addition to counterclaims asserting that our patents are invalid or unenforceable, or both. In any patent infringement proceeding, there is a risk that a court will decide that a patent that we own or have licensed is invalid or unenforceable, in whole or in part, and that we do not have the right to stop the other party from using the invention at issue. There is also a risk that, even if the validity of our patents is upheld, the court will construe the claims of our patents narrowly or decide that we do not have the right to stop the other party from using the invention at issue on the grounds that our patent claims do not cover the invention at issue. An adverse outcome in a litigation or proceeding involving our patents could limit our ability to assert our patents against those parties or other competitors, and may curtail or preclude our ability to exclude third parties from making and selling similar or competitive products. Any of these occurrences could adversely affect our competitive business position, business prospects and financial condition. Similarly, if we assert trademark infringement claims, a court may determine that the marks we have asserted are invalid or unenforceable, or that the party against whom we have asserted trademark infringement has superior rights to the marks in question. In this case, we could ultimately be forced to cease use of such trademarks.

Even if we established infringement by competitors, a court may decide not to grant an injunction against further infringing activity by competitors and instead award only monetary damages, which may or may not be an adequate remedy. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during litigation. Moreover, we cannot assure you that we will have sufficient financial or other resources to file and pursue such infringement claims, which typically last for years before they are concluded. Even if we ultimately prevail in such infringement claims, the monetary cost of such litigation and the diversion of the attention of our management and scientific personnel could outweigh any benefit we receive as a result of the proceedings.

Our product candidates may face competition sooner than expected, and our patents may be challenged.

Our success will depend in part on our ability to obtain and maintain patent protection for our product candidates and technologies and to prevent third parties from infringing upon our proprietary rights. We must also operate without infringing upon patents and proprietary rights of others, including by obtaining appropriate licenses to patents or other proprietary rights held by third parties, if necessary. However, the patent applications we have filed or may file in the future may never yield patents that protect our inventions and intellectual property assets. Failure to obtain patents that sufficiently cover our formulations and technologies would limit our protection against generic drug manufacturers, pharmaceutical companies and other parties who may seek to copy our products, produce substantially similar products or use technologies substantially similar to those we own, co-own, or exclusively license.

We do not expect to receive non-patent regulatory exclusivity for *neffy* if approved by the FDA under the 505(b)(2) regulatory pathway. Without non-patent marketing exclusivity for *neffy*, we may face competition by third parties seeking to market generic versions of *neffy* as early as our approval by the FDA. In seeking approval for a drug product under the 505(b)(2) regulatory pathway, applicants are required to list with the FDA certain patents of the applicant or that are held by third parties whose claims cover the applicant's product. Upon approval of an NDA, each of the patents listed in the application for the drug is then published in the Orange Book. Any subsequent applicant who files an ANDA seeking approval of a generic equivalent version of a drug product listed in the Orange Book or an NDA submitted under the 505(b)(2) regulatory pathway referencing a drug listed in the Orange Book must make one of the following certifications to the FDA concerning patents: (1) the patent information concerning the reference listed drug product has not been submitted to the FDA; (2) any such patent that was filed has expired; (3) the date on which such patent will expire; or (4) such patent is invalid or will not be infringed upon by the manufacture, use or sale of the drug product for which the application is submitted. This last certification is known as a paragraph IV certification. A notice of the paragraph IV certification must be provided to each owner of the patent that is the subject of the certification and to the holder of the approved NDA to which the ANDA or 505(b)(2) application refers. Although we expect that our patents will be vigorously defended from infringement by third parties, there can be no assurances that we will be successful with respect to such defense or any other legal proceedings which may arise in the ordinary course of our business. Such a failure may have a material impact on our business, results of operations and financial condition in the future.

Because of the expense and uncertainty of litigation, we may not be in a position to enforce our intellectual property rights against third parties.

Because of the expense and uncertainty of litigation, we may conclude that even if a third party is infringing any one of our issued patents or other intellectual property rights, the risk-adjusted cost of bringing and enforcing such an infringement claim or action may be too high or not in the best interest of our company or our stockholders. In such cases, we may decide that the more prudent course of action is to simply monitor the situation or initiate or seek some other non-litigious action or solution.

Intellectual property litigation may lead to unfavorable publicity that harms our reputation.

During the course of any intellectual property litigation, there could be public announcements of the initiation of the litigation as well as results of hearings, rulings on motions, and other interim proceedings in the litigation. Such announcements could harm our reputation, the perceived value of our intellectual property or the market for our existing or future products, which could have a material adverse effect on our business.

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

We may be subject to claims that former employees, consultants, independent contractors, collaborators or other third parties have an interest in our patents or other intellectual property as an owner, co-owner, inventor or co-inventor. The failure to name the proper inventors on a patent application can result in the patents issuing thereon being unenforceable. Inventorship disputes may arise from conflicting views regarding the contributions of different individuals named as inventors, the effects of foreign laws where foreign nationals are involved in the development of the subject matter of the patent, conflicting obligations of third parties involved in developing our product candidates or as a result of questions regarding co-ownership of potential joint inventions. Litigation may be necessary to resolve these and other claims challenging inventorship and/or ownership. Alternatively, or additionally, we may enter into agreements to clarify the scope of our rights in such intellectual property. 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.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

We have registered trademarks in the United States, as well as in foreign jurisdictions, including the United Kingdom, European Union, and Japan. Our future trademarks or trade names may be challenged, infringed, circumvented, declared generic or descriptive, or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to or appeal those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected. We may license our trademarks and trade names to third parties, such as distributors. Though these license agreements may provide guidelines for how our trademarks and trade names may be used, a breach of these agreements or misuse of our trademarks and trade names by our licensees may jeopardize our rights in or diminish the goodwill associated with our trademarks and trade names.

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

Once granted, patents may remain open to opposition, interference, re-examination, post-grant review, inter partes review, nullification or derivation action in court or before patent offices or similar proceedings for a given period after allowance or grant, during which time third parties can raise objections against such grant. In the course of such proceedings, which may continue for a protracted period of time, the patent owner may be compelled to limit the scope of the allowed or granted claims thus attacked, or may lose the allowed or granted claims altogether. In addition, the degree of future protection afforded by our intellectual property rights is uncertain because even granted intellectual property rights have limitations, and may not adequately protect our business. The following examples are illustrative:

- others may be able to make formulations that are similar to *neffy* or any of our future product candidates but that are not covered by the claims of our patent rights;
- the patents of third parties may have an adverse effect on our business;
- we or our licensors or any future strategic partners might not have been the first to conceive or reduce to practice the inventions covered by the issued patents or pending patent applications that we own, co-own or exclusively license;
- we or our licensors or any future strategic partners might not have been the first to file patent applications covering certain of our inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights;
- it is possible that our pending patent applications will not lead to issued patents;
- issued patents that we may own or co-own or that we exclusively license in the future 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 patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- third parties performing manufacturing or testing for us using our product candidates or technologies could use the intellectual property of others without obtaining a proper license;
- we may not develop additional proprietary technologies that are patentable; and
- the patents of others may have an adverse effect on our business.

Should any of these events occur, they could have a material adverse effect on our business, financial condition, results of operations and prospects.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patent protection for some of our technology and product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. Elements of our product candidates, including processes for their preparation and manufacture, may involve proprietary know-how, information, or technology that is not covered by patents, and thus for these aspects we may consider trade secrets and know-how to be our primary intellectual property. Any disclosure, either intentional or unintentional, by our employees, the employees of third parties with whom we share our facilities or third-party consultants and vendors that we engage to perform research, clinical trials or manufacturing activities, or misappropriation by third parties (such as through a cybersecurity breach) of our trade secrets or proprietary information could enable competitors to duplicate or surpass our technological achievements, thus eroding our competitive position in our market.

Trade secrets and unpatented know-how can be difficult to protect. We require our employees to enter into written employment agreements containing provisions of confidentiality and obligations to assign to us any inventions generated in the course of their employment. We and any third parties with whom we share facilities enter into written agreements that include confidentiality and intellectual property obligations to protect each party's property, potential trade secrets, proprietary know-how and information. We further seek to protect our potential trade secrets, proprietary know-how and information in part, by entering into non-disclosure and confidentiality agreements with parties who are given access to them, such as our corporate collaborators, outside scientific collaborators, contract research organizations, contract manufacturers, consultants, advisors and other third parties. With our consultants, contractors and outside scientific collaborators, these agreements typically include invention assignment obligations. Although we have taken steps to protect our trade secrets and unpatented know-how, we cannot provide any assurances that all such agreements have been duly executed, and any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Monitoring unauthorized uses and disclosures is difficult, and we do not know whether the steps we have taken to protect our proprietary technologies will be effective. Unauthorized parties may also attempt to copy or reverse engineer certain aspects of our products that we consider proprietary. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts inside and outside the United States are less willing or unwilling to protect trade secrets.

Trade secrets may be independently developed by others in a manner that could prevent legal recourse by us. Trade secrets will over time be disseminated within the industry through independent development, the publication of journal articles and the movement of skilled personnel from company to company or academic to industry scientific positions. Though our agreements with third parties typically restrict the ability of our advisors, employees, collaborators, licensors, suppliers, third-party contractors and consultants to publish data potentially relating to our trade secrets, our agreements may contain certain limited publication rights. Because from time-to-time we expect to rely on third parties in the development, manufacture and distribution of our products and provision of our services, we must, at times, share trade secrets with them. Despite employing the contractual and other security precautions described above, the need to share trade secrets 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. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor or other third party, our competitive position would be harmed.

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

We employ individuals who previously worked with other companies, including our competitors or potential competitors. We could in the future be subject to claims that we or our employees, consultants, or independent contractors have inadvertently or otherwise used or disclosed alleged trade secrets or other confidential information of current or former employers or competitors. Although we try to ensure that our employees, consultants and independent contractors do not use the intellectual property, proprietary information, know-how or trade secrets of others in their work for us, we may become subject to claims that we caused an individual to breach the terms of his or her non-competition or non-solicitation agreement, or that we or these individuals have, inadvertently or otherwise, used or disclosed the alleged intellectual property, proprietary information, know-how or trade secrets of a current or former employer or competitor.

While we may litigate to defend against these claims, even if we are successful, litigation could result in substantial costs and could be a distraction to management and other employees. If our defenses to these claims fail, in addition to requiring us to pay monetary damages, a court could prohibit us from using technologies that are essential to our product candidates, if such technologies are found to incorporate or be derived from the trade secrets or other proprietary information of the current or former employers. Moreover, any such litigation or the threat thereof may adversely affect our reputation, our ability to form strategic alliances or sublicense our rights to collaborators, engage with scientific advisors or hire employees or consultants, each of which would have an adverse effect on our business, results of operations and financial condition.

In the future, we may need to obtain additional licenses of third-party technology that may not be available to us or are available only on commercially unreasonable terms, and which may cause us to operate our business in a more costly or otherwise adverse manner that was not anticipated.

From time to time, we may be required to license technologies relating to our therapeutic programs from additional third parties to further develop or commercialize our product candidates. Should we be required to obtain licenses to any third-party technology, including any such patents required to manufacture, use or sell our product candidates, such licenses may not be available to us on commercially reasonable terms, or at all. The inability to obtain any third-party license required to develop or commercialize any of our product candidates could cause us to abandon any related efforts, which could seriously harm our business and operations.

Any collaboration arrangements that we may enter into in the future may not be successful, which could adversely affect our ability to develop and commercialize our products.

Any future collaborations that we enter into may not be successful. The success of our collaboration arrangements will depend heavily on the efforts and activities of our collaborators. Collaborations are subject to numerous risks, which may include that:

- collaborators have significant discretion in determining the efforts and resources that they will apply to collaborations;
- collaborators may not pursue development and commercialization of our products or may elect not to continue or renew development or commercialization programs based on trial or test results, changes in their strategic focus due to the acquisition of competitive products, availability of funding or other external factors, such as a business combination that diverts resources or creates competing priorities;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products or product candidates;
- a collaborator with marketing, manufacturing and distribution rights to one or more products may not commit sufficient resources to or otherwise not perform satisfactorily in carrying out these activities;
- we could grant exclusive rights to our collaborators that would prevent us from collaborating with others;
- collaborators may not properly maintain or defend our intellectual property rights or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability;
- disputes may arise between us and a collaborator that causes the delay or termination of the research, development or commercialization of our current or future products or that results in costly litigation or arbitration that diverts management attention and resources;
- collaborations may be terminated, and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable current or future products;
- collaborators may own or co-own intellectual property covering our products that results from our collaborating with them, and in such cases, we would not have the exclusive right to develop or commercialize such intellectual property; and
- a collaborator’s sales and marketing activities or other operations may not be in compliance with applicable laws resulting in civil or criminal proceedings.

Risks Related to Our Business Operations, Employee Matters and Managing Growth

A pandemic, epidemic, or outbreak of an infectious disease may materially and adversely affect our business, including our nonclinical studies, clinical trials, third parties on whom we rely, our supply chain, our ability to raise capital, our ability to conduct regular business and our financial results.

We are subject to risks related to public health crisis and any efforts to halt the spread of any public health crises. For example, COVID-19 and policies and regulations implemented by governments in response to its outbreak, such as directing businesses and governmental agencies to cease non-essential operations at physical locations, prohibiting certain nonessential gatherings and ceasing non-essential travel had a significant impact, both direct and indirect, on businesses and commerce, as worker shortages occurred, supply chains were disrupted, facilities and production were suspended, and demand for certain goods and services, such as medical services and supplies, spiked, while demand for other goods and services fell. We experienced certain impacts of COVID-19, including inability to conduct clinical trial site monitoring for certain earlier phase clinical trials and delays in completing clinical trials, bioanalytical sample analysis and study reports. There can be no guarantee we will not experience other impacts from a resurgence of COVID-19 or other pandemics, epidemics or infectious disease outbreaks, such as being forced to further delay or pause enrollment, experiencing potential interruptions to our supply chain, facing difficulties or additional costs in enrolling patients in future clinical trials or being able to achieve full enrollment of our studies within the timeframes we anticipate, or at all. Additionally, pandemics, epidemics or other infectious disease outbreaks could have extensive impacts in many aspects of society and could result in significant disruptions to the global economy, as well as businesses and capital markets around the world. Other global health concerns could also result in social, economic, and labor instability in the countries in which we or the third parties with whom we engage operate.

While we have been working closely with our third-party manufacturers, distributors and other partners to manage our supply chain activities and mitigate potential disruptions to the production of *neffy* as a result of pandemics, epidemics or other infectious disease outbreaks, if such a public health crisis were to persist for an extended period of time, there could be significant and material disruptions to our supply chain and operations, and associated delays in the manufacturing and supply of *neffy* and any future product candidates. Any such supply disruptions, including disruptions in procuring items that are essential for our development activities and securing manufacturing slots for the products needed for such activities, could adversely impact our ability to initiate and complete nonclinical studies or clinical trials and generate sales of and revenue from our product candidates, if approved, which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.

COVID-19 affected and a resurgence of COVID-19 or other public health crisis may in the future affect employees of third-party CROs located in affected geographies that we rely upon to carry out our clinical trials. If any future public health crisis is not contained, we may experience disruptions that could severely impact our business and clinical trials, including:

- delays or difficulties in our commercialization efforts;
- delays or difficulties in enrolling patients in our clinical trials;
- delays or difficulties in clinical site initiation, including difficulties in recruiting clinical site investigators and clinical site staff;
- diversion of healthcare resources away from the conduct of clinical trials, including the diversion of sites or facilities serving as our clinical trial sites and staff supporting the conduct of our clinical trials, including our trained therapists, or absenteeism that reduces site resources;
- interruption of key clinical trial activities, such as clinical trial site monitoring, due to limitations on travel imposed or recommended by federal, state or national governments, employers and others or interruption of clinical trial subject visits and study procedures, the occurrence of which could affect the integrity of clinical trial data;
- risk that participants enrolled in our clinical trials will acquire a virus or illness while the clinical trial is ongoing, which could impact the results of the clinical trial, including by increasing the number of observed adverse events or patient withdrawals from our trials;
- limitations in employee resources that would otherwise be focused on conducting our clinical trials, including because of sickness of employees or their families or the desire of employees to avoid contact with large groups of people;
- delays in receiving authorizations from regulatory authorities to initiate our future clinical trials;
- delays in clinical sites receiving the supplies and materials needed to conduct our clinical trials;
- interruption in global shipping that may affect the transport of clinical trial materials, such as *neffy* used in our clinical trials;
- changes in local regulations as part of a response to the public health crisis which may require us to change the ways in which our clinical trials are conducted, which may result in unexpected costs, or the discontinuation of the clinical trials altogether;
- interruptions or delays in nonclinical studies due to restricted or limited operations at research and development laboratory facilities;
- delays in necessary interactions with local regulators, ethics committees and other important agencies and contractors due to limitations in employee resources or forced furlough of government employees; and
- refusal of the FDA, the EMA or the other regulatory bodies to accept data from clinical trials in affected geographies outside the United States, the EU or other relevant local geographies.

Any negative impact a resurgence of COVID-19 or other public health crisis has on patient enrollment or treatment, or the development of *neffy* and any future product candidates, could cause costly delays to clinical trial activities, which could adversely affect our ability to obtain regulatory approval for and to commercialize *neffy* and any future product candidates, if approved, increase our operating expenses, which could have a material adverse effect on our financial results. COVID-19 also caused significant volatility in public equity markets and disruptions to the United States and global economies and any future pandemic, epidemic, infectious disease outbreak or similar public health crisis could lead to further market dislocation. Any such increased volatility and economic dislocation may make it more difficult for us to raise capital on favorable terms, or at all. If we or any of the third parties with whom we engage were to experience renewed shutdowns or other business disruptions, our ability to conduct our business in the manner and on the timelines presently planned could be materially and negatively affected, which could have a material adverse impact on our business and our results of operations and financial conditions. To the extent a resurgence of COVID-19 or any future pandemic, epidemic, infectious disease outbreak or other public health crisis adversely affects our business and financial results, it may also heighten many of the other risks described in this "Risk Factors" section, such as those relating to the timing and completion of our clinical trials and our ability to obtain future financing.

Our success is highly dependent on our ability to attract and retain highly skilled executive officers and employees.

Our success depends, and will likely continue to depend, upon our ability to hire and retain the services of our current executive officers and our other highly qualified personnel. We have entered into employment agreements with each of our executive officers but they may terminate their employment or engagement with us at any time. The loss of their services might impede the achievement of our research, development and commercialization objectives.

Our ability to compete in the biotechnology and pharmaceuticals industries depends upon our ability to attract and retain highly qualified managerial, scientific and medical personnel. Our industry has experienced a high rate of turnover of management personnel in recent years. Replacing executive officers or other key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to develop, gain regulatory approval of and commercialize products successfully.

Our industry has experienced a high rate of turnover in recent years. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these additional key employees on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions.

We rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors, which includes entities owned by our executive officers and directors, may be employed by other entities and may have commitments under consulting or advisory contracts with those entities that may limit their availability to us. If we are unable to continue to attract and retain highly qualified personnel, our ability to develop and commercialize *neffy* or any future product candidates will be limited.

We only have a limited number of employees to manage and operate our business.

As of December 31, 2022, we had seventeen full-time employees and three part-time employees. Our focus on the development of *neffy* requires us to optimize cash utilization and to manage and operate our business in a highly efficient manner. We cannot assure you that it will be able to hire and/or retain adequate staffing levels to develop *neffy* or to run our operations and/or to accomplish all of the objectives that we otherwise would seek to accomplish.

Our employees, independent contractors, consultants, current and future licensing and collaboration partners and CROs may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements, which could cause significant liability for us and harm our reputation.

We are exposed to the risk that our employees, independent contractors, consultants, current and future licensing and collaboration partners and CROs may engage in fraudulent conduct or other illegal activity. Misconduct by those parties could include intentional, reckless and/or negligent conduct or disclosure of unauthorized activities to us that violates:

- FDA regulations or similar regulations of comparable non-U.S. regulatory authorities, including those laws requiring the reporting of true, complete and accurate information to such authorities;
- manufacturing standards;
- federal and state healthcare fraud and abuse laws and regulations and similar laws and regulations established and enforced by comparable non-U.S. regulatory authorities; and
- laws that require the reporting of financial information or data accurately.

Activities subject to these laws also involve the improper use or misrepresentation of information obtained in the course of clinical trials, creating fraudulent data in our nonclinical studies or clinical trials or illegal misappropriation of product materials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter 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, standards or regulations. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business and results of operations, including the imposition of civil, criminal and administrative penalties, damages, monetary fines, disgorgement, integrity oversight and reporting obligations, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment of our operations, any of which could have a material adverse effect on our ability to operate our business and our results of operations.

We expect to expand our organization, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

We expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of regulatory affairs and sales, marketing and distribution, as well as to support our public company operations. To manage these growth activities, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Our management may need to devote a significant amount of our attention to managing these growth activities. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion or relocation of our operations, retain key employees, or identify, recruit and train additional qualified personnel. Our inability to manage the expansion or relocation of our operations effectively may result in weaknesses in our infrastructure, give rise to operational mistakes, loss of business opportunities, loss of employees and reduced productivity among remaining employees. Our expected growth could also require significant capital expenditures and may divert financial resources from other projects, such as the development of *neffy* for additional indications or future product candidates. If we are unable to effectively manage our expected growth, our expenses may increase more than expected, our ability to generate revenues could be reduced and we may not be able to implement our business strategy, including the successful commercialization of *neffy* or any future product candidates.

Risks Related to the Securities Markets and Ownership of Our Common Stock

The market price of our common stock could be volatile.

The market price of our common stock could be subject to significant fluctuations. Market prices for securities of pre-commercial pharmaceutical, biotechnology and other life sciences companies have historically been particularly volatile. Some of the factors that may cause the market price of our common stock to fluctuate include:

- our ability to obtain regulatory approvals for our product candidates, and delays or failures to obtain such approvals;
- failure of any of our product candidates, if approved, to achieve commercial success;
- failure by us to maintain our existing third-party license and supply agreements;

- failure by us or our licensors to prosecute, maintain, or enforce our intellectual property rights;
- changes in laws or regulations applicable to our product candidates;
- any inability to obtain adequate supply of our product candidates or the inability to do so at acceptable prices;
- adverse regulatory authority decisions;
- introduction of new products, services or technologies by our competitors;
- failure to meet or exceed financial and development projections we may provide to the public;
- failure to meet or exceed the financial and development projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;
- announcements of significant acquisitions, strategic collaborations, joint ventures or capital commitments by us or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters, and our ability to obtain patent protection for our product candidates;
- additions or departures of key personnel;
- significant lawsuits, including patent or stockholder litigation;
- if securities or industry analysts do not publish research or reports about our business, or if they issue an adverse or misleading opinion regarding our business and stock;
- changes in the market valuations of similar companies;
- general market or macroeconomic conditions;
- sales of our common stock by us or our stockholders in the future;
- trading volume of our common stock;
- announcements by commercial partners or competitors of new commercial products, clinical progress or the lack thereof, significant contracts, commercial relationships or capital commitments;
- adverse publicity generally, including with respect to other products and potential products in such markets;
- the introduction of technological innovations or new therapies that compete with potential products of ours;
- changes in the structure of health care payment systems; and
- period-to-period fluctuations in our financial results.

Moreover, the stock markets in general have experienced substantial volatility that has often been unrelated to the operating performance of individual companies. These broad market fluctuations may also adversely affect the trading price of our common stock.

In the past, following periods of volatility in the market price of a company's securities, stockholders have often instituted class action securities litigation against those companies. For example, following a decline in Silverback's stock price, a federal securities class action complaint was filed on November 5, 2021 against Silverback and certain of its former officers and directors in the U.S. District for the Western District of Washington, captioned Dresner v. Silverback Therapeutics, Inc., et al., Case No. 2:21-cv-01499, which alleges violations of (i) Sections 11 and 15 of the Securities Act; and (ii) Sections 10(b) and 20(a) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and SEC Rule 10b-5 promulgated thereunder. Defendants filed a motion to dismiss the action in May 2022. The court held a hearing on October 28, 2022 and issued an order granting defendants' motion to dismiss without prejudice on November 4, 2022. Plaintiffs were given leave to amend and filed a Second Amended Complaint ("SAC") on December 5, 2022, which asserted Section 11 claims only with respect to Silverback's December 3, 2020 IPO and Section 10(b) claims during a shorter class period of March 29, 2021 through March 31, 2022. Defendants filed a motion to dismiss the SAC on January 2, 2023. Lead plaintiff filed an opposition brief on January 23, 2023, and defendants filed a reply brief January 27, 2023. The court is expected to issue a ruling on the motion to dismiss in the first half of 2023.Even if we are successful in defending against this action or any similar claims that may be brought in the future, such litigation could result in substantial costs and a diversion of management's attention and resources, which could harm our business.

Additionally, a decrease in the stock price of our common stock may cause our common stock to no longer satisfy the continued listing standards of Nasdaq. If we are not able to maintain the requirements for listing on Nasdaq, we could be delisted, which could have a materially adverse effect on our ability to raise additional funds as well as the price and liquidity of our common stock.

We will incur costs and demands upon management as a result of complying with the laws and regulations affecting public companies.

We will incur significant legal, accounting and other expenses that we did not incur as a private company prior to the Merger, including costs associated with public company reporting requirements. We will also incur costs associated with corporate governance requirements, including requirements under the Sarbanes-Oxley Act, as well as new requirements implemented by the SEC and Nasdaq. These rules and regulations are expected to increase our legal and financial compliance costs and to make some activities more time consuming and costly. For example, our management team consists of the executive officers of ARS Pharma prior to the Merger, some of whom have not previously managed and operated a public company. These executive officers and other personnel will need to devote substantial time to gaining expertise regarding operations as a public company and compliance with applicable laws and regulations. These rules and regulations also may make it difficult and expensive for us to obtain directors' and officers' liability insurance. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors or as our executive officers, which may adversely affect investor confidence in us and could cause our business or stock price to suffer.

Delaware law and provisions in our amended and restated certificate of incorporation and amended and restated bylaws could make a merger, tender offer or proxy contest difficult, thereby depressing the trading price of our common stock.

Our status as a Delaware corporation and the anti-takeover provisions of the Delaware General Corporation Law ("DGCL") may discourage, delay or prevent a change in control by prohibiting us from engaging in a business combination with an interested stockholder for a period of three years after the person becomes an interested stockholder, even if a change of control would be beneficial to our stockholders. In addition, our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that may make the acquisition of us more difficult, including the following:

- a classified board of directors with three-year staggered terms, which could delay the ability of stockholders to change the membership of a majority of our board of directors;
- the ability of our board of directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the exclusive right of our board of directors to elect a director to fill a vacancy created by the expansion of our board of directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our board of directors;
- a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders;
- the requirement that a special meeting of stockholders may be called only by a majority vote of our entire board of directors, the chair of our board of directors or our chief executive officer, which could delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors;
- the requirement for the affirmative vote of holders of at least 66-2/3% of the voting power of all of the then-outstanding shares of our voting stock, voting together as a single class, to amend the provisions of our amended and restated certificate of incorporation relating to the management of our business or our amended and restated bylaws, which may inhibit the ability of an acquirer to affect such amendments to facilitate an unsolicited takeover attempt; and
- advance notice procedures with which stockholders must comply to nominate candidates to our board of directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

In addition, as a Delaware corporation, we will be subject to Section 203 of the DGCL. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time. A Delaware corporation may opt out of this provision by express provision in its original certificate of incorporation or by amendment to its certificate of incorporation or bylaws approved by its stockholders. However, we have not opted out of this provision.

These and other provisions in our amended and restated certificate of incorporation, amended and restated bylaws and Delaware law could make it more difficult for stockholders or potential acquirors to obtain control of our board of directors or initiate actions that are opposed by our then-current board of directors, including delay or impede a merger, tender offer or proxy contest involving us. The existence of these provisions could negatively affect the price of our common stock and limit opportunities for our stockholders to realize value in a corporate transaction.

Our amended and restated certificate of incorporation designates the state courts the State of Delaware or, if no state court located within the State of Delaware has jurisdiction, the federal court for the District of Delaware, and the federal district courts of the United States of America to be the exclusive forums for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers and employees.

Our amended and restated certificate of incorporation provides that, to the fullest extent permitted by law, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if and only if the Court of Chancery of the State of Delaware lacks subject matter jurisdiction, any state court located within the State of Delaware or, if and only if all such state courts lack subject matter jurisdiction, the federal district court for the District of Delaware) and any appellate court therefrom shall will be the sole and exclusive forum for the following types of actions or proceedings under Delaware statutory or common law: (i) any derivative action or proceeding brought on behalf of us; (ii) any action or proceeding asserting a claim of breach of a fiduciary duty owed by any of our current or former directors, officers or other employees or our stockholders; (iii) any action or proceeding asserting a claim against us or any of our current or former directors, officers or other employees, arising out of or pursuant to any provision of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws; (iv) any action or proceeding to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our amended and restated bylaws; (v) any action or proceeding as to which the DGCL confers jurisdiction to the Court of Chancery of the State of Delaware; and (vi) any action asserting a claim against us or any of our directors, officers or other employees, governed by the internal affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated certificate of incorporation further provides that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. While the Delaware courts have determined that such choice of forum provisions are facially valid and several state trial courts have enforced such provisions and required that suits asserting Securities Act claims be filed in federal court, there is no guarantee that courts of appeal will affirm the enforceability of such provisions and a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions. If a court were to find either exclusive forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with litigating Securities Act claims in state court, or both state and federal court, which could seriously harm our business, financial condition, results of operations, and prospects.

These exclusive forum provisions may make it more expensive for stockholders to bring a claim than if the stockholders were permitted to select another jurisdiction and limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage lawsuits against us and our directors, officers and other employees. If a court were to find either exclusive-forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving the dispute in other jurisdictions, all of which could seriously harm our business.

We do not anticipate paying any cash dividends in the foreseeable future.

We plan to retain our future earnings, if any, to fund the development and growth of our business. As a result, capital appreciation, if any, of our common stock will be our stockholders' sole source of gain, if any, for the foreseeable future.

An active trading market for our common stock may not develop and our stockholders may not be able to resell their shares of common stock for a profit, if at all.

Prior to the Merger, there had been no public market for our common stock. An active trading market for our shares of common stock may never develop or be sustained. If an active market for our common stock does not develop or is not sustained, it may be difficult for our stockholders to sell their shares at an attractive price or at all.

Future sales of shares by existing stockholders could cause our stock price to decline.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market after any applicable legal restrictions on resale lapse, the trading price of our common stock could decline. We are not able to predict the effect that sales may have on the prevailing market price of our common stock.

If equity research analysts do not publish research or reports, or publish unfavorable research or reports, about us, our business or our market, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that equity research analysts publish about us and our business. Equity research analysts may elect not to provide research coverage of our common stock, and such lack of research coverage may adversely affect the market price of our common stock. In the event we do have equity research analyst coverage, we will not have any control over the analysts, or the content and opinions included in their reports. The price of our common stock could decline if one or more equity research analysts downgrade our stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of us or fails to publish reports on us regularly, demand for our common stock could decrease, which in turn could cause our stock price or trading volume to decline.

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, the Sarbanes-Oxley Act and the rules and regulations of Nasdaq. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control 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 the Sarbanes-Oxley Act. As a private company prior to the Merger, we have never been required to test our internal controls within a specified period. This will require that we incur substantial professional fees and internal costs to expand our accounting and finance functions and that we expend significant management efforts. We may experience difficulty in meeting these reporting requirements in a timely manner.

We may discover 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 the Sarbanes-Oxley Act, 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 sanctions or investigations by Nasdaq, the SEC or other regulatory authorities.

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

We are an "emerging growth company," as defined under the Jumpstart Our Business Startups Act (the "JOBS Act"). For so long as we are an "emerging growth company," we plan to take advantage of certain exemptions from reporting requirements that are applicable to other public companies that are not "emerging growth companies" including, but not limited to, compliance with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We cannot predict if investors will find our common stock less attractive, or us less comparable to certain other public companies because we will rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Under the JOBS Act, "emerging growth companies" can delay adopting new or revised accounting standards issued subsequent to the enactment of the JOBS Act until such time as those standards apply to private companies. We have irrevocably elected not to avail ourself of this exemption from new or revised accounting standards, and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not "emerging growth companies."

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

We have incurred substantial losses during our history. Unused federal net operating losses ("NOLs") for the tax years beginning before January 1, 2018, will carry forward to offset future taxable income, if any, until such unused losses expire. Unused federal NOLs generated in tax years beginning after December 31, 2017, will not expire and may be carried forward indefinitely, but the deductibility of such federal NOL carryforwards in taxable years beginning after December 31, 2020, is limited to 80% of taxable income. In addition, both current and future unused losses and other tax attributes may be subject to limitation under Sections 382 and 383 of the Code if we undergo an "ownership change," generally defined as a greater than 50 percentage point change (by value) in our equity ownership by certain stockholders over a three-year period. The Merger resulted in an ownership change of our company. The NOL carryforwards of pre-Merger, privately-held ARS Pharmaceuticals, Inc. ("ARS Pharma") may also be subject to limitation as a result of prior shifts in equity ownership and/or the Merger. Additional ownership changes in the future could result in additional limitations on our NOL carryforwards. Similar provisions of state tax law may also apply to limit our use of accumulated state tax attributes. In addition, at the state level, there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed. Consequently, even if we achieve profitability, we may not be able to utilize a material portion of our, NOL carryforwards and other tax attributes, which could adversely affect our business, cash flow, financial condition or results of operations.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our corporate headquarters are located in San Diego, California, where we lease approximately 4,047 square feet of office space. This existing lease will expire on February 28, 2025. We believe that our existing facilities are adequate for our current needs.

Item 3. Legal Proceedings.

From time to time, we may be involved in various claims and legal proceedings relating to claims arising out of our operations. See Note 7- Commitments and Contingencies of this Annual Report, which is incorporated by reference in this Item 3, for any required disclosure.

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

On November 8, 2022, Silverback completed its reverse merger with privately-held ARS Pharmaceuticals, Inc. On November 9, 2022, the combined company changed its name to ARS Pharmaceuticals, Inc. Silverback's shares of common stock were listed on the Nasdaq Global Market from December 4, 2020 through the close of business on November 8, 2022 under the ticker symbol "SBTX." On November 9, 2022, we began trading on the Nasdaq Global Market under the ticker symbol "SPRY."

Holders of Common Stock

As of March 17, 2023, there were approximately 29 holders of record of our common stock. Because most of our common stock is held by brokers, nominees, and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders.

Dividend Policy

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings to support our operations and finance the growth and development of our business. We do not intend to pay cash dividends on our common stock for the foreseeable future. Any future determination related to our dividend policy will be made at the discretion of our board of directors and will depend upon, among other factors, our results of operations, financial condition, capital requirements, contractual restrictions, business prospects and other factors our board of directors may deem relevant.

Recent Sales of Unregistered Securities

None.

Issuer Purchases of Equity Securities

None.

Use of Proceeds

On December 3, 2020, we commenced our initial public offering ("IPO") pursuant to a registration statement on Form S-1 (File No. 333-250009) that was declared effective by the SEC on December 3, 2020, for 11,500,000 shares of our common stock for sale to the public at a price of $21.00 per share. In addition, in December 2020, the underwriters exercised their over-allotment option to purchase 1,725,000 additional shares of our common stock in the initial public offering at the public offering price of $21.00 per share, such that the aggregate offering price of the IPO was $277.7 million. The net offering proceeds to us, after deducting underwriting discounts and commissions and offering costs, were $255.3 million. No offering expenses were paid directly or indirectly to any of our directors or officers (or their associates) or persons owning 10% or more of any class of our equity securities or to any other affiliates. The underwriters for our initial public offering were Goldman Sachs & Co. LLC, SVB Leerink LLC, Stifel, Nicolaus & Company, Incorporated, and H.C. Wainwright & Co., LLC.

On November 8, 2022, Silverback completed its reverse merger with privately-held ARS Pharmaceuticals, Inc. On November 9, 2022, the combined company changed its name to ARS Pharmaceuticals, Inc.

The net proceeds from the IPO are held in cash and cash equivalents, primarily in treasury money market accounts, and investments, primarily in U.S. Treasury securities. Through December 31, 2022, approximately $95.7 million of the net proceeds from the IPO have been used, of which, (i) an estimated $51.7 million was used toward development of Silverback's product candidates, (ii) $0.8 million was used to repay outstanding indebtedness, (iii) $16.0 million was used for transaction costs related to the Merger, including $7.0 million in severance and change in control benefit payments made to Silverback's former officers and (iv) an estimated $27.2 million was used for working capital and general corporate purposes.

There have been no updates to the planned use of proceeds information from the IPO as described in our final prospectus filed with the SEC pursuant to Rule 424(b)(4) on December 4, 2020, except as otherwise disclosed in our Annual Report on Form 10-K, filed with the SEC on March 31, 2022, and our Quarterly Report on Form 10-Q, filed with the SEC on August 11, 2022. We continue to intend to use the remaining net proceeds from the IPO, together with our existing cash and cash equivalents, to fund the development and, if approved, commercialization of *neffy* for the emergency treatment of Type I allergic reactions and other indications, as well as for working capital and other general corporate purposes. We may also use a portion of the net proceeds from the IPO to in-license, acquire or invest in complementary businesses, technologies, products or assets. However, we have no current commitments or obligations to do so.

Item 6. [Reserved]

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

You should read the following discussion and analysis together with our financial statements and related notes included in "Item 8. Financial Statements and Supplementary Data" in this Annual Report. The following discussion contains forward-looking statements that involve risks and uncertainties. For a complete discussion of forward-looking statements, see the section above entitled "Forward Looking Statements." Our actual results could differ materially from those expressed or implied in any forward-looking statements as a result of various factors, including those set forth under the caption "Item 1A. Risk Factors."

Overview

We are a biopharmaceutical company focused on the development of our novel, potentially first-in-class product candidate, *neffy* (previously referred to as ARS-1) for the emergency treatment of Type I allergic reactions, including anaphylaxis. *neffy* is a proprietary composition of epinephrine with an innovative absorption enhancer called Intravail®, which allows *neffy* to provide intranasal delivery of epinephrine.

We believe *neffy*'s "no needle, no injection" approach will address a significant unmet need in the use of epinephrine, which is currently approved only in injectable formulations for the emergency treatment of Type I allergic reactions. There are approximately 25 to 40 million people in the United States who experience Type I allergic reactions. Of this group, approximately 16 million people have been diagnosed and experienced severe Type I allergic reactions that may lead to anaphylaxis, but only 3.3 million currently have an active epinephrine autoinjector prescription, and of those, only half consistently carry their prescribed autoinjector with them due to the many drawbacks of these devices. In aggregate, we estimate that 90% of patients prescribed an epinephrine device are not achieving an optimal treatment outcome today. These drawbacks include the use of needles in the devices, which can result in patient and caregiver injury as well as hesitation and delays in administration due principally to apprehension and pain of needles, allowing the allergic reaction to progress in severity leading to symptoms that seriously impact patient quality of life, to potential need for emergency services and/or hospitalizations, and to life-threatening symptoms or events. Intra-muscular injections also are subject to dosing errors and risk of accidental blood vessel injections, which can cause a significant spike in the intravascular delivery of epinephrine potentially leading to serious cardiovascular complications or events. We believe *neffy*'s "no needle, no injection" delivery that eliminates apprehension, pain and safety concerns, small size allowing for ease of portability, ease of use, and high reliability provide it with a user-friendly profile that will increase prescriptions for epinephrine and make it more likely for patients and caregivers to administer epinephrine sooner, achieve more rapid symptom relief and prevent the allergic reaction from progressing to a level of severity that could lead to hospitalization or even death.

Data from our studies of *neffy* demonstrated nasally delivered epinephrine reached blood levels comparable to those of already approved epinephrine injectable products. Our NDA was accepted for review by FDA in the fourth quarter of 2022 with an anticipated mid-2023 PDUFA target action date and if our NDA is approved, we believe *neffy* will be the first "no needle, no injection" marketed epinephrine product for the emergency treatment of Type I allergic reactions. However, the timing for regulatory approvals is outside our control, may be delayed and is uncertain.

Since our inception in 2015 as ARS Pharmaceuticals, Inc., we have devoted substantially all of our efforts and financial resources to organizing and staffing our company, business planning, raising capital, performing research and development activities, and providing general and administrative support for these operations. We do not have any products approved for sale and have not generated any product sales. We have funded our operations primarily with proceeds from the Merger, private placement of convertible preferred stock, licensing, supply and distribution arrangements with our commercialization partners, and bank debt. From inception to December 31, 2022, we have raised $262.3 million in cash, cash equivalents and short-term investments, net of transaction costs, from the Merger, net proceeds of $76.3 million from the issuance of convertible preferred and common stock, $27.8 million from our collaboration, licensing, supply and distribution arrangements, and $10.0 million from bank debt. As of December 31, 2022, we had cash, cash equivalents, and short-term investments of $274.4 million.

We have incurred net losses from operations since our inception. Our net loss was $34.7 million for the year ended December 31, 2022 and as of December 31, 2022 we had an accumulated deficit of $76.9 million. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year, depending on the timing of our clinical trials, our expenditures on other development activities, the cost for regulatory filings, expenses for pre-commercial activities to establish sales, marketing and distribution capabilities for our product candidates, and our ability to earn potential regulatory and commercial milestones under our collaboration arrangements. We expect our expenses and operating losses will increase substantially as our product candidate, *neffy* potentially is approved by the FDA and we commence commercialization efforts, any future product candidates advance through clinical trials, we expand our clinical, regulatory, quality, manufacturing and pre-commercial sales and marketing capabilities, and incur additional costs to operate as a public company following the completion of the Merger. If we obtain marketing approval for any of our product candidates, we will incur significant commercialization expenses for marketing, sales, manufacturing and distribution activities, and added expenditures to expand our operational, financial and management systems and increase personnel to support these operations.

We do not expect to generate any revenues from product sales unless and until we successfully obtain regulatory approval for one or more product candidates, if ever. Until such time, if ever, as we can generate substantial product revenue, we may finance our operations through our existing cash, cash equivalents, short-term investments, equity offerings, debt financings and other capital sources which may include collaborations, strategic alliances, marketing, distribution or licensing arrangements or other arrangements with third parties. However, we may be unable to raise additional funds or enter into such other arrangements when needed on favorable terms or at all. In addition, any future debt agreements may limit our ability to enter into certain debt financings without the consent of the lenders thereunder. Our failure to raise capital or enter into such other arrangements when needed would have a negative impact on our financial condition and may require us to delay, reduce or terminate our research and development programs or other operations, or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

We do not own or operate manufacturing facilities. We currently rely on third-party manufacturers and suppliers for *neffy*, and we expect to continue to do so to meet our nonclinical, clinical and any commercial activities. Our third-party manufacturers are required to manufacture our product candidates under cGMP requirements and other applicable laws and regulations.

Merger

On November 8, 2022 (the “Closing Date”), privately-held ARS Pharmaceuticals, Inc. (“ARS Pharma) merged with Silverback Therapeutics, Inc., a Delaware corporation (“Silverback”), a publicly traded company. In accordance with the terms of the agreement and plan of merger and reorganization, dated July 21, 2022, as amended on August 11, 2022 and October 25, 2022 (the “Merger Agreement”), Sabre Merger Sub, Inc. (“Merger Sub”), a wholly-owned subsidiary of Silverback, merged into ARS Pharma, with ARS Pharma surviving as Silverback’s wholly-owned subsidiary. At the completion of the Merger, the prior ARS Pharma equityholders owned 62% and the prior Silverback equityholders owned 38% of the combined company, in each case on a fully diluted basis using the treasury stock method and excluding out-of-money options of Silverback. Upon completion of the Merger, Silverback changed its name to ARS Pharmaceuticals, Inc. As, among other facts, the stockholders of ARS Pharma owned a majority of the combined company, the Merger was treated for accounting purposes as if ARS Pharma had acquired Silverback. As a result of the Merger being accounted for as if ARS Pharma had acquired Silverback, the financial statements of ARS Pharma are presented as the historical financial statements of the combined company for all periods presented.

At the effective time of the Merger (the “Effective Time”), each share of ARS Pharma common stock outstanding immediately prior to the Effective Time, after giving effect to the automatic conversion of all shares of preferred stock of ARS Pharma into shares of ARS Pharma common stock immediately prior to the Effective Time (the “Preferred Stock Conversion”), (excluding shares held as treasury stock by ARS Pharma or held or owned by Silverback, Merger Sub or any subsidiary of Silverback or ARS Pharma and dissenting shares) were automatically converted into the right to receive shares of Silverback common stock equal to the exchange ratio of 1.1819. Outstanding and unexercised options and warrants to purchase shares of ARS Pharma common stock were converted into options and warrants to purchase shares of Silverback common stock.

Recent Events

In September 2020, we entered into a license and supply agreement (the “Recordati License and Supply Agreement”) with Recordati Ireland, Ltd (“Recordati”). Pursuant to the Recordati License and Supply Agreement, we granted Recordati an exclusive, royalty-bearing, sublicensable license under our patents relating to *neffy* to (i) perform Recordati’s development activities on the epinephrine compositions (“Recordati Licensed Compositions”) and related products (“Recordati Licensed Products”) for commercialization in the EU, United Kingdom, and certain countries in the Middle East, Africa and Eurasia (the “Recordati Territory”), (ii) manufacture (or have manufactured) the Recordati Licensed Products for commercialization in the Recordati Territory, (iii) file and hold regulatory approvals for the Licensed Products in the Recordati Territory, and (iv) commercialize the Recordati Licensed Products in the Recordati Territory (collectively, the “Recordati Rights”).

On February 22, 2023, we entered into the Termination Agreement with Recordati, pursuant to which, among other things, we and Recordati agreed to terminate the Recordati License and Supply Agreement. Pursuant to the Termination Agreement, we will reacquire all of the Recordati Rights and have agreed to pay Recordati a one-time upfront payment of €3.0 million and additional payments upon achievement of certain milestones including: (i) an EMA regulatory milestone payment of €2.0 million, (ii) a milestone payment of €5.0 million upon first commercial sale of a Recordati Licensed Product in the Recordati Territory, and (iii) milestone payments of up to €5.0 million in the aggregate from sales of Recordati Licensed Product(s) in the Recordati Territory.

Financial Overview

Revenues

To date, we have not generated any revenues from the commercial sale of any products, and we may not generate revenues from the commercial sale of any products. We have signed collaboration and license agreements including supply and distribution for *neffy* with Alfresa Pharma in Japan and Pediatrix in China. The terms of these agreements may include payment to us of one or more of the following: non-refundable, up-front license fees; clinical, regulatory, and/or commercial milestone payments; clinical development fees; and royalties or a transfer price on net sales of licensed products if *neffy* receives marketing approval in these regions. In addition, we previously entered into the Recordati License and Supply Agreement, which was terminated in February 2023. We expect revenues to fluctuate in future periods based on our ability to meet various regulatory milestones, and contingent on successfully obtaining regulatory approval for *neffy* in the US and the licensed regions, US product sales, commercial milestones, royalties or transfer price earned from our partner's net sales and the supply of commercial product as set forth in the agreements described earlier.

Research and Development Expenses

To date, our research and development expenses have related primarily to clinical development, process development and manufacturing costs of our product candidate. Research and development expenses are recognized as incurred and payments made prior to the receipt of goods or services to be used in research and development are capitalized until the goods or services are received.

Research and development expenses include:

- salaries, payroll taxes, benefits and stock-based compensation charges for personnel engaged in research and development efforts;
- external research and development expenses incurred under agreements with contract research organizations, or CROs, investigative sites and consultants and other third-party organizations to conduct our clinical studies and development activities;
- costs related to manufacturing our product candidates for clinical trials and process validation studies, including fees paid to third-party manufacturers;
- costs related to compliance with regulatory requirements and regulatory filings; and
- indirect expenses including insurance and facility-related expenses.

Our external research and development expenses for our clinical stage product candidate consists primarily of fees, materials and other costs paid to CROs, CMOs, consultant and contractors. Our clinical trials and manufacturing costs for the periods presented below reflect an allocation of expenses associated with personnel costs, equity-based compensation expense, and indirect costs incurred in support of overall research and development, such as facilities-related costs.

We expect that our research and development expenses will likely decrease in 2023 based on our planned clinical development and manufacturing activities, as we plan to transition to commercialization efforts for the potential launch of our first product that year. However, the timing for regulatory approvals is outside our control, may be delayed and is uncertain. We cannot determine with certainty the timing of initiation, the duration or the completion costs of current or future clinical trials and the manufacturing costs of our product candidates due to the inherently unpredictable nature of clinical development and manufacturing activities. Clinical development and manufacturing timelines, the probability of success and development costs can differ materially from expectations. We anticipate that we will make determinations as to which product candidates to pursue and how much funding to direct to each product candidate on an ongoing basis in response to the results of ongoing and future clinical trials, regulatory developments and our ongoing assessments as to each product candidate's commercial potential. In addition, we cannot forecast to what degree our licensing, supply and distribution arrangements would affect our development plans and capital requirements.

The duration, costs and timing of clinical trials and development of our product candidates will depend on a variety of factors that include:

- per patient trial costs;
- the number of patients that participate in the trials;
- the number of sites included in the trials;
- the countries in which the trials are conducted;
- the length of time required to enroll eligible patients;
- the number of doses that patients receive;
- the drop-out or discontinuation rates of patients;
- potential additional safety monitoring or other studies requested by regulatory agencies;
- the efficacy and safety profile of our product candidates, and
- the cost to seek regulatory approvals for any product candidates that successfully complete clinical trials
- the timing, receipt, and terms of any approvals from applicable regulatory authorities including the FDA and non-U.S. regulators;
- maintaining a continued acceptable safety profile of our product candidates following approval, if any, of our product candidates;
- establishing or maintaining commercial manufacturing capabilities or making arrangements with third-party manufacturers in order to ensure that we or our third-party manufacturers are able to make product successfully;
- significant and changing government regulation and regulatory guidance;
- the impact of any business interruptions to our operations or to those of the third parties with whom we work; and
- the extent to which we establish additional strategic collaborations or other arrangements.

A change in the outcome of any of these variables with respect to the development of any of our product candidates could significantly change the costs and timing associated with the development of that product candidate. The process of conducting the necessary clinical research and manufacturing to obtain regulatory approval is costly and time-consuming. The actual probability of success for our product candidates or any future candidates may be affected by a variety of factors. We may never succeed in achieving regulatory approval for our product candidates or any future candidates. Further, a number of factors, including those outside of our control, could adversely impact the timing and duration of our product candidates' or any future candidates' development, which could increase our research and development expenses.

General and Administrative

General and administrative expenses consist primarily of salaries, benefits, equity-based compensation for personnel in executive, finance, business development, sales and marketing and other corporate administrative functions. General and administrative expenses also include legal fees incurred relating to corporate and patent matters, professional fees incurred for accounting, auditing, tax and administrative consulting services, facility costs, market research costs, and insurance costs.

We anticipate our general and administrative expenses will increase substantially in 2023 as we add sales and marketing personnel, infrastructure and programs to support pre-commercial activities, and if our product candidates receive marketing approval, commercialization activities. We also anticipate increased general and administrative personnel to support our operations, and higher patent and facility related costs. We also expect to incur added audit, legal, regulatory and tax-related services associated with maintaining compliance with exchange listing and SEC requirements, director and officer insurance premiums, board of director fees, and investor relations costs associated with operating as a public company following the Merger.

Total Other Income (Expense)

Total other income (expense) consists primarily of interest expense from bank debt, interest income from our cash, cash equivalents, and investments, and changes in the fair value of our warrant liability prior to the Merger. As a result of the Merger, the warrant liability was reclassified to equity and fair value adjustments are no longer required.

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 (in thousands, except percentages):

	Years Ended December 31,		Dollar	%
	2022	2021	Change	Change
Revenue under collaboration agreements	$ 1,316	$ 5,506	$ (4,190)	(76%)
Operating expenses:				
Research and development[1]	18,376	20,273	(1,897)	(9)
General and administrative[1]	18,456	4,687	13,769	294
Total operating expenses	36,832	24,960	11,872	48
Loss from operations	(35,516)	(19,454)	(16,062)	83
Total other income (expense):	834	(789)	1,623	(206)
Net loss	(34,682)	(20,243)	(14,439)	71
Unrealized gain on available-for-sale securities	407	—	407	100
Comprehensive loss attributable to common stockholders	$ (34,275)	$ (20,243)	$ (14,032)	69%

[1] Includes stock-based compensation expense as follows (in thousands):

	Years Ended December 31,	
	2022	2021
Research and development	$ 213	$ 2,114
General and administrative	5,630	715
Total	$ 5,843	$ 2,829

Revenues. Revenue under collaboration agreements was $1.3 million and $5.5 million for the years ended December 31, 2022 and 2021, respectively. The revenues for the years ended December 31, 2022 and 2021 include the recognition of revenue for the portion of upfront and clinical and regulatory milestone payments under our collaborations with Alfresa and Recordati that have been allocated to research and development services provided for during the years. Revenue under these collaboration agreements decreased $1.2 million from 2021 to 2022. The remaining decrease from 2021 to 2022 is due to the recognition of an upfront payment of $3.0 million under our collaboration and distribution agreement with Pediatrix signed in March 2021 relating to the issuance and delivery of a technology license, with no comparable activity in 2022. We expect revenues to fluctuate in future periods based on our ability to meet various regulatory milestones, and contingent on successfully obtaining regulatory approval for *neffy* in the licensed regions, commercial milestones, royalties or transfer price earned from our partner's net sales and the supply of commercial product as set forth in these agreements.

Research and Development Expenses. Research and development expenses were $18.4 million and $20.3 million for the years ended December 31, 2022 and 2021, respectively. The decrease of $1.9 million was primarily due to a $3.1 million decrease in clinical trial costs associated with *neffy* and a $1.9 million decrease in stock-based compensation. These aggregated decreases were partially offset by $1.1 million in in-process research and development acquired in the Merger, a $1.0 million increase in license fees for the milestone payment to Aegis upon the FDA's acceptance of our US NDA filing, and a $0.9 million increase in regulatory consulting costs.

	Years Ended December 31,	
	2022	2021
Clinical trials	$ 8,894	$ 10,560
Manufacturing and non-clinical development	9,482	9,713
Total research and development expenses	$ 18,376	$ 20,273

General and Administrative Expenses. General and administrative expenses were $18.5 million and $4.7 million for the years ended December 31, 2022 and 2021, respectively. The increase of $13.8 million was primarily due to a $4.9 million increase in stock-based compensation of which $3.0 million was for the replacement of stock awards held by Silverback employees and directors in connection with the Merger and $1.3 million for the vesting of previously issued performance-based options, a $3.6 million increase in outside services associated with marketing and consulting, a $2.3 million increase in legal fees, a $2.2 million increase in payroll and related expenses, and a $0.6 million increase in insurance costs.

Total Other Income (Expense). Total other income was $0.8 million for the year ended December 31, 2022 and total other expense was $0.8 million for the year ended December 31, 2021. The difference of $1.6 million was primarily due to a $1.8 million increase in interest income from our cash, cash equivalents, and investments partially offset by a $0.1 million loss due to the change in fair value of the preferred stock warrant liability.

Liquidity and Capital Resources

Sources of Liquidity and Capital

Since our inception, we have not generated any revenue from any product sale and have incurred significant operating losses and negative cash flows from our operations. We have not yet commercialized any of our product candidates and we do not expect to generate revenue from sales of any product candidates until the second half of 2023 or after, if at all. We have funded our operations to date primarily with proceeds from the Merger, the sale of preferred and common stock, revenue earned under collaboration, licensing, supply and distribution agreements and bank debt. From inception to December 31, 2022, we have raised $262.3 million in cash, cash equivalents and short-term investments, net of transaction costs, from the Merger, net proceeds of $76.3 million from the issuance of convertible preferred and common stock, $27.8 million from our collaboration, licensing, supply and distribution arrangements, and $10.0 million from bank debt. As of December 31, 2022, we had cash, cash equivalents, and short-term investments of $274.4 million.

Cash flows

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

	Years Ended December 31,	
	2022	2021
Net cash and cash equivalents used in operating activities	$ (40,078)	$ (17,561)
Net cash and cash equivalents used in investing activities	(199)	(55)
Net cash and cash equivalents provided by financing activities	190,732	53,158
Net increase in cash and cash equivalents	$ 150,455	$ 35,542

Operating Activities

During the year ended December 31, 2022, net cash used in operating activities was $40.1 million. This consisted primarily of a net loss of $34.7 million and an increase in our operating assets and liabilities of $12.8 million, partially offset by non-cash charges of $7.4 million. The increase in our operating assets and liabilities was primarily due to a decrease in accounts payable and accrued liabilities of $10.3 million, an increase in prepaid and other assets of $1.2 million, and a decrease in contract liability of $1.3 million. The non-cash charges primarily consisted of non-cash stock-based compensation of $5.8 million, acquired in-process research and development of $1.1 million, depreciation, amortization and accretion expense of $0.3 million, and change in fair value of warrant liability of $0.1 million.

During the year ended December 31, 2021, net cash used in operating activities was $17.6 million. This consisted primarily of a net loss of $20.2 million and an increase in our operating assets and liabilities of $0.4 million, partially offset by non-cash charges of $3.0 million. The increase in our operating assets and liabilities was primarily due to a decrease in contract liability of $2.5 million, partially offset by a decrease in prepaid and other assets of $1.2 million and an increase in accounts payable and accrued liabilities of $1.0 million. The non-cash charges primarily consisted of stock-based compensation of $2.8 million and depreciation, amortization and accretion expense of $0.2 million.

Investing Activities

During the year ended December 31, 2022, the cash and cash equivalents used in investing activities was primarily due to $0.2 million in purchases of property and equipment. During the year ended December 31, 2021, the cash and cash equivalents used in investing activities was primarily due to $0.1 million in purchases of property and equipment.

Financing Activities

During the year ended December 31, 2022, the cash and cash equivalents provided by financing activities was primarily due to $198.8 million in net proceeds from the Merger. In addition, we acquired $63.5 million in short-term investments through the Merger. Also, during the year ended December 31, 2022, we used cash of $8.7 million for repayment of the bank note. During the year ended December 31, 2021, the cash and cash equivalents provided by financing activities was primarily due to $54.8 million of proceeds from the issuance of Series D convertible preferred stock in August 2021 plus $0.2 million from common stock option exercises, partially offset by $1.8 million repayments on the bank note.

Future Funding Requirements

Based on our current operating plan, we believe that our existing cash and cash equivalents will be sufficient to meet our anticipated cash requirements through at least the next three years. In particular, we expect our cash, cash equivalents, and short-term investments will allow us to fund our expenses related to the FDA's review of our NDA for *neffy,* fund proof of concept clinical trials of *neffy* for additional indications, fund pre-commercial manufacturing and sales and marketing activities, and if and when *neffy* is approved by the FDA, fund our commercial launch. However, our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary materially. We have based this estimate on assumptions that may prove to be wrong, and we could deplete our capital resources sooner than we expect. Additionally, the process of testing product candidates in clinical trials is costly, and the timing of progress and expenses in these trials is uncertain.

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

- the scope, progress, results and costs of researching and developing our current product candidates, as well as other additional product candidates we may develop and pursue in the future;
- the scope and costs of manufacturing our product candidates and commercial manufacturing activities;
- the timing of, and the costs involved in, obtaining marketing approvals for our product candidates;
- the number of future product candidates that we may pursue and their development requirements;
- subject to receipt of regulatory approval, the costs of commercialization activities for our product candidates, to the extent such costs are not the responsibility of any collaborators, including the costs and timing of establishing product sales, marketing, distribution and manufacturing capabilities;
- subject to receipt of regulatory approval, revenue, if any, received from commercial sales of our product candidates or any other additional product candidates we may develop and pursue in the future;
- the timing and amount of any milestone and royalty payments under the Aegis License Agreement and the Termination Agreement;
- the extent to which we in-license or acquire rights to other products, product candidates or technologies;
- our headcount growth and associated costs as we expand our employee headcount and establish a commercial infrastructure;
- the costs of preparing, filing and prosecuting patent applications, maintaining and protecting our intellectual property rights, including enforcing and defending intellectual property related claims; and
- the costs of operating as a public company.

Until such time, if ever, as we can generate substantial product revenues to support our cost structure, we expect to finance our cash needs through a combination of our existing cash, cash equivalents, short-term investments, equity offerings, debt financings and other capital sources which may include collaborations, strategic alliances, marketing, distribution or licensing arrangements or other arrangements with third parties. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be or could be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. Debt financing and equity 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. In addition, our current or future debt agreements may limit our ability to incur additional debt. If we raise funds through additional collaborations, or other similar arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, development programs or product candidates or grant licenses on terms that may not be favorable to us and/or may reduce the value of our common stock.

Our ability to raise additional funds may be adversely impacted by potential worsening global economic conditions and disruptions to and volatility in the credit and financial markets in the US, including due to recent bank failures, and worldwide resulting from macroeconomic factors. Because of the numerous risks and uncertainties associated with product development, we cannot predict the timing or amount of increased expenses and cannot assure you that we will ever be profitable or generate positive cash flow from operating activities.

Material Cash Requirements

Under our license agreement with Aegis, we have payment obligations of up to $20.0 million contingent upon our achievement of certain regulatory and commercial milestones and are required to make royalty payments in connection with the sale of products developed under that agreement. We are unable to estimate the timing or likelihood of achieving additional milestones or royalty payments under this agreement. We are also responsible for reimbursing Aegis for patent costs incurred in connection with prosecuting and maintaining patent rights that are specific to epinephrine or epinephrine products.

Pursuant to the Termination Agreement with Recordati, we have payment obligations of up to €10.0 million contingent upon our achievement of certain regulatory and commercial milestones, and up to €5.0 million based on a low double-digit percentage of sales of sales of Recordati Licensed Product(s) in the Recordati Territory We are unable to estimate the timing or likelihood of achieving these milestones and sales-based payments under this agreement.

In October 2021, we entered into a lease agreement to rent office space with a lease commencement date of December 2021. The lease has a term of 38 months. Annual rent expense is $0.2 million and is subject to annual increases of 3%, plus our share of operating expenses and taxes.

We enter into contracts in the normal course of business with third-party contract organizations and vendors for clinical studies, manufacturing and other services and products. These contracts generally provide for termination after a notice period.

To date, we have not recognized any reserves related to uncertain tax positions. As of December 31, 2022, we had no accrued interest or penalties related to uncertain tax positions.

Critical Accounting Policies and Significant Judgements and Estimates

Our management's discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP"). The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses and the disclosure of contingent assets and liabilities in our financial statements. On an ongoing basis, we evaluate our estimates and judgments, including those related to revenues recognized under collaboration agreements, accruals for research and development expenses and valuation of equity awards. We base our estimates on historical experience, known trends and events, and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies and estimates are described in more detail in Note 2- Summary of Significant Accounting Policies to our consolidated financial statements, we believe the following accounting policies and estimates to be most critical to the preparation of our consolidated financial statements.

Revenue

Our revenues generally consist of licenses and research services under license and collaboration agreements.

We recognize revenue when we transfer promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. To determine revenue recognition for contracts with customers we perform the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligation(s) in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligation(s) in the contract; and (v) recognize revenue when (or as) we satisfy the performance obligation(s). At contract inception, we assess the goods or services promised within each contract, assess whether each promised good or service is distinct and identify those that are performance obligations. We recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

The upfront payments and fees received prior to satisfying the relevant revenue recognition criteria are recorded as contract liability in the balance sheet and recognized as revenue when the related revenue recognition criteria are met.

Collaboration agreements typically contain multiple elements, or performance obligations, including research and development services and technology licenses. Our assessment of what constitutes a separate performance obligation requires us to apply judgement. Specifically, we have to identify which goods and services we are required to provide under the contract are distinct. For our collaboration agreements, we have identified several performance obligations at the inception of the contract since the delivered elements are deemed capable of being distinct within the context of the contract. Accordingly, the initial transaction price is allocated to the various performance obligations where we recognized revenue related to the license, which was delivered upon contract inception, and the remaining performance obligation is recognized as the underlying services are provided under the cost-based input method over the research terms. Using the cost-based input method, we recognize revenue based on actual costs incurred as a percentage of total estimated costs as we complete our performance obligations. Any cumulative effect of revisions to estimated costs to complete our performance obligations is recorded in the period in which changes are identified and amounts can be reasonably estimated. This approach requires us to use significant judgement and make estimates of future expenditures. If our estimates or judgements change over the course of the collaboration, they may affect the timing and amount of revenue that it recognizes in the current and future periods.

The transaction price for a contract represents the amount to which we are entitled in exchange for providing goods and services to the customer. The transaction price does not include amounts subject to uncertainties unless it is probable that there will be no significant reversal of revenue when the uncertainty is resolved. Apart from the upfront license payment and certain milestones, all other fees we may earn under our collaborative agreements are subject to significant uncertainties of product development and commercial sales targets. The transaction price of an agreement is allocated to each performance obligation on a relative stand-alone selling price basis, for which we recognize revenue as or when the performance obligations under the contract are satisfied.

Accrued Research and Development

We have entered into various agreements with CROs, CMOs, and other service providers. Our research and development accruals are estimated based on the level of services performed, progress of the studies, including the phase or completion of events, and contracted costs. The estimated costs of research and development provided, but not yet invoiced, are included in accrued liabilities on the balance sheet. If the actual timing of the performance of services or the level of effort varies from the original estimates, we will adjust the accrual accordingly. Payments made to third parties under these arrangements in advance of the performance of the related services are recorded as prepaid expenses and other current assets until the services are rendered. Although we do not expect our estimates to be materially different from amounts actually incurred, if our estimates of the status and timing of services performed differ from the actual status and timing of services performed, it could result in us reporting amounts that are too high or too low in any particular period. To date, our estimated accruals have not differed materially from actual costs incurred.

Stock-Based Compensation

Stock-based compensation expense represents the grant date fair value of equity awards recognized in the period using the Black-Scholes option pricing model. We recognize the expense for equity awards on a straight-line basis over the requisite service periods of the awards, which is usually the vesting period. Forfeitures are recognized as they occur. Estimating the fair value of equity awards pursuant to the Black-Scholes option pricing model requires us to make assumptions regarding a number of variables, including the risk-free interest rate, the expected stock price volatility, the expected term of stock options, the expected dividend yield and the fair value of the underlying common stock on the date of grant. Changes in these assumptions can materially affect the fair value and ultimately how much stock-based compensation expense is recognized.

The Black-Scholes option pricing model utilizes inputs which are highly subjective assumptions and generally require significant judgment. We determine these assumptions in the following manner:

- ***Fair Value of Common Stock.*** Prior to the Merger, since there was no public market for our common stock, our board of directors, with input from management, determined the fair value of our common stock on each grant date by considering a number of objective and subjective factors, including the most recent independent third-party valuation of our common stock, sales of our convertible preferred stock to unrelated third-parties, our operating and financial performance, the lack of liquidity of our capital stock and general and industry-specific economic outlook, and our board of directors' assessment of additional objective and subjective factors that it believed were relevant and that may have changed from the date of the most recent valuation through the date of the grant. Historically, these independent third-party valuations of our equity instruments were generally performed contemporaneously with identified value inflection points. Following the Merger, the fair market value of our common stock is based on its closing price as reported on the date of grant on the primary stock exchange on which our common stock is traded.

- ***Expected Term.*** The expected term represents the period that the options granted are expected to be outstanding. The expected term of stock options issued is determined using the simplified method (based on the mid-point between the vesting date and the end of the contractual term) as we have concluded that our stock option exercise history does not provide a reasonable basis upon which to estimate expected term.

- ***Expected Volatility.*** Given our limited historical stock price volatility data, we derived the expected volatility from the average historical volatilities over a period approximately equal to the expected term of comparable publicly traded companies within our peer group that were deemed to be representative of future stock price trends as we have limited trading history for our common stock. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.

- ***Risk-Free Interest Rate.*** The risk-free interest rate is based on the U.S. Treasury rate, with maturities similar to the expected term of the stock options.

- ***Expected Dividend Yield.*** We have never paid dividends on our common stock and do not anticipate paying any dividends in the foreseeable future. Therefore, we used an expected dividend yield of zero.

Recent Accounting Pronouncements

See Note 2- Summary of Significant Accounting Policies to our consolidated financial statements for information about recent accounting pronouncements, the timing of their adoption, and our assessment, if any, of their potential impact on our financial condition and results of operations.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Not applicable to a "smaller reporting company" as defined under Item 10(f)(1) of Regulation S-K of the Securities Act.

Item 8. Financial Statements and Supplementary Data

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and the Board of Directors of ARS Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of ARS Pharmaceuticals, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations and comprehensive loss, convertible preferred stock and stockholders' equity (deficit) and cash flows for each of the two years in the period ended December 31, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

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

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

/s/ Ernst & Young LLP

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

San Diego, California
March 23, 2023

ARS Pharmaceuticals, Inc.
CONSOLIDATED BALANCE SHEETS
(In thousands, except par value and share amounts)

	December 31, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 210,518	$ 60,063
Short-term investments	63,863	—
Prepaid expenses and other current assets	3,319	667
Total current assets	277,700	60,730
Right-of-use asset	445	621
Fixed assets, net	329	72
Other assets	2,961	23
Total assets	$ 281,435	$ 61,446
Liabilities, convertible preferred stock and stockholders' equity (deficit)		
Current liabilities:		
Accounts payable and accrued liabilities (including related party amounts of $16 in 2022 and $159 in 2021)	$ 4,931	$ 3,107
Lease liability, current	230	144
Contract liability, current	283	1,457
Note payable, current	—	3,479
Total current liabilities	5,444	8,187
Lease liability, net of current portion	251	480
Contract liability, net of current portion	2,854	2,996
Note payable, net of current portion	—	4,930
Preferred stock warrant liability	—	83
Total liabilities	8,549	16,676
Commitments and contingencies (Note 7)		
Convertible preferred stock and stockholders' equity (deficit):		
Preferred stock, $0.0001 par value; 10,000,000 shares authorized at December 31, 2022 and 2021; no shares issued and outstanding at December 31, 2022 and 2021	—	—
Series A convertible preferred stock, $0.01 par value; no shares and 4,764,000 shares authorized at December 31, 2022 and 2021, respectively; no shares and 4,764,000 shares issued and outstanding at December 31, 2022 and 2021, respectively	—	365
Series B convertible preferred stock, $0.01 par value; no shares and 606,060 shares authorized at December 31, 2022 and 2021, respectively; no shares and 606,060 shares issued and outstanding at December 31, 2022 and 2021, respectively	—	1,000
Series C convertible preferred stock, $0.01 par value; no shares and 7,749,999 shares authorized at December 31, 2022 and 2021, respectively; no shares and 7,692,309 shares issued and outstanding at December 31, 2022 and 2021, respectively	—	19,868
Series D convertible preferred stock, $0.01 par value; no shares and 9,337,066 shares authorized at December 31, 2022 and 2021, respectively; no shares and 9,337,066 shares issued and outstanding at December 31, 2022 and 2021, respectively	—	54,806
Stockholders' equity (deficit)		
Common stock, $0.0001 par value; 200,000,000 and 56,000,000 shares authorized at December 31, 2022 and 2021, respectively; 93,943,316 and 30,369,413 shares issued and outstanding at December 31, 2022 and 2021, respectively	9	3
Additional paid-in capital	349,408	10,984
Accumulated other comprehensive gain	407	—
Accumulated deficit	(76,938)	(42,256)
Total stockholders' equity (deficit)	272,886	(31,269)
Total liabilities, convertible preferred stock and stockholders' equity (deficit)	$ 281,435	$ 61,446

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

ARS Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(In thousands, except share and per share information)

	Years Ended December 31,	
	2022	2021
Revenue under collaboration agreements	$ 1,316	$ 5,506
Operating expenses:		
Research and development (including related party amounts of $2,144 in 2022 and $1,072 in 2021)	18,376	20,273
General and administrative (including related party amounts of $603 in 2022 and $476 in 2021)	18,456	4,687
Total operating expenses	36,832	24,960
Loss from operations	(35,516)	(19,454)
Other income (expense):		
Other income (expense), net	974	(789)
Change in fair value of financial instruments	(140)	—
Total other income (expense):	834	(789)
Net loss	$ (34,682)	$ (20,243)
Unrealized gain on available-for-sale securities	407	—
Comprehensive loss attributable to common stockholders	$ (34,275)	$ (20,243)
Net loss per share attributable to common stockholders, basic and diluted	$ (0.87)	$ (0.70)
Weighted-average shares outstanding used in computing net loss per share attributable to common stockholders, basic and diluted	39,956,043	28,872,242

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

ARS Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND STOCKHOLDERS' EQUITY (DEFICIT)
(In thousands, except share amounts)

	Series A Convertible Preferred Stock		Series B Convertible Preferred Stock		Series C Convertible Preferred Stock		Series D Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Gain	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount				
Balance at December 31, 2020	4,764,000	$ 365	606,060	$ 1,000	7,692,309	$ 19,868	Accumulated	$ —	26,411,772	$ 3	$ 7,958	$ —	$ (22,013)	$ (14,052)
Issuance of Series D convertible preferred stock for cash, net of issuance costs of $194	—	—	—	—	—	—	9,337,066	54,806	—	—	—	—	—	—
Vesting of restricted common stock	—	—	—	—	—	—	—	—	3,756,226	—	28	—	—	28
Exercise of stock options	—	—	—	—	—	—	—	—	201,415	—	169	—	—	169
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	2,829	—	—	2,829
Net loss and comprehensive net loss	—	—	—	—	—	—	—	—	—	—	—	—	(20,243)	(20,243)
Balance at December 31, 2021	4,764,000	365	606,060	1,000	7,692,309	19,868	9,337,066	54,806	30,369,413	3	10,984	—	(42,256)	(31,269)
Conversion of preferred stock to common stock as a result of the Merger	(4,764,000)	(365)	(606,060)	(1,000)	(7,692,309)	(19,868)	(9,337,066)	(54,806)	26,473,899	3	76,036	—	—	76,039
Issuance of common stock to Silverback stockholders as a result of the Merger	—	—	—	—	—	—	—	—	36,535,541	3	255,758	—	—	255,761
Reclassification of warrant liability to equity	—	—	—	—	—	—	—	—	—	—	223	—	—	223
Exercise of common stock options, shares issued under the employee stock purchase plan, and release of restricted stock units	—	—	—	—	—	—	—	—	564,463	—	564	—	—	564
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	5,843	—	—	5,843
Net loss and comprehensive loss	—	—	—	—	—	—	—	—	—	—	—	407	(34,682)	(34,275)
Balance at December 31, 2022	—	$ —	—	$ —	—	$ —	—	$ —	93,943,316	$ 9	$ 349,408	$ 407	$ (76,938)	$ 272,886

The accompanying notes are an integral part of these financial statements

ARS Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,	
	2022	2021
Cash flows from operating activities:		
Net loss	$ (34,682)	$ (20,243)
Non-cash adjustments to reconcile net loss to net cash provided by (used) in operating activities:		
Stock-based compensation expense	5,843	2,829
Acquired in-process research and development	1,056	—
Change in fair value of warrant liability	140	(4)
Depreciation, amortization and accretion expense	319	213
Changes in operating assets and liabilities:		
Prepaid and other assets	(1,186)	1,173
Accounts payable and accrued liabilities (including related party amounts of $(143) in 2022 and $13 in 2021)	(10,285)	974
Operating right-of-use assets and lease liabilities, net	33	4
Contract liability	(1,316)	(2,507)
Net cash used in operating activities	(40,078)	(17,561)
Cash flows from investing activities:		
Purchase of property and equipment	(199)	(55)
Net cash used in investing activities	(199)	(55)
Cash flows from financing activities:		
Cash proceeds from the Merger, net of transaction costs	198,843	—
Proceeds from exercise of common stock options	570	169
Repayment of bank note payable	(8,681)	(1,817)
Proceeds from issuance of preferred stock, net	—	54,806
Net cash provided by financing activities	190,732	53,158
Net change in cash and cash equivalents	150,455	35,542
Cash and cash equivalents at beginning of year	60,063	24,521
Cash and cash equivalents at end of year	$ 210,518	$ 60,063
Supplemental cash flow information:		
Conversion of Series A, B, C, and D convertible preferred stock to common stock	$ 76,039	$ —
Short-term investments assumed in the Merger	$ 63,473	$ —
Prepaid expense and other current assets assumed in the Merger	$ 4,404	$ —
Accounts payable and accrued liabilities assumed in the Merger	$ 12,017	$ —
Reclassification of warrant liability to equity	$ 223	$ —
Purchases of property and equipment included in accounts payable	$ 91	$ —
Interest paid	$ 366	$ 576

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

1. Nature of Business

Description of Business

ARS Pharmaceuticals, Inc. ("ARS" or the "Company") is focused on the development of ARS-1 (brand name *neffy*®), a proprietary product candidate for the needle-free intranasal delivery of epinephrine for the emergency treatment of type 1 allergic reactions including anaphylaxis. The Company incorporated in Delaware in January 2016 and is located in San Diego, California. The Company has a wholly owned subsidiary, ARS Pharmaceuticals Operations, Inc., incorporated in Delaware in August 2015 through which it conducts substantially all its operations, which survived the Merger as more fully described below. ARS Pharmaceuticals Operations, Inc. has a wholly owned subsidiary in Ireland, ARS Pharmaceuticals IRL, Limited, to facilitate the filing of regulatory approval for *neffy* in European countries.

Merger Transaction

On November 8, 2022 (the "Closing Date"), Silverback Therapeutics, Inc., a Delaware corporation ("Silverback"), now known as ARS Pharmaceuticals, Inc., completed its reverse merger (the "Merger") with privately-held ARS Pharmaceuticals, Inc. ("ARS Pharma"), in accordance with the terms of the agreement and plan of merger and reorganization, dated July 21, 2022, as amended on August 11, 2022 and October 25, 2022 (the "Merger Agreement"), whereby Sabre Merger Sub, Inc. ("Merger Sub"), a Delaware corporation and wholly-owned subsidiary of Silverback, merged into ARS Pharma, with ARS Pharma surviving as Silverback's wholly-owned subsidiary. ARS Pharma was renamed ARS Subsidiary, Inc. At the completion of the Merger, the prior ARS Pharma equityholders owned 62% and the prior Silverback equityholders owned 38% of the combined company, in each case on a fully diluted basis using the treasury stock method and excluding out-of-money options of Silverback.

The Merger was accounted for as a reverse recapitalization, with ARS Pharma being treated as the acquirer for accounting purposes. Pursuant to the Merger Agreement, Silverback changed its name to ARS Pharmaceuticals, Inc., and changed its corporate ticker symbol on the Nasdaq Global Market to "SPRY". See discussions of the transactions in connection with the Merger at Note 3-Merger and Related Transactions.

Liquidity and Capital Resources

The accompanying financial statements have been prepared assuming that the Company will continue as a going concern. The Company has incurred net operating losses since its inception and had an accumulated deficit of $76.9 million as of December 31, 2022. The Company had cash, cash equivalents, and short-term investments of $274.4 million as of December 31, 2022 and has not generated positive cash flows from operations. To date, the Company has funded its operations primarily with proceeds from the Merger, the issuance of convertible preferred stock, payments earned under collaboration agreements and bank debt. The Company's currently available cash, cash equivalents, and investments as of December 31, 2022 are sufficient to meet its anticipated cash requirements for at least the 12 months following the date the financial statements are issued.

From August 5, 2015 (inception) through December 31, 2022, the Company has devoted substantially all of its efforts to developing intellectual property and conducting product development and clinical trials, raising capital, and building infrastructure. The Company has a limited operating history, and the sales and income potential of the Company's business and market are unproven. If the Company does not successfully commercialize any product candidates for which it receives regulatory approval, it will be unable to generate recurring product revenue or achieve profitability. Management expects operating expenses to increase for the foreseeable future and there can be no assurance that the Company will ever achieve profitability, or if achieved, that it will be sustained on a continuing basis.

The novel coronavirus-2019 ("COVID-19") epidemic and geopolitical events have resulted in a significant disruption of global financial markets. The Company's ability to raise additional capital may be adversely impacted by potential worsening global economic conditions and further disruptions to, and volatility in, the credit and financial markets in the United States, including recent bank failures, and worldwide resulting from a resurgence of COVID-19, future health epidemics or pandemics, geopolitical actions or other macroeconomic factors. If such further disruption occurs, the Company could experience an inability to access additional capital. If the Company is not able to secure adequate additional funding, it may be forced to make reductions in spending, extend payment terms with suppliers, liquidate assets where possible, and/or suspend or curtail planned programs. Any of these actions could materially harm the Company's business, results of operations, and future prospects.

2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The financial statements have been prepared in conformity with U.S. generally accepted accounting principles ("U.S. GAAP"). Any reference in these notes to applicable guidance is meant to refer to the authoritative U.S. GAAP as found in the Accounting Standards Codification ("ASC"), and Accounting Standards Update ("ASU"), of the Financial Accounting Standards Board ("FASB"). The consolidated financial statements include the accounts of the Company and ARS Pharmaceuticals IRL, Limited for the year ended December 31, 2022. All intercompany accounts and transactions have been eliminated in consolidation. The Company's functional and reporting currency is the U.S. dollar. Assets and liabilities that are not denominated in the functional currency are remeasured into U.S. dollars at foreign currency exchange rates in effect at the balance sheet date except for nonmonetary assets, which are remeasured at historical foreign currency exchange rates in effect at the date of transaction. Net realized and unrealized gains and losses from foreign currency transactions and remeasurement are reported in other income (expense) in the consolidated statements of operations and comprehensive loss. All adjustments considered necessary for a fair presentation have been included.

Since ARS Pharma was determined to be the accounting acquirer in connection with the Merger, for periods prior to the Merger the consolidated financial statements were prepared on a stand-alone basis for ARS Pharma and did not include the combined entities activity or financial position. Subsequent to the Merger, the consolidated financial statements as of and for the year ended December 31, 2022 include Silverback's activity and Silverback's assets and liabilities at their acquisition date fair value. Historical share and per share figures of ARS Pharma have been retroactively restated based on the exchange ratio of 1.1819.

Use of Estimates

The preparation of the Company's consolidated financial statements requires it to make estimates and assumptions that impact the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities in the Company's consolidated financial statements and accompanying notes. The most significant estimates in the Company's consolidated financial statements relate to revenue recognized for its collaboration agreements, accruals for research and development expenses and valuation of equity awards. These estimates and assumptions are based on current facts, historical experience and various other factors believed to be reasonable under the circumstances, the results of which 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 and adversely from these estimates. To the extent there are material differences between the estimates and actual results, the Company's future results of operations will be affected.

Cash and Cash Equivalents

Cash and cash equivalents include cash readily available in checking, money market and sweep accounts. The Company considers all highly liquid investments with original maturities of three months or less at the date of purchase to be cash equivalents.

Investments

The Company invests excess cash in investment grade intermediate-term fixed income securities. These investments are included in short-term investments on the balance sheets, classified as available-for-sale, and reported at fair value with unrealized gains and losses included in accumulated other comprehensive loss. Realized gains and losses on the sale of these securities are recognized in net loss.

Fair Value of Financial Instruments

Cash and cash equivalents and investments are carried at fair value. The carrying amounts of all prepaid expenses and other current assets, accounts payable, accrued liabilities, and contract liability, are considered to be representative of their respective fair values because of the short-term nature of those instruments.

Concentrations of Credit Risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash and cash equivalents. The Company maintains deposits in federally insured financial institutions in excess of federally insured limits and limits its exposure to cash risk by placing its cash with high credit quality financial institutions.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation. Depreciation is calculated using the straight-line method over the estimated useful lives of the assets, generally five years. Repairs and maintenance costs are charged to expense as incurred.

Impairment of Long-Lived Assets

Long-lived assets consist primarily of property and equipment. The Company reviews its long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable. Recoverability is measured by comparison of the carrying amount to the future undiscounted net cash flows which the asset or asset group are expected to generate. If such assets are considered to be impaired, the impairment to be recognized is measured as the amount by which the carrying amount of the assets exceeds its fair value. The Company has not recognized any impairment losses from inception through December 31, 2022.

Leases

Effective January 1, 2021, the Company early adopted ASC No. 2016-02, *Leases (Topic 842)* ("ASC 842"), which supersedes the current accounting for leases, using the modified retrospective transition method. The Company has elected to apply the practical expedients allowed by the standard for existing leases. The new standard, while retaining two distinct types of leases, finance and operating, (i) requires lessees to record a right-of-use ("ROU") asset and a related liability for the rights and obligations associated with a lease, regardless of lease classification, and recognize lease expense in a manner similar to current accounting, (ii) eliminates current real estate specific lease provisions, (iii) modifies the lease classification criteria and (iv) aligns many of the underlying lessor model principles with those in the new revenue standard. The Company determines the initial classification and measurement of its ROU asset and lease liabilities at the lease commencement date and thereafter, if modified. The Company recognizes a ROU asset for its operating leases with lease terms greater than 12 months. The lease term includes any renewal options and termination options that the Company is reasonably assured to exercise. The lease liability is calculated by using the present value of all lease payments, with the present value determined by using the incremental borrowing rate for operating leases determined by using the incremental borrowing rate of interest that the Company would pay to borrow on a collateralized basis an amount equal to the lease payments in a similar economic environment as well as a review of peer companies. Variable charges for common area maintenance and other variable costs are recognized as expense as incurred. Rent expense for operating leases is recognized on a straight-line basis over the reasonably assured lease term based on the total lease payments and is included in research and development and general and administrative expenses in the consolidated statements of operations and comprehensive loss.

Warrant Liability

The Company has issued freestanding warrants to purchase shares of its Series C convertible preferred stock. Prior to the Merger, the Company adjusted the carrying value of such Series C convertible preferred stock warrants to the estimated fair value at each reporting date, with any related increases or decreases in the fair value being recorded within other income (expense) in the consolidated statements of operations and comprehensive loss. Pursuant to the Merger Agreement the Series C convertible preferred stock warrants became warrants to purchase shares of the combined company's common stock. As a result of the Merger, the warrants no longer meet the requirements for liability accounting, as such, the Company adjusted the value of the warrants to the estimated fair value as of the Merger date and reclassified them to equity.

Revenue Recognition

Our revenues generally consist of licenses and research services under license and collaboration agreements. We recognize revenue when we transfer promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. To determine revenue recognition for contracts with customers we perform the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligation(s) in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligation(s) in the contract; and (v) recognize revenue when (or as) we satisfy the performance obligation(s). At contract inception, we assess the goods or services promised within each contract, assess whether each promised good or service is distinct and identify those that are performance obligations. We recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

Research and Development Costs

Research and development are expensed in the period incurred. Research and development costs primarily consist of salaries and related expenses for personnel, stock-based compensation expense, external research and development costs incurred under agreements with contract research organizations, investigative sites and consultants to conduct our clinical studies, costs related to compliance with regulatory requirements, costs related to manufacturing the Company's product candidates for clinical trials and other allocated expenses.

Payments for research and development activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and payments made in advance of performance are reflected in the accompanying consolidated balance sheets as prepaid expenses. The Company records accruals for estimated costs incurred for ongoing research and development activities. When evaluating the adequacy of the accrued liabilities, the Company analyzes progress of the services, including the phase or completion of events, invoices received and contracted costs. The Company uses judgments and estimates to determine the prepaid or accrued balances at the end of any reporting period. Actual results could differ from the Company's estimates.

Patent Costs

Costs related to filing and pursuing patent applications are recorded as general and administrative expenses in the statements of operations and expensed as incurred since recoverability of such expenditures is uncertain.

License Fees

Costs incurred to acquire technology licenses and milestone payments made on existing agreements are charged to research and development expense or capitalized based upon the asset achieving technological feasibility in accordance with management's assessment regarding the ultimate recoverability of the amounts paid and the potential for alternative future use.

Stock-Based Compensation

Stock-based compensation expense represents the cost of the grant date fair value of stock option grants recognized over the requisite service period of the awards (usually the vesting period) on a straight-line basis. The Company recognizes expense for awards subject to performance-based milestones over the remaining service period when management determines that achievement of the milestone is probable. Management evaluates when the achievement of a performance-based milestone is probable based on the expected satisfaction of the performance conditions at each reporting date. The Company estimates the fair value of stock option grants using the Black-Scholes option pricing model and recognizes forfeitures as they occur.

The Company's equity incentive plans allow for the issuance of restricted stock awards that may be subject to vesting. The unvested shares of any restricted stock awards are held in escrow as the stock award vests or until the holder's termination of services, whichever occurs first. In the event the holder's services terminate, the Company has the right of repurchase, at its option, the portion of unvested stock awards. For all early exercised unvested stock awards, a liability is established related to the cash received for the unvested portion of the stock award, which represents the Company's repurchase rights if the award holders were to be terminated and their stock repurchased.

Income Taxes

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

The Company recognizes net deferred tax assets to the extent that the Company believes these assets are more likely than not to be realized. In making such a determination, management considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If management determines that the Company would be able to realize its deferred tax assets in the future in excess of their net recorded amount, management would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes.

The Company records uncertain tax positions on the basis of a two-step process whereby (1) management determines whether it is more likely than not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, management recognizes the largest amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority. The Company recognizes interest and penalties related to unrecognized tax benefits within income tax expense. Any accrued interest and penalties are included within the related tax liability.

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and circumstances from non-owner sources. The Company's comprehensive loss was the same as its reported net loss for all periods presented.

Segment Reporting

Operating segments are components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker for purposes of making decisions regarding resource allocation and assessing performance. The Company views its operations and manages its business as one operating segment.

Net Loss Per Common Share

Basic net loss per share attributable to common stockholders is calculated by dividing the net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period, without consideration of potentially dilutive securities. Diluted net loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders since the effect of potentially dilutive securities is anti-dilutive given the net loss of the Company. For purposes of this calculation, convertible preferred stock, stock options, and preferred stock warrants are considered to be common stock equivalents but are not included in the calculations of diluted net loss per share for the periods presented as their effect would be antidilutive.

The following securities are excluded from the calculation of weighted-average dilutive common shares because their inclusion would have been anti-dilutive. Historical share figures have been retroactively restated based on the exchange ratio of 1.1819.

	December 31, 2022	December 31, 2021
Convertible preferred stock	—	26,473,899
Warrants to purchase convertible preferred stock	—	45,456
Warrants to purchase common stock	45,456	—
Common stock options granted and outstanding	12,063,560	4,769,572
Total	12,109,016	31,288,927

Recently Issued Accounting Pronouncements — Not Yet Adopted

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments,* which changes the accounting for recognizing impairments of financial assets. Under the new guidance, credit losses for certain types of financial instruments will be estimated based on expected losses. The new guidance also modifies the impairment models for available-for-sale debt securities and for purchased financial assets with credit deterioration since their origination. This update is effective for the Company beginning January 1, 2023. The Company is currently evaluating the impact the standard may have on its financial statements and related disclosures.

3. Merger and Related Transactions

As described in Note 1- Nature of Business, ARS Pharma merged with Silverback on November 8, 2022. The Merger was accounted for as a reverse recapitalization under U.S. GAAP. ARS Pharma was considered the accounting acquirer for financial reporting purposes. This determination was based on the facts that, immediately following the Merger: (i) ARS Pharma stockholders own a substantial majority of the voting rights of the combined organization; (ii) ARS Pharma has designated a majority (eight of eleven) of the initial members of the board of directors of the combined organization; and (iii) ARS Pharma’s senior management holds all key positions in senior management of the combined organization. The transaction was accounted for as a reverse recapitalization because on the effective date of the Merger, the pre-combination assets of Silverback were primarily cash and other non-operating assets. Additionally, the Company concluded that the in-process research and development (“IPR&D”) assets that remained as of the combination were not significant when compared to the cash and investments obtained through the transaction.

Under reverse recapitalization accounting, the assets and liabilities of Silverback were recorded at their fair value which approximated book value due to the short-term nature of the instruments. No goodwill or intangible assets were recognized. Consequently, the Company's consolidated financial statements reflect the issuance of 36,535,541 shares to the former stockholders of Silverback.

Under the terms of the Merger Agreement, immediately prior to the effective time of the Merger, each share of ARS Pharma’s preferred stock was converted into a share of ARS Pharma’s common stock.

As the accounting acquirer, ARS Pharma is deemed to have assumed all of Silverback's outstanding and unexercised stock options. The assumed options continue to be governed by the terms of the 2016 and 2020 Equity Incentive Plans of Silverback (as discussed more in Note 10- Stock-Based Compensation) under which the options were originally granted.

As part of the reverse recapitalization, ARS Pharma obtained $262.3 million in cash, cash equivalents and short-term investments, net of transaction costs. ARS Pharma also obtained prepaids and other current assets of approximately $4.4 million and assumed payables and accruals of approximately $12.0 million. ARS Pharma also obtained $1.1 million in IPR&D assets that have no alternative future use. The fair value attributable to these assets was recorded as research and development expense in the Company's consolidated statement of operations and comprehensive loss for the year ended December 31, 2022. ARS Pharma also incurred transaction costs of approximately $2.1 million and this amount is recorded as a reduction to additional paid-in capital in the accompanying consolidated statement of convertible preferred stock and stockholders' equity (deficit) for the year ended December 31, 2022.

4. Fair Value Measurements

The Company categorizes its assets and liabilities measured at fair value in accordance with the authoritative accounting guidance that establishes a consistent framework for measuring fair value and expands disclosures for each major asset and liability category measured at fair value on either a recurring or nonrecurring basis. Fair value is defined as the 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 such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering such assumptions, the guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value as follows:

Level 1- Quoted prices (unadjusted) in active markets for identical assets or liabilities;

Level 2- Inputs other than quoted prices included within Level 1 that are either directly or indirectly observable; and

Level 3- Unobservable inputs in which little or no market activity exists, therefore requiring an entity to develop its own assumptions about the assumptions that market participants would use in pricing.

In 2021, based on the borrowing rates currently available to the Company for loans with similar terms, management believe the fair value of the note payable approximates its carrying value. In 2022, the note payable was fully paid off.

The following table identifies the Company's assets that were measured at fair value on a recurring basis (in thousands):

December 31, 2022	Level	Amortized Cost	Gross unrealized gains	Gross unrealized losses	Estimated Fair Value
Money market funds	1	$ 209,273	$ —	$ —	$ 209,273
Short-term investments - U.S. Treasury securities	1	63,456	407	—	63,863
Total	1	272,729	407	—	273,136
December 31, 2021					
Money market funds	1	$ 59,401	$ —	$ —	$ 59,401

There were no transfers between the Level 1 and Level 2 categories or into or out of the Level 3 category during the periods presented.

The Company's short-term investments portfolio contains investments in U.S. Treasury securities that have an effective maturity date that is less than one year from the respective balance sheet date. As of December 31, 2022, the Company did not have any investments in an unrealized loss position.

As of December 31, 2022, the Company did not have any liabilities that were measured at fair value on a recurring basis. As a result of the Merger, the preferred stock warrant liability that was outstanding was remeasured as of the Merger date and reclassified to equity. During 2022, the Company recorded total other expense relating to this warrant of $0.1 million. There were no transfers between the Level 1 and Level 2 categories or into or out of the Level 3 category during the periods presented.

5. Balance Sheet Details

Prepaid expenses and other current assets consisted of the following (in thousands):

	December 31, 2022	December 31, 2021
Prepaid insurance	$ 1,539	$ 666
Prepaid expenses	771	—
Interest receivable	796	1
Other receivables	213	—
Total	$ 3,319	$ 667

Property and equipment consisted of the following (in thousands):

	December 31, 2022	December 31, 2021
Equipment	$ 377	$ 86
Less accumulated depreciation	(48)	(14)
Total	$ 329	$ 72

Depreciation expense was immaterial for the years ended December 31, 2022 and 2021.

Other assets consisted of the following (in thousands):

	December 31, 2022	December 31, 2021
Prepaid insurance	$ 2,940	$ —
Security deposit	21	23
Total	$ 2,961	$ 23

Accounts payable and accrued liabilities consisted of the following (in thousands):

	December 31, 2022	December 31, 2021
Accounts payable	$ 1,659	$ 1,786
Accrued legal and professional fees	908	53
Accrued clinical expenses	609	477
Accrued compensation	447	660
Accrued tax expenses	174	—
Accrued development expenses	133	109
Other	1,001	22
Total	$ 4,931	$ 3,107

6. Collaboration and Out-Licensing

The Company has entered into collaboration and licensing agreements to license certain rights to *neffy* to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: non-refundable, up-front license fees; clinical, regulatory, and/or commercial milestone payments; payment for clinical and commercial supply and royalties or a transfer price on the net sales of licensed products.

Licenses of Intellectual Property. If the license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, revenue is recognized from non-refundable, up-front payments allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. If the license is not a distinct performance obligation, the Company evaluates the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue from non-refundable, up-front fees. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Milestone Payments. At the inception of each arrangement that includes clinical, regulatory or commercial milestone payments, the Company evaluates whether achieving the milestones is considered probable and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the value of the associated milestone is included in the transaction price. Milestone payments that are not within the Company's control, such as approvals from regulators or where attainment of the specified event is dependent on the development activities of a third party, are not considered probable of being achieved until those approvals are received or the specified event occurs. Revenue is recognized when the underlying performance obligation has been transferred to the customer.

Research and Development Revenues. For arrangements that contain research and development commitments, any arrangement consideration allocated to the research and development work is recognized as the underlying services are performed over the research and development term.

Clinical and Commercial Supply. Arrangements that include a promise for the future supply of drug product for either clinical development or commercial supply at the licensee's discretion are generally considered as options. We assess if these options provide a material right to the licensee and if so, they are accounted for as separate performance obligations. The Company has not earned revenues for clinical or commercial supply sales as of December 31, 2022.

Royalty/Transfer Price Revenues. For arrangements that include sales-based royalties or transfer price, including milestone payments based on the level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). The Company has not received any royalty or transfer price revenues as of December 31, 2022.

Alfresa Agreement

In March 2020, the Company signed a Letter of Intent ("LOI") with Alfresa Pharma Corporation ("Alfresa") for the right to negotiate a definitive agreement for the exclusive license and sublicensable right to develop, register, import, manufacture and commercialize *neffy* in Japan in exchange for an upfront payment of $2.0 million. In April 2020, the Company entered into a Collaboration and License Agreement for the rights pursuant to the LOI. Under the agreement, the Company delivered a license to the *neffy* technology and is responsible for completion of a certain clinical study and for the manufacturing of development and commercial drug supply. The parties agreed to share the cost of any additional clinical studies required for approval of *neffy* in Japan. Alfresa is solely responsible for regulatory and commercialization activities and may elect to assume responsibility for manufacturing and supplying drug product for commercial use in Japan. Either party may terminate the agreement for certain breaches of the agreement. Unless terminated earlier by either or both parties, the term of the agreement will continue until the later of (i) expiration of the last-to-expire patent in Japan; or (ii) 10 years after the commercial sale of *neffy* in Japan.

In addition to the $2.0 million received under the LOI, the Company is eligible to receive up to $13.0 million of milestone payments upon achievement of certain clinical and regulatory milestones. Further, the Company is eligible to receive a negotiable transfer price expected to be in the low double-digit percentage on net sales subject to the regulatory approval to commercialize *neffy* in Japan. In July 2020, the Company earned a $5.0 million milestone payment upon the completion of a clinical milestone in Japan.

At the commencement of this collaboration, the Company identified the following performance obligations: the license for *neffy* and research and development services. The Company determined the initial transaction price to be the $7.0 million, which includes a clinical milestone as it was deemed not probable of significant reversal at the inception of the agreement. Due to the uncertainty in the achievement of the regulatory and commercial milestones, the variable consideration associated with these future milestone payments has been fully constrained and is excluded from the transaction price until such time that the Company concludes that it is probable that a significant reversal of previously recognized revenue will not occur. These estimates will be re-assessed at each reporting period. The transaction price was allocated to the performance obligations based on the estimated stand-alone selling price of each performance obligation. The Company recognized revenue of $0.1 million and $0.2 million for the years ended December 31, 2022 and 2021, respectively and had a contract liability of an immaterial amount and $0.1 million as of December 31, 2022 and 2021, respectively.

Recordati Agreement

In September 2020, the Company entered into a License and Supply Agreement (the "Recordati Agreement") with Recordati Ireland, Ltd. ("Recordati") for the exclusive license and sublicensable right to develop, import, manufacture or have manufactured commercial product, file and hold regulatory approvals and commercialize *neffy* in Europe and certain European Free Trade Association, Russia/the Commonwealth of Independent States, Middle East and African countries (the "Recordati Territory"). Under the Recordati Agreement, the Company is responsible for completion of any clinical studies for *neffy* required by the European Medicines Agency ("EMA") before granting European Union Marketing Authorization, and by the Medicines and Healthcare products Regulatory Agency ("MHRA") prior to granting United Kingdom Marketing Authorization. The Company filed the initial regulatory submissions with the EMA in the fourth quarter of 2022 and will file the initial regulatory submissions with the MHRA for *neffy* and is responsible for the manufacturing of commercial supply. Recordati is solely responsible all regulatory activities in the region after the Company's initial regulatory submissions to the EMA and MHRA, for any post-approval clinical studies and commercialization activities. Either party may terminate the Recordati Agreement for certain breaches. Unless terminated earlier by either or both parties, the term of the Recordati Agreement will continue as long as Recordati has commercial sales of *neffy* in the region.

Under the terms of the Recordati Agreement, the Company received an upfront payment of $11.8 million and a regulatory milestone payment of $6.0 million during 2020. In addition, the Company is eligible to receive up to 90.0 million euros of milestone payments upon achievement of certain regulatory and commercial sales milestones. Subject to regulatory approval, the Company will earn tiered royalties in the low double-digits on annual net sales in the region and will receive a per unit supply price for the sale of commercial supply to Recordati. The per unit commercial supply costs are subject to a cap. The combined tiered royalty and supply price have a low double-digit cap.

At the commencement of this collaboration, the Company identified the following performance obligations: the license for *neffy* in the defined territory and the research and development services. The Company determined the initial transaction price to be the $11.8 million. Due to the uncertainty in the achievement of all the developmental and commercial milestones, at inception of the contract, the variable consideration associated with future milestone payments was fully constrained and excluded from the transaction price until such time that the Company concludes that it is probable that a significant reversal of previously recognized revenue will not occur. These estimates will be re-assessed at each reporting period. The transaction price was allocated to the performance obligations based on the estimated stand-alone selling price of each performance obligation. In November 2020, the Company earned a regulatory milestone of $6.0 million. The Company recognized revenue of $1.2 million and $2.3 million for the years ended December 31, 2022 and 2021, respectively. As of December 31, 2022 and 2021, there was a contract liability of $3.1 million and $4.4 million, respectively.

On February 22, 2023, the Company and Recordati entered into a termination agreement (the "Termination Agreement"), pursuant to which, among other things, the Company and Recordati agreed to terminate the Recordati Agreement and the Company will reacquire all of the Recordati's rights under the Recordati Agreement, as described in Note 14- Subsequent Events.

Pediatrix Agreement

In March 2021, the Company entered into a Collaboration and Distribution Agreement with Pediatrix Therapeutics, Inc. ("Pediatrix") for the exclusive license and sublicensable right to develop, import, manufacture or have manufactured commercial product, file and hold regulatory approvals and commercialize *neffy* in the People's Republic of China, Taiwan, Macau, and Hong Kong. Under the agreement, Pediatrix is responsible, at its sole cost and expense, for all ongoing development work that is necessary for or otherwise supports regulatory approval in the defined territory, including all clinical trials, and activities related to post approval commitments and commercialization tests. In addition, Pediatrix is responsible for commercialization activities and may elect to assume responsibility for manufacturing and supplying drug product for commercial use. The Company is responsible for the manufacturing of product for clinical studies as well as commercial supply, all at a negotiated transfer price. Either party may terminate the agreement for certain breaches of the agreement. Unless terminated earlier by either or both parties, the term of the agreement will continue as long as Pediatrix has commercial sales of *neffy* in the region, or 10 years after the first commercial sale.

Under the terms of the agreement, the Company received an upfront payment of $3.0 million. In addition, the Company is eligible to receive up to $84.0 million of milestone payments upon achievement of certain regulatory and commercial sales milestones. Subject to regulatory approval, the Company will earn tiered royalties in the low double-digits on annual net sales in the region and will receive a per unit supply price for the sale of commercial supply to Pediatrix.

At the commencement of this collaboration, the Company identified performance obligations related to the delivery of the license for *neffy* in the defined territory and manufacturing of product for clinical studies and commercial supply. The Company concluded that the license was distinct from potential supply obligation. The supply provisions are effectively options granted to Pediatrix to purchase future goods and would only constitute a performance obligation if they contain a material right. The Company determined the option to purchase the clinical and commercial supply was not at a significantly discounted price and does not represent a material right, therefore does not constitute a performance obligation. The Company determined the initial transaction price to be the $3.0 million. Due to the uncertainty in the achievement of all the developmental and commercial milestones, the variable consideration associated with these future milestone payments has been fully constrained and is excluded from the transaction price until such time that the Company concludes that it is probable that a significant reversal of previously recognized revenue will not occur. These estimates will be re-assessed at each reporting period. The Company recognized revenue of the full $3.0 million during the year ended December 31, 2021.

A reconciliation of contract liability from collaboration agreements was as follows (in thousands):

Balance at December 31, 2021	$	4,453
Revenue recognized		(1,316)
Balance at December 31, 2022	$	3,137

7. Commitments and Contingencies

Note Payable

In September 2019, the Company entered into a Loan and Security Agreement (“Loan Agreement”) with Silicon Valley Bank for working capital in the principal amount, as amended, of $10.0 million (the “Note”). The Note required interest only payments through June 30, 2021 and had a maturity date of March 1, 2024. In addition, there was a final payment (“Balloon Payment”) of $0.3 million at maturity.

In connection with the Note, the lender received warrants to purchase 38,460 shares of Series C convertible preferred stock at $2.60 per share. The warrants were immediately exercisable and will expire on September 30, 2029. The estimated fair value of the warrants at issuance was $86,000 which was recorded as a debt discount. In addition, the Company recorded debt issuance costs totaling $47,000.

The debt discount, debt issuance costs and Balloon Payment were amortized to interest expense using the effective interest rate method over the loan term. The Company recognized interest expense of $0.6 million and $0.8 million for the years ended December 31, 2022 and 2021, respectively, and debt discount amortization of $0.3 million and $0.2 million for the years ended December 31, 2022 and 2021, respectively.

On November 7, 2022, the Company paid off the remaining balance of $5.4 million on its loans with Silicon Valley Bank, including all principal and interest and the Balloon Payment. The warrants issued to Silicon Valley Bank in connection with the loans continue to be outstanding.

Leases

In October 2021, the Company entered into a 38-month noncancelable lease for its current headquarters location consisting of 4,047 rentable square feet of office space in San Diego, California. Under the terms of the agreement, there is no option to extend the lease, and the Company is subject to additional charges for common area maintenance and other costs. Monthly rental payments due under the lease commenced on December 6, 2021 and escalate through the lease term. The Company prepaid the first month’s rent upon execution of the lease, and the lease agreement provided full rent abatement for the second and third months of the rental term. As of December 31, 2022, the remaining lease term of the Company’s operating lease was 26 months, and the discount rate on the Company’s operating lease was 8%. As there was not an implicit rate within the lease, the discount rate was determined by using a set of peer companies incremental borrowing rates. The Company's operating lease expense was $0.2 million and immaterial for the years ended December 31, 2022 and 2021, respectively. The Company's variable lease expense was $0.1 million and immaterial for the years ended December 31, 2022 and 2021, respectively. Cash paid for amounts included in the measurement of lease liabilities was $0.2 million and zero for the years ended December 31, 2022 and 2021, respectively.

Future minimum noncancelable operating lease payments are as follows (in thousands):

Year ended December 31,	Amount
2023	$ 238
2024	245
2025	42
Total lease payments	525
Less imputed interest	(44)
Lease liability	481
Less current portion of lease liability	(230)
Lease liability, net of current portion	$ 251

Contingencies

From time to time, the Company may be involved in various legal proceedings and subject to claims that arise in the ordinary course of business.

On August 12, 2021, Amphastar Pharmaceuticals, Inc. (“Amphastar”) filed a Petition for Inter Partes Review (“IPR”) with the United States Patent and Trademark Office (“USPTO”), seeking to invalidate claims 1-20 of United States Patent No. 10,682,414 (the “‘414 patent”). The ‘414 patent issued on June 16, 2020 and is entitled “Intranasal Epinephrine Formulations and Methods for the Treatment of Disease.” The claims of the ‘414 patent are directed to methods of treating a type-1 hypersensitivity reaction, including anaphylaxis, using an aqueous nasal spray pharmaceutical formulation containing epinephrine or a salt thereof, including the Company’s *neffy* product candidate, in a single dose. On February 9, 2023, the USPTO issued a Final Written Decision finding claims 3-6 and 18-20, which encompass the Company’s *neffy* product candidate, patentable, and claims 1-2 and 7-17 unpatentable. Both the Company and Amphastar have the right to file a motion for reconsideration with the USPTO in addition to a notice of appeal with the United States Court of Appeals for the Federal Circuit. Although the results of any motion for reconsideration or notice of appeal are inherently unpredictable and uncertain, and could result in either the USPTO or the Federal Circuit finding some or all of claims 1-20 of the ‘414 patent to be invalid or unenforceable, the Company does not believe that an adverse outcome will have a material adverse effect on its business, operating results, cash flows or financial condition.

On November 5, 2021, a securities class action complaint was filed against Silverback and certain of Silverback’s former officers and directors in the U.S. District for the Western District of Washington, captioned Dresner v. Silverback Therapeutics, Inc., et al., Case No. 2:21-cv-01499 (the “Dresner Case”). The court has appointed lead plaintiff and lead plaintiff's counsel, and plaintiff's counsel then filed the amended complaint on April 11, 2022. The amended complaint alleges that between December 3, 2020 and March 31, 2022, Silverback and certain of its officers and directors violated (1) Sections 11 and 15 of the Securities Act of 1933, as amended; and (2) Sections 10(b) and 20(a) of the Securities Exchange Act of 1934, as amended, and Securities and Exchange Commission (“SEC”) Rule 10b-5 promulgated thereunder, by making allegedly false and misleading statements in various SEC filings and press releases regarding the clinical and commercial prospects of its product candidate, SBT6050, which is now discontinued. The complaint seeks unspecified damages and interest, as well as attorneys’ fees and other costs. Silverback and the other defendants filed a motion to dismiss on May 26, 2022 and lead plaintiff filed an opposition brief on July 11, 2022. On August 10, 2022, Silverback and the other defendants filed a reply brief. The court held a hearing on October 28, 2022 and issued an order granting defendants’ motion to dismiss without prejudice on November 4, 2022. Plaintiffs were given leave to amend and filed a Second Amended Complaint (“SAC”) on December 5, 2022, which asserted Section 11 claims only with respect to Silverback’s December 3, 2020 IPO and Section 10(b) claims during a shorter class period of March 29, 2021 through March 31, 2022. Defendants filed a motion to dismiss the SAC on January 2, 2023. Lead plaintiff filed an opposition brief on January 23, 2023, and defendants filed a reply brief January 27, 2023. The court is expected to issue a ruling on the motion to dismiss in the first half of 2023.

Regardless of the outcome, involvement in legal proceedings may have an adverse impact on the Company because of defense and settlement costs, diversion of management resources, and other factors. The Company cannot predict the outcome of these suits, and failure by the Company to obtain favorable resolutions could have a material adverse effect on its business, results of operations, and financial condition. The Company’s chances of success on the merits of either of these suits are still uncertain and any possible loss or range of loss cannot be reasonably estimated and as such the Company has not recorded a liability as of December 31, 2022.

Except as described above, the Company is not currently involved in any legal proceeding that it believes could have a materially adverse effect on its financial condition or results of operations. Except as described above, there is no action, suit, proceeding, inquiry or investigation before or by any court, public board, government agency, self-regulatory organization or other body pending or, to the knowledge of the Company’s executive officers, threatened against or affecting the Company, the Company’s common stock, any of its subsidiaries or its subsidiaries’ officers or directors in their capacities as such, in which an adverse decision could have a material adverse effect.

8. In-Licensing and Supply

License Agreement with Aegis

In June 2018, the Company entered into a License Agreement (the "Aegis Agreement") with Aegis Therapeutics, LLC ("Aegis"). Under the Aegis Agreement, the Company licensed the exclusive, worldwide, royalty-bearing, sublicensable, rights to certain proprietary Aegis technology, patent rights and know-how to develop and commercialize epinephrine products. The Company utilizes this technology for the development of its lead product candidate, *neffy*. As consideration for the license, the Company paid an upfront license fee of $50,000, which was recorded in research and development expenses in the consolidated statement of operations.

The Company is required to make aggregate milestone payments of up to $20.0 million upon achievement of certain regulatory and commercial milestones. The regulatory milestone payments under the Aegis Agreement will be recognized as research and development expense upon completion of the required events, as the triggering events are not considered to be probable until they are achieved. The Company made a $0.5 million milestone payment to Aegis upon the achievement of a regulatory milestone during 2019, and a $1.0 million payment to Aegis upon the FDA's acceptance of the Company's New Drug Application ("NDA") submission for *neffy,* which occurred in the third quarter of 2022. The Company may be required to pay royalties based on annual net product sales in the low to mid-single digits on its or its sublicensees' net sales of the Licensed Products (as defined in the Aegis Agreement) on a country-by-country and product-by-product basis.

The Company is responsible for reimbursing Aegis for patent costs incurred in connection with prosecuting and maintaining patent rights that are specific to epinephrine or epinephrine products. There were no expenses recognized in connection with legal patent fees for the years ended December 31, 2022 and 2021.

The Company may terminate the Aegis Agreement with 30 days written notice or either party may terminate the Aegis Agreement for certain breaches of the Aegis Agreement. Unless terminated earlier by either or both parties, the term of the Aegis Agreement will continue until the final expiration of all royalty obligations under the Aegis Agreement.

In conjunction with the Aegis Agreement, the Company also entered into a Supply Agreement (the "Supply Agreement") with Aegis that allows the Company to purchase materials for preclinical, development and commercial use at predetermined prices. The Company may elect to have Aegis supply minimum quantities but there are no minimum or maximum purchase obligations under the Supply Agreement unless this election is made. The parties may terminate the Supply Agreement at any time by mutual agreement. In addition, the parties may terminate the Supply Agreement in the event of certain breaches of the Supply Agreement or upon the earlier of the expiration or termination of the Aegis Agreement or June 2028. The Supply Agreement term may be extended by mutual written agreement. Expense recognized under the Supply Agreement was $1.0 million and $0.2 million for the years ended December 31, 2022 and 2021, respectively.

Manufacturing Agreement with Renaissance

In September 2020, the Company entered into a manufacturing agreement (the "Renaissance Agreement") with Renaissance Lakewood, LLC ("Renaissance"). Pursuant to the Renaissance Agreement, Renaissance agreed to manufacture for, and provide to the Company, *neffy* nasal unit dose sprays ("Renaissance Products"). The Company is obligated to provide Renaissance with certain supplies to manufacture the Renaissance Products and to purchase from Renaissance a mid double-digit percentage of the Company's annual aggregate Renaissance Product requirements in the E.U., and a high double-digit percentage of the Company's annual aggregate Renaissance Product requirements in the U.S. The Renaissance Agreement contains conventional commercial pharmaceutical manufacturing provisions including certain minimum purchase amounts to be determined in the future based on forecast needs and minimum batch size projections. The Company may also request Renaissance to perform certain services related to the Renaissance Product, for which the Company will pay reasonable compensation to Renaissance.

The initial term of the Renaissance Agreement commenced on September 9, 2020 and continues (a) for Renaissance Product designated for commercial sale in the U.S. until the earlier of the fifth anniversary of the (i) target U.S. launch date and (ii) the initial U.S. launch date ("U.S. Initial Term"), and (b) for Renaissance Product designated for commercial sale in the E.U. and other countries, the earlier of the fifth anniversary of (i) the target E.U. launch date and (ii) the initial E.U. launch date ("E.U. Initial Term"), in each case unless earlier terminated by one of the parties. The U.S. Initial Term and E.U. Initial Term automatically renew for successive two-year terms ("Renewal Term"). Either party may elect not to renew the U.S. Renewal Term and/or the E.U. Renewal Term by providing the requisite prior notice to the other party. Either party may terminate the Renaissance Agreement (1) for uncured material breach of the other party, (2) upon notice for insolvency-related events of the other party that are not discharged within a defined time period, (3) on a product-by-product basis if the manufacture, distribution or sale would materially contravene any applicable law, (4) by providing the requisite notice if (a) the Company has not submitted a regulatory filing for any Renaissance Product in the U.S. on or before June 30, 2022, (b) the authorization and approval to distribute or sell Renaissance Product in the U.S. is not granted on or before the target U.S. launch date, (c) the authorization and approval representing more than a targeted number of units of Renaissance Product sold in the U.S. during the last calendar year is withdrawn by the FDA, or (d) the Company decided in its sole discretion to cease commercializing the Renaissance Product in the U.S., (5) in the case of a force majeure event that continues for six months or more, or (6) a violation by the other party of trade control or anti-corruption laws. Expense recognized under the Renaissance Agreement was $2.0 million and $3.1 million for the years ended December 31, 2022 and 2021, respectively.

9. Convertible Preferred Stock and Common Stock and Stockholders' Equity (Deficit)

Authorized Shares

The Company's current Amended and Restated Certificate of Incorporation authorizes 200,000,000 shares of common stock, par value $0.0001 per share, and 10,000,000 shares of preferred stock, par value $0.0001 per share.

Convertible Preferred Stock

In April 2016, the ARS Pharma issued 3,600,000 shares of Series A convertible preferred stock at $0.0833 per share for net cash proceeds of $0.3 million. Subsequently, in July 2017, an additional 1,164,000 shares of Series A convertible preferred stock were issued at $0.0833 per share for net cash proceeds of $0.1 million.

In March, June and July 2018, ARS Pharma issued a total of 606,060 shares of Series B convertible preferred stock at $1.65 per share for net cash proceeds of $1.0 million.

In September and December 2018, ARS Pharma issued 7,692,309 shares of Series C convertible preferred stock at $2.60 per share for net cash proceeds of $19.8 million.

In August 2021, ARS Pharma issued 9,337,066 shares of Series D convertible preferred stock at $5.89 per share for net cash proceeds of $54.8 million.

Collectively, the Series A, B, C and D convertible preferred stock issuances will be referred to as "Series Convertible Preferred Stock."

On November 8, 2022, ARS Pharma completed the Merger with Silverback in accordance with the Merger Agreement. Under the terms of the Merger Agreement, immediately prior to the effective time of the Merger, 22,399,435 shares of ARS Pharma's preferred stock were converted into 26,473,899 shares of ARS Pharma's common stock.

Common Stock

Upon completion of the Merger on November 8, 2022, as the accounting acquirer, ARS Pharma is deemed to have issued 36,535,541 shares of its common stock to Silverback stockholders.

Common stock reserved for future issuance consisted of the following:

	December 31, 2022
Common stock options granted and outstanding	12,063,560
Common stock reserved for future awards or option grants	3,373,801
Total	15,437,361

10. Stock-Based Compensation

Stock-based compensation expense recognized for all equity awards has been reported in the consolidated statements of operations and comprehensive loss as follows (in thousands):

	Years Ended December 31,	
	2022	2021
Research and development expense	$ 213	$ 2,114
General and administrative expense	5,630	715
Total stock-based compensation expense	$ 5,843	$ 2,829

As of December 31, 2022, the total unrecognized stock-based compensation expense was $4.6 million, which is expected to be recognized over a remaining weighted-average period of approximately 2.48 years.

For the year ended December 31, 2022, ARS Pharma recognized $1.3 million in stock-based compensation expense for 236,380 performance-based options that vested upon the closing of the Merger. For the year ended December 31, 2021, no performance-based stock-based compensation was recognized.

In connection with the Merger, the Company replaced (only for accounting purposes) 6,599,068 stock options and 493,456 restricted stock units held by Silverback employees and directors. The replacement awards were revalued at their acquisition-date fair value and then attributed to pre and post-combination service. This resulted in $3.1 million in expense attributed to post-combination service to be recognized as compensation cost by the Company, of which $3.0 million has been recognized in general and administrative expense in the accompanying consolidated statements of operations for the year ended December 31, 2022. 482,805 replaced restricted stock units vested in connection with the Merger and the remaining 10,651 are outstanding as of December 31, 2022.

Equity Incentive Plans

In September 2018, ARS Pharma adopted the 2018 Equity Incentive Plan. As a result of the Merger, on November 8, 2022 ARS Pharma, as the accounting acquirer, is deemed to have assumed Silverback's 2016 and 2020 Equity Incentive Plans, and Employee Stock Purchase Plan (“ESPP”). For the year ended December 31, 2022, ESPP activity is not material to the consolidated financial statements.

As of December 31, 2022, the 2016 and 2020 Equity Incentive Plans authorized a total of 11,321,495 shares, of which 3,079,688 shares are available for future grant, and 6,439,311 shares are outstanding. As of December 31, 2022, the 2018 Equity Incentive Plan authorized a total of 6,634,333 shares, of which 294,113 shares are available for future grant, and 5,634,900 shares are outstanding. The Company does not intend to grant future stock options or other equity awards under the 2018 Equity Incentive Plan.

Stock Options

Stock options granted under the Company’s equity incentive plans expire no later than 10 years from the date of grant and generally vest over a four-year period, with vesting either occurring at a rate of 25% at the end of the first year and thereafter in 36 equal monthly installments or on a monthly basis. In the case of awards granted to our non-employee board members, vesting generally occurs on a monthly basis over three years or in full on an annual basis. The Company issues new shares of common stock upon the exercise of stock options.

A summary of the Company's stock option activity for the year ended December 31, 2022 is as follows:

	Shares Subject to Options Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2021	4,828,667	$ 1.06		
Assumed in the Merger	6,599,068	$ 10.14		
Granted	1,472,647	$ 1.50		
Exercised	(548,768)	$ 1.04		
Forfeited	(288,054)	$ 1.26		
Outstanding at December 31, 2022	12,063,560	$ 6.07	5.56	$ 60,437
Vested and expected to vest at December 31, 2022	12,063,560	$ 6.07	5.56	$ 60,437
Exercisable at December 31, 2022	12,032,474	$ 6.06	5.56	$ 60,336

The exercisable shares subject to options outstanding at December 31, 2022 in the table above include vested and early exercisable awards. The aggregate intrinsic value in the table above is calculated as the difference between the exercise price of the underlying options and the estimated fair value of the Company's common stock for all options that were in-the-money at December 31, 2022. The aggregate intrinsic value of options exercised during the years ended December 31, 2022 and 2021 was $1.2 million and $0.1 million, respectively.

The weighted-average grant date fair value per share of option grants for the years ended December 31, 2022 and 2021 was $1.50 and $0.97, respectively. The total fair value of shares vested during the years ended December 31, 2022 and 2021 was $2.7 million and $0.4 million, respectively.

The fair value of stock options granted or assumed in connection with the Merger was estimated using a Black-Scholes option-pricing model ("Black-Scholes") with the following weighted-average assumptions:

	Assumed on November 8, 2022	Years Ended December 31, 2022	Years Ended December 31, 2021
Expected term (in years)	0.8	6.1	6.0
Expected volatility	98.9%	91.3%	91.6%
Risk-free interest rate	4.5%	2.1%	1.2%
Expected dividend yield	—	—	—

The fair value of stock options was determined using the Black-Scholes assumptions below. Each of these inputs is subjective and generally requires significant judgement.

Fair Value of Common Stock. Prior to the Merger on November 8, 2022, grant date fair market value of the shares of common stock underlying stock options was determined by ARS Pharma's Board of Directors. Following the Merger, the fair market value of the Company's common stock is based on its closing price as reported on the date of grant on the primary stock exchange on which the Company's common stock is traded. Prior to the Merger, there was no public market for the ARS Pharma's common stock, therefore the ARS Pharma Board of Directors determined the fair value of common stock at the time of grant of the option by considering a number of objective and subjective factors including independent third-party valuations of the ARS Pharma common stock, sales of convertible preferred stock to unrelated third parties, operating and financial performance, the lack of liquidity of capital stock and general and industry specific economic outlook, amongst other factors.

Expected Term. The expected term represents the period that the options granted are expected to be outstanding. The expected term of stock options issued is determined using the simplified method (based on the mid-point between the vesting date and the end of the contractual term) as the Company has concluded that its stock option exercise history does not provide a reasonable basis upon which to estimate expected term.

Expected Volatility. Given the Company's limited historical stock price volatility data, the Company derived the expected volatility from the average historical volatilities over a period approximately equal to the expected term of comparable publicly traded companies within its peer group that were deemed to be representative of future stock price trends as the Company has limited trading history for its common stock. The Company will continue to apply this process until a sufficient amount of historical information regarding the volatility of its own stock price becomes available.

Risk-free Interest Rate. The risk-free interest rate is based on the U.S. Treasury rate, with maturities similar to the expected term of the stock options.

Expected Dividend Yield. The Company has never paid dividends on its common stock and does not anticipate paying any dividends in the foreseeable future. Therefore, the Company uses an expected dividend yield of zero.

11. Income Taxes

A reconciliation of the federal statutory income tax rate to the Company's effective tax rate is as follows (in thousands):

	Years Ended December 31,	
	2022	2021
Tax computed at federal statutory rate	$ (7,283)	$ (4,251)
State income taxes, net of federal benefit	(21)	(9)
Equity compensation	290	562
Research and development credits	(624)	(1,120)
Other	452	38
Valuation allowance	7,186	4,780
Provision for income taxes	$ —	$ —

Significant components of the Company's net deferred tax assets were as follows (in thousands):

	Years Ended December 31,	
	2022	2021
Deferred tax assets:		
Net operating losses	$ 8,252	$ 5,457
Research and development credits	2,964	2,340
Intangible assets	3,746	219
Equity compensation	2,279	63
Contract liability	661	943
Other	104	257
Total deferred tax assets	18,006	9,279
Deferred tax liabilities:		
ROU asset	(94)	(131)
Other	(155)	(10)
Total deferred liabilities	(249)	(141)
Gross deferred tax assets	17,757	9,138
Valuation allowance	(17,757)	(9,138)
Net deferred tax assets	$ —	$ —

The Company has established a valuation allowance against net deferred tax assets due to the uncertainty that such assets will be realized. The Company periodically evaluates the recoverability of the deferred assets. At such time as it is determined that it is more likely than not that the deferred tax asset will be realized, the valuation allowance will be reduced. The change in the valuation allowance for the year ended December 31, 2022 was an increase of $8.6 million.

At December 31, 2022, the Company had federal and state net operating loss carryforwards ("NOL") of $38.9 million and $7.2 million, respectively. Federal NOL carryforwards of $38.9 million, generated after 2017, may be carryforward indefinitely but can only be utilized to offset 80% of future taxable income. The state NOL carryforwards begin expiring in 2036. State NOLs totaling $1.6 million may be carried forward indefinitely. In addition, the Company also has federal and California research and development credit carryforwards totaling $3.4 million and $0.7 million, respectively. The federal research and development credit carryforwards will begin to expire in 2035 unless previously utilized. The California research credits do not expire. The NOL and credit carryovers noted above do not include the pre-Merger amounts attributable to Silverback as noted in the IRC Section 382 disclosure in the paragraph below.

Pursuant to Internal Revenue Code ("IRC") Sections 382 and 383, annual use of the company's NOL and research and development credit carryforwards may be limited in the event a cumulative change in ownership of more than 50% occurs within a three-year period. The Company has not completed an ownership change analysis pursuant to IRC Section 382. If ownership changes have occurred or occurs in the future, the amount of remaining tax attribute carryforwards available to offset taxable income and income tax expense in future years may be restricted or eliminated. If eliminated, the related asset would be removed from deferred tax assets with a corresponding reduction in the valuation allowance. Due to the existence of the valuation allowance, limitations created by future ownership changes, if any, will not impact the Company's effective tax rate.

Additionally, as part of the transaction with Silverback, certain deferred tax assets generated in the Silverback pre-Merger periods were acquired by the Company consisting of federal and state net operation loss carryovers, research tax credit carryovers, and other tax attributes. These deferred tax assets will be subject to limitations on future use under IRC Section 382 and some of the attributes may expire unused. The Company has not completed an analysis under IRC Section 382 to determine the amount of such tax attributes that will be available annually and how much, if any, of the tax attributes may expire unused. As a result, the Company has not included any of these deferred tax assets in its components of deferred tax asset in the table above. Once the analysis is complete, to the extent that such deferred tax assets are available for future utilization, such assets will be included in the deferred tax assets and will be fully offset by valuation allowance as of December 31, 2022.

The evaluation of uncertainty in a tax position is a two-step process. The first step involves recognition. The Company determines whether it is more likely than not that a tax position will be sustained upon tax examination, including resolution of any related appeals or litigation, based on only the technical merits of the position. The technical merits of a tax position are derived from both statutory and judicial authority (legislation and statutes, legislative intent, regulations, rulings, and case law) and their applicability to the facts and circumstances of the tax position. If a tax position does not meet the more-likely-than-not recognition threshold, the benefit of that position is not recognized in the financial statements. The second step is measurement. A tax position that meets the more-likely-than-not recognition threshold is measured to determine the amount of benefit to recognize in the financial statements. The tax position is measured as the largest amount of benefit that is greater than 50% likely of being realized upon ultimate resolution with a taxing authority.

The following table summarizes the reconciliation of the unrecognized tax benefits activity during the years ended December 31, 2022 and 2021 (in thousands):

	Years Ended December 31,	
	2022	2021
Unrecognized tax benefits - beginning	$ 1,147	$ 941
Gross increase – current-period tax positions	373	206
Unrecognized tax benefits - ending	$ 1,520	$ 1,147

The unrecognized tax benefit amounts are reflected in the determination of the Company's deferred tax assets. If recognized, none of these amounts would affect the Company's effective tax rate, since it would be offset by an equal corresponding adjustment in the deferred tax asset valuation allowance. The Company does not foresee material changes to its liability for uncertain tax benefits within the next twelve months.

The Company files income tax returns in the United States, various states within the United States, and Ireland. Due to the Company's losses incurred, the Company's income tax returns for all jurisdictions are subject to examination by tax authorities from inception. The Company's policy is to recognize interest expense and penalties related to income tax matters as tax expense. As of December 31, 2022, there were no significant accruals for interest related to unrecognized tax benefits or tax penalties. The Company has not incurred any material interest or penalties as of the current reporting date with respect to income tax matters. The Company does not expect that there will be unrecognized tax benefits of a significant nature that will increase or decrease within 12 months of the reporting date.

12. Employee Benefit Plans

In June 2022, the Company adopted a retirement plan, which is qualified under section 401(k) of the Internal Revenue Code of 1986, as amended, for the Company's U.S. employees. The plan allows eligible employees to defer, at the employee's discretion, pretax compensation up to the Internal Revenue Service (the "IRS") annual limits. The Company matches up to 5% of an employee's contributions, subject to IRS limitations. Expense associated with the Company's matching contribution totaled $0.1 million for the year ended December 31, 2022.

13. Related-Party Transactions

In September 2015, the Company entered into a consulting agreement, superseded in July 2022, for regulatory and development services with Pacific-Link Consulting, LLC, an entity owned by the President/Chief Executive Officer/director and the Chief Medical Officer of the Company. The Company incurred consulting expense related to this agreement totaling $2.1 million and $1.1 million during the years ended December 31, 2022 and 2021, respectively.

In September 2018, the Company entered into a consulting agreement with Marlinspike Group, LLC ("Marlinspike Group") to provide management, business consulting services and business development support. In addition, Marlinspike Group provides the use of its facilities to the Company from time to time. The managing member of Marlinspike Group is the Chair of the Board of Directors of the Company and one of its stockholders. The Company incurred annual expenses related to this agreement totaling $0.2 million for both of the years ended December 31, 2022 and 2021.

In November 2018, the Company entered into a consulting agreement for commercial and marketing consulting services with Red Team Associates, LLC ("Red Team"), an entity controlled by the Executive Vice President of Commercial Strategy of the Company. The Company incurred consulting expense related to this agreement totaling $0.2 million and $0.1 million during the years ended December 31, 2022 and 2021, respectively.

In April 2021, the Company entered into a consulting agreement, as amended in April 2022, with a member of the Board of Directors of the Company for general advice and assistance with the development of its current and future product candidates. As compensation for the consulting services the Company granted the member of the Board of Directors 590,950 stock options that vest over a four-year period. The Company incurred stock-based compensation expense related to this agreement totaling $0.1 million for both of the years ended December 31, 2022 and 2021.

14. Subsequent Events

Termination Agreement

On February 22, 2023, the Company entered into the Termination Agreement with Recordati, pursuant to which, among other things, the Company and Recordati agreed to terminate the Recordati License and Supply Agreement. Pursuant to the Termination Agreement, the Company will reacquire all of the Recordati Rights and has agreed to pay Recordati a one-time upfront payment of €3.0 million and additional payments upon achievement of certain milestones including: (i) an EMA regulatory milestone payment of €2.0 million, (ii) a milestone payment of €5.0 million upon first commercial sale of a Recordati Licensed Product in the Recordati Territory, and (iii) milestone payments of up to €5.0 million in the aggregate from sales of Recordati Licensed Product(s) in the Recordati Territory.

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

As required by Rules 13a-15(b) and 15d-15(b) of the Exchange Act, our management with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022. The term “disclosure controls and procedures” as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2022, our Chief Executive Officer and our Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

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 Rule 13a-15(f) under the Exchange Act. Our management, including our Chief Executive Officer and Chief Financial Officer, conducted an evaluation of the effectiveness of our internal control over financial reporting based on the 2013 framework in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2022.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risks that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting that occurred 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.

Information required by this item and not set forth below will be set forth in the sections headed *Election of Directors* and *Executive Officers* contained in our definitive proxy statement for our 2023 annual meeting of stockholders to be filed with the Securities and Exchange Commission on or before May 1, 2023 (the "Proxy Statement") pursuant to General Instructions G(3) of Form 10-K and is incorporated herein by reference.

We have adopted a Code of Business Conduct and Ethics that applies to all officers, directors and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or person performing similar functions. A current copy of the Code of Business Conduct and Ethics is available on the Corporate Governance section of our website at ir.ars-pharma.com. If we make any substantive amendments to the Code of Business Conduct and Ethics or grants any waiver from a provision of the Code of Business Conduct and Ethics to any executive officer or director that are required to be disclosed pursuant to SEC rules, we will promptly disclose the nature of the amendment or waiver on our website or in a current report on Form 8-K.

Item 11. Executive Compensation.

The information required by this item will be set forth in the section headed Executive and Director Compensation contained in the Proxy Statement and is incorporated herein by reference.

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

Information required by this item will be set forth in the sections headed Security Ownership of Certain Beneficial Owners and Management and E*xecutive and Director Compensation* contained in the Proxy Statement and is incorporated herein by reference.

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

Information required by this item will be set forth in the sections headed *Certain Related-Person Transactions* and *Information Regarding the Board of Directors and Corporate Governance* contained in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services.

Information required by this item will be set forth in the sections headed *Ratification of Selection of Independent Registered Public Accounting Firm* contained in the Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) *Documents filed as part of this report.*

(1) *Financial Statements.* The following financial statements of ARS Pharmaceuticals, Inc., together with the report of Ernst & Young LLP, an independent registered public accounting firm, required to be filed pursuant to Part II, Item 8 of this Annual Report are included on the following pages:

	Page
Report of Independent Registered Public Accounting Firm (PCAOB ID: 42)	**Error! Bookmark not defined.**
Consolidated Balance Sheets	108
Consolidated Statements of Operations and Comprehensive Loss	109
Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)	110
Consolidated Statements of Cash Flows	111
Notes to Financial Statements	112

(2) *Financial Statement Schedules.* None.

(3) *List of exhibits required by Item 601 of Regulation S-K.* See part (b) below.

(b) Exhibits.

Exhibit Number	Description
2.1‡	Agreement and Plan of Merger and Reorganization, dated as of July 21, 2022, by and among Silverback Therapeutics, Inc., Sabre Merger Sub, Inc. and ARS Pharmaceuticals, Inc., as amended by the First Amendment, dated August 11, 2022 and the Second Amendment, dated October 25, 2022 (incorporated by reference to Exhibit 2.1 to the registrant's Current Report on Form 8-K, as amended, filed with the SEC on November 8, 2022).
3.1	Amended and Restated Certificate of Incorporation, as amended.
3.2	Amended and Restated Bylaws (incorporated by reference to Exhibit 3.2 to the registrant's Current Report on Form 8-K, filed with the SEC on December 8, 2020).
4.1	Reference is made to Exhibit 3.1 and 3.2.
4.2	Amended and Restated Investors' Rights Agreement, by and between the registrant and certain of its stockholders, dated September 22, 2020 (incorporated by reference to Exhibit 4.2 to the registrant's Registration Statement on Form S-1 (File No. 333-250009), as amended, filed with the SEC on November 10, 2020).
4.3	Description of Registrant's Common Stock.
4.5	Warrant to purchase stock issued to Silicon Valley Bank, dated as of September 30, 2019, as amended on December 7, 2020 (incorporated by reference to Exhibit 4.1 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.1+	Form of Indemnity Agreement, by and between the registrant and its directors and officers (incorporated by reference to Exhibit 10.1 to the registrant's Registration Statement on Form S-1 (File No. 333-250009), as amended, filed with the SEC on November 10, 2020).
10.2+	ARS Pharmaceuticals, Inc. 2016 Equity Incentive Plan, as amended, and Forms of Option Agreement, Notice of Exercise, Notice of Early Exercise, Restricted Stock Grant Notice and Restricted Stock Award Agreement thereunder (incorporated by reference to Exhibit 10.2 to the registrant's Registration Statement on Form S-1 (File No. 333-250009), as amended, filed with the SEC on November 10, 2020).
10.3+	ARS Pharmaceuticals, Inc. 2020 Equity Incentive Plan, and Forms of Option Grant Notice, Option Agreement and Notice of Exercise thereunder (incorporated by reference to Exhibit 10.3 to the registrant's Registration Statement on Form S-1 (File No. 333-250009), as amended, filed with the SEC on November 30, 2020).

10.4+	Forms of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement under the ARS Pharmaceuticals, Inc. 2020 Equity Incentive Plan (incorporated by reference to Exhibit 10.15 to the Registrant's Annual Report on Form 10-K, filed with the SEC on March 31, 2022).
10.5+	ARS Pharmaceuticals, Inc. 2020 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.4 to the registrant's Registration Statement on Form S-1 (File No. 333-250009), as amended, filed with the SEC on November 30, 2020).
10.6+	ARS Pharmaceuticals, Inc. 2018 Equity Incentive Plan, as amended (incorporated by reference to Exhibit 99.1 to the registrant's Registration Statement on Form S-8 (File No. 333-269262) filed with the SEC on January 17, 2023).
10.7+	Forms of Stock Option Grant Notice, Option Agreement, Notice of Exercise and Early Exercise Stock Purchase Agreement under the ARS Pharmaceuticals, Inc. 2018 Equity Incentive Plan, as amended (incorporated by reference to Exhibit 99.2 to the registrant's Registration Statement on Form S-8 (File No. 333-269262) filed with the SEC on January 17, 2023).
10.8+	ARS Pharmaceuticals Inc. Change in Control and Severance Benefit Plan.
10.9+	Non-Employee Director Compensation Policy, as amended (incorporated by reference to Exhibit 10.1 to the registrant's Quarterly Report on Form 10-Q, filed with the SEC on May 12, 2022).
10.10*‡	Termination Agreement, dated as of February 22, 2023, by and between ARS Pharmaceuticals, Inc. and Recordati Ireland, Ltd.
10.11*‡	License Agreement, dated as of June 18, 2018, by and between ARS Pharmaceuticals, Inc. and Aegis Therapeutics, LLC, as amended by the First Amendment to License Agreement, dated as of July 15, 2020, and the Second Amendment to License Agreement, dated as of January 6, 2021 (incorporated by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.12*‡	Collaboration and License Agreement, dated as of April 30, 2020, by and between ARS Pharmaceuticals, Inc. and Alfresa Pharma Corporation (incorporated by reference to Exhibit 10.2 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.13*‡	Collaboration and Distribution Agreement, dated as of March 1, 2021, by and between ARS Pharmaceuticals, Inc. and Pediatrix Therapeutics (incorporated by reference to Exhibit 10.3 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.14*‡	Manufacturing Agreement, dated as September 9, 2020, by and between ARS Pharmaceuticals, Inc. and Renaissance Lakewood, LLC (incorporated by reference to Exhibit 10.4 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.15+	Executive Employment Agreement, dated as of September 14, 2018, by and between ARS Pharmaceuticals, Inc. and Richard E. Lowenthal (incorporated by reference to Exhibit 10.6 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.16+	Executive Employment Agreement, dated as of February 9, 2022, by and between ARS Pharmaceuticals, Inc. and Kathleen Scott (incorporated by reference to Exhibit 10.7 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.17+	Executive Employment Agreement, dated as of September 14, 2018, by and between ARS Pharmaceuticals, Inc. and Dr. Sarina Tanimoto, as amended by Amendment No. 1 to Executive Employment Agreement, dated as of September 1, 2021 (incorporated by reference to Exhibit 10.8 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.18+	Executive Employment Agreement, as of February 16, 2022, by and between ARS Pharmaceuticals, Inc. and Eric Karas (incorporated by reference to Exhibit 10.9 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.19+	Executive Employment Agreement, dated as of June 1, 2019, by and between ARS Pharmaceuticals, Inc. and Justin Chakma (incorporated by reference to Exhibit 10.10 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.20+	Executive Employment Agreement, by and between the ARS Pharmaceuticals, Inc. and Brian T. Dorsey, effective as of October 1, 2018 (incorporated by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K, filed with the SEC on December 9, 2022).
10.21+	Executive Employment Agreement, by and between ARS Pharmaceuticals, Inc. and Alex Fitzpatrick, effective as of December 1, 2022.
10.22+	Consulting Agreement, dated as of April 26, 2021, by and between ARS Pharmaceuticals, Inc. and Brenton L. Saunders, as amended on April 25, 2022 (incorporated by reference to Exhibit 10.11 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
10.23+	Consulting Agreement, by and between ARS Pharmaceuticals, Inc. and Marlinspike Group, LLC, dated September 14, 2018 (incorporated by reference to Exhibit 10.12 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).

10.24+	Consulting Agreement, by and between ARS Pharmaceuticals, Inc. and Pacific-Link Regulatory Consulting, Inc., dated July 1, 2022 (incorporated by reference to Exhibit 10.13 to the registrant's Current Report on Form 8-K, filed with the SEC on November 8, 2022).
23.1	Consent of Independent Registered Public Accounting Firm.
24.1	Power of Attorney (see signature page).
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Principal Executive and Financial Officers Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	Inline XBRL Instance 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 (embedded within the Inline XBRL document)

+ Indicates management contract or compensatory plan.

‡ Schedules have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The registrant undertakes to furnish supplemental copies of any of the omitted schedules upon request by the SEC.

* Certain information in this exhibit is omitted because it is both not material and is the type that the registrant treats as private or confidential.

Item 16. Form 10-K Summary

None.

SIGNATURES

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

ARS Pharmaceuticals, Inc.

Date: March 23, 2023

By: /s/ Richard Lowenthal, M.S., MBA
Richard Lowenthal, M.S., MBA
President, Chief Executive Officer, and Director

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Richard Lowenthal and Kathy Scott , 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 Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Name	Title	Date
/s/ Richard Lowenthal, M.S., MBA Richard Lowenthal, M.S., MBA	President, Chief Executive Officer, and Director *(Principal Executive Officer)*	March 23, 2023
/s/ Kathy Scott Kathy Scott	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 23, 2023
/s/ Pratik Shah, Ph.D. Pratik Shah, Ph.D.	Chairman of the Board of Directors	March 23, 2023
/s/ Peter Kolchinsky, Ph.D. Peter Kolchinsky, Ph.D.	Director	March 23, 2023
/s/ Rajeev Dadoo, Ph.D. Rajeev Dadoo, Ph.D.	Director	March 23, 2023
/s/ Brenton L. Saunders Brenton L. Saunders	Director	March 23, 2023
/s/ Phillip Schneider Phillip Schneider	Director	March 23, 2023
/s/ Michael Kelly Michael Kelly	Director	March 23, 2023
/s/ Jonathan S. Leff Jonathan S. Leff	Director	March 23, 2023
/s/ Laura Shawver, Ph.D. Laura Shawver, Ph.D.	Director	March 23, 2023
/s/ Peter A. Thompson, M.D. Peter A. Thompson, M.D.	Director	March 23, 2023
/s/ Saqib Islam, J.D. Saqib Islam, J.D.	Director	March 23, 2023