UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

Form 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2023
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: 001-37761

VISTAGEN THERAPEUTICS, INC.

(Exact name of registrant as specified in its charter)

Nevada	**20-5093315**
(State or other jurisdiction of incorporation or organization)	*(I.R.S. Employer Identification No.)*

343 Allerton Avenue
South San Francisco, CA 94080
(Address of principal executive offices including zip code)

(650) 577-3600
(Registrant's telephone number, including area code)

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 $0.001 per share	VTGN	Nasdaq Capital Market

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

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

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

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

As of November 9, 2023, 27,023,038 shares of the registrant's common stock, $0.001 par value, were issued and outstanding.

Vistagen Therapeutics, Inc.
Quarterly Report on Form 10-Q
for the Quarter Ended September 30, 2023
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PART I. FINANCIAL INFORMATION

Item 1. Condensed Consolidated Financial Statements (Unaudited)

VISTAGEN THERAPEUTICS, INC.

CONDENSED CONSOLIDATED BALANCE SHEETS
(Unaudited)
(Amounts in Dollars, except share amounts)

	September 30, 2023	March 31, 2023
	(Unaudited)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 37,608,400	$ 16,637,600
Prepaid expenses and other current assets	1,393,300	802,700
Deferred contract acquisition costs - current portion	74,500	67,100
Total current assets	39,076,200	17,507,400
Property and equipment, net	444,300	507,300
Right-of-use asset - operating lease	2,045,000	2,260,300
Deferred offering costs	362,000	495,700
Deferred contract acquisition costs - non-current portion	167,400	217,600
Security deposits	100,900	100,900
Total assets	$ 42,195,800	$ 21,089,200
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 1,305,000	$ 2,473,100
Accrued expenses	292,600	787,400
Note payable	-	105,300
Deferred revenue - current portion	793,000	714,300
Operating lease obligation - current portion	517,100	485,600
Financing lease obligation - current portion	1,800	1,700
Total current liabilities	2,909,500	4,567,400
Non-current liabilities:		
Deferred revenue - non-current portion	1,780,600	2,314,600
Operating lease obligation - non-current portion	1,854,000	2,119,800
Financing lease obligation - non-current portion	6,500	7,400
Total non-current liabilities	3,641,100	4,441,800
Total liabilities	6,550,600	9,009,200
Commitments and contingencies (Note 9)		
Stockholders' equity:		
Preferred stock, $0.001 par value; 10,000,000 shares authorized at September 30, 2023 and March 31, 2023; no shares outstanding at September 30, 2023 and March 31, 2023	-	-
Common stock, $0.001 par value; 325,000,000 shares authorized at September 30, 2023 and March 31, 2023; 12,016,750 and 7,315,583 shares issued at September 30, 2023 and March 31, 2023, respectively	12,000	7,300
Additional paid-in capital	379,943,800	342,892,500
Treasury stock, at cost, 4,522 shares of common stock held at September 30, 2023 and March 31, 2023	(3,968,100)	(3,968,100)
Accumulated deficit	(340,342,500)	(326,851,700)
Total stockholders' equity	35,645,200	12,080,000
Total liabilities and stockholders' equity	$ 42,195,800	$ 21,089,200

See accompanying notes to Condensed Consolidated Financial Statements, including Note 5, *Capital Stock*, for information on reverse split of common stock effective on June 6, 2023.

VISTAGEN THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(Unaudited)
(Amounts in Dollars, except share amounts)

	Three Months Ended September 30,		Six Months Ended September 30,	
	2023	2022	2023	2022
Revenues:				
Sublicense revenue	$ 277,700	$ (892,500)	$ 455,300	$ (582,500)
Total revenues	277,700	(892,500)	455,300	(582,500)
Operating expenses:				
Research and development	3,850,600	12,894,500	8,047,800	28,185,800
General and administrative	3,207,300	3,702,300	6,185,500	8,494,100
Total operating expenses	7,057,900	16,596,800	14,233,300	36,679,900
Loss from operations	(6,780,200)	(17,489,300)	(13,778,000)	(37,262,400)
Other income, net:				
Interest income, net	192,500	6,100	289,700	8,400
Loss before income taxes	(6,587,700)	(17,483,200)	(13,488,300)	(37,254,000)
Income taxes	-	-	(2,500)	(5,500)
Net loss and comprehensive loss	$ (6,587,700)	$ (17,483,200)	$ (13,490,800)	$ (37,259,500)
Basic and diluted net loss per common share	$ (0.66)	$ (2.54)	$ (1.55)	$ (5.41)
Weighted average common share - basic and diluted	10,042,530	6,893,708	8,717,050	6,890,152

See accompanying notes to Condensed Consolidated Financial Statements, including Note 5, *Capital Stock*, for information on reverse split of common stock effective on June 6, 2023.

VISTAGEN THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)
(Amounts in Dollars)

	Six Months Ended September 30,	
	2023	**2022**
Cash flows from operating activities:		
Net loss	$ (13,490,800)	$ (37,259,500)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	63,000	65,600
Stock-based compensation	1,152,800	1,988,600
Amortization of operating lease right-of-use asset	215,300	196,300
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	288,900	2,431,400
Operating lease liability	(234,300)	(212,000)
Deferred sublicense revenue, net of deferred contract acquisition costs	(412,500)	527,700
Accounts payable and accrued expenses	(1,662,900)	(47,200)
Net cash used in operating activities	(14,080,500)	(32,309,100)
Cash flows from investing activities:		
Purchases of laboratory and other equipment	-	(199,500)
Net cash used in investing activities	-	(199,500)
Cash flows from financing activities:		
Net proceeds from issuance of common stock, including option exercises	-	104,400
Net proceeds (expenses) from sale of common stock under At the Market (ATM) facility, net of deferred offering costs	36,032,600	(89,600)
Net proceeds from sale of common stock under Employee Stock Purchase Plan	4,200	56,100
Repayment of financing lease obligations	(800)	(700)
Repayment of note payable	(984,700)	(409,700)
Net cash provided by (used in) financing activities	35,051,300	(339,500)
Net increase (decrease) in cash and cash equivalents	20,970,800	(32,848,100)
Cash and cash equivalents at beginning of period	16,637,600	68,135,800
Cash and cash equivalents at end of period	$ 37,608,400	$ 35,287,700
Supplemental disclosure of noncash activities:		
Insurance premiums settled by issuing note payable	$ 879,500	$ 1,139,700

See accompanying notes to Condensed Consolidated Financial Statements, including Note 5, *Capital Stock*, for information on reverse split of common stock effective on June 6, 2023.

VISTAGEN THERAPEUTICS, INC.

CONDENSED CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(Unaudited)
(Amounts in Dollars, except share amounts)

	Common Stock		Additional Paid-in	Treasury	Accumulated	Total Stockholders'
	Shares	Amount	Capital	Stock	Deficit	Equity
Balances at March 31, 2022	**6,889,400**	**$ 6,900**	**$ 336,280,500**	**$ (3,968,100)**	**$ (267,604,000)**	**$ 64,715,300**
Share-based compensation expense	-	-	956,900	-	-	956,900
Sale of common stock pursuant to 2019 Employee Stock Purchase Plan	2,500	-	56,100	-	-	56,100
Issuance of common stock upon exercise of options for cash	3,333	-	100,000	-	-	100,000
Net loss for quarter ended June 30, 2022	-	-	-	-	(19,776,300)	(19,776,300)
Balances at June 30, 2022	**6,895,233**	**6,900**	**337,393,500**	**(3,968,100)**	**(287,380,300)**	**46,052,000**
Share-based compensation expense	-	-	1,031,800	-	-	1,031,800
Issuance of common stock upon exercise of options for cash	367	-	4,400	-	-	4,400
Issuance of common stock upon exercise of options (cashless)	3,646	-	-	-	-	-
Net loss for quarter ended September 30, 2022	-	-	-	-	(17,483,200)	(17,483,200)
Balances at September 30, 2022	**6,899,246**	**$ 6,900**	**$ 338,429,700**	**$ (3,968,100)**	**$ (304,863,500)**	**$ 29,605,000**
Balances at March 31, 2023	**7,315,583**	**$ 7,300**	**$ 342,892,500**	**$ (3,968,100)**	**$ (326,851,700)**	**$ 12,080,000**
Share-based compensation expense	-	-	569,100	-	-	569,100
Sale of common stock pursuant to 2019 Employee Stock Purchase Plan	2,672	-	4,200	-	-	4,200
Issuance of common stock upon ATM sales, net of issuance costs	561,418	600	1,098,200	-	-	1,098,800
Net loss for quarter ended June 30, 2023	-	-	-	-	(6,903,100)	(6,903,100)
Balances at June 30, 2023	**7,879,673**	**7,900**	**344,564,000**	**(3,968,100)**	**(333,754,800)**	**6,849,000**
Share-based compensation expense	-	-	583,700	-	-	583,700
Issuance of common stock upon ATM sales, net of issuance costs	4,137,077	4,100	34,796,100	-	-	34,800,200
Net loss for quarter ended September 30, 2023	-	-	-	-	(6,587,700)	(6,587,700)
Balances at September 30, 2023	**12,016,750**	**$ 12,000**	**$ 379,943,800**	**$ (3,968,100)**	**$ (340,342,500)**	**$ 35,645,200**

See accompanying notes to Condensed Consolidated Financial Statements, including Note 5, *Capital Stock*, for information on reverse split of common stock effective on June 6, 2023.

Note 1. Description of Business

Vistagen Therapeutics, Inc., a Nevada corporation (*Vistagen*, the *Company*, *we*, *our*, or *us*), is a clinical-stage biopharmaceutical company aiming to transform the treatment landscape for individuals living with anxiety, depression and other central nervous system (*CNS*) disorders. We are advancing therapeutics with the potential to be faster-acting and with fewer side effects and safety concerns than those currently available. Our pipeline includes six product candidates with clinical-stage experience, including five investigational agents belonging to a new class of drugs known as pherines, in addition to AV-101, an oral prodrug candidate of 7-chloro-kynurenic acid (7-CI-KYNA), which is a potent and selective full antagonist (i.e., inhibitor) of the glycine coagonist site of the N-methyl-D-aspartate receptor (*NMDAR*). Pherines are neuroactive nasal sprays with an innovative mechanism of action (*MOA*). They activate chemosensory neurons in the nasal cavity which selectively modulate key neural circuits in the brain without requiring systemic absorption or direct activity on neurons in the brain. AV-101 inhibits the activity of the ion channel of the NMDAR but does not block it, unlike approved ion channel-blocking NMDAR antagonists which have significant side effects.

Vistagen's goal is to develop and commercialize, on our own and with strategic partners, a broad range of innovative therapies for neuropsychiatric, neurological and neuroendocrine disorders where current treatment options are inadequate to meet the medical needs of and improve the lives of millions of individuals affected by CNS disorders in numerous pharmaceutical markets worldwide.

Recent Developments

October 2023 Public Offering

On October 2, 2023, we entered into an underwriting agreement (the *Underwriting Agreement*) with Jefferies LLC, Stifel, Nicolaus & Company, Incorporated, and William Blair & Company, L.L.C., as the representatives of the underwriters identified therein (the *Underwriters*), in connection with the underwritten offering, issuance and sale by the Company of 15,010,810 shares of our common stock, pre-funded warrants to purchase up to 3,577,240 shares of common stock (the *Pre-Funded Warrants*), warrants to purchase up to 9,294,022 shares of common stock (or pre-funded warrants to purchase up to 9,294,022 shares of common stock in lieu thereof) (the *T1 Warrants*) and warrants to purchase 11,265,086 shares of common stock (or pre-funded warrants to purchase up to 11,265,086 shares of common stock in lieu thereof) (the *T2 Warrants*). The combined offering price for each share of common stock, accompanying T1 Warrant and accompanying T2 Warrant was $5.38. The combined offering price per Pre-Funded Warrant, accompanying T1 Warrant and accompanying T2 Warrant was $5.379. The securities were issued pursuant to the Company's effective shelf registration statement on Form S-3 (File No. 333-254299) (the *S-3 Shelf Registration Statement*) and a related prospectus supplement filed with the Securities and Exchange Commission (the *October 2023 Public Offering*). The October 2023 Public Offering closed on October 4, 2023, at which time we received net proceeds of approximately $93.5 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by the Company. Refer to Note 10, *Subsequent Events*, for additional information regarding the securities offered, issued and sold in connection with the October 2023 Public Offering.

ATM Sales

From July 1, 2023 through September 14, 2023, we sold an aggregate of 4,137,077 shares of common stock under the Open Market Sale Agreement SM (*Sales Agreement*) for the at-the-market offering (*ATM*) program with Jefferies LLC (*Jefferies*) for aggregate net cash proceeds of approximately $35.1 million.

Note 2. Basis of Presentation and Principles of Consolidation

The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (*U.S. GAAP*) applicable to interim periods and, in the opinion of management, include all normal recurring adjustments, necessary to state fairly the results of operations for the reported periods. Our condensed consolidated financial statements have also been prepared on a basis substantially consistent with, and should be read in conjunction with our audited consolidated financial statements for the year ended March 31, 2023, which are included in our Annual Report on Form 10-K (*Annual Report)* which was filed with the Securities and Exchange Commission on June 28, 2023. The year-end condensed consolidated balance sheet was derived from our audited consolidated financial statements but does not include all disclosures required by U.S. GAAP. The results of our operations for any interim periods are not necessarily indicative of the results of our operations for any other interim period or for a full fiscal year.

The accompanying unaudited condensed consolidated financial statements include the accounts of Vistagen and its subsidiaries. All intercompany accounts and transactions have been eliminated.

Our significant accounting policies are described in Note 3 of the Notes to the consolidated financial statements included in our Annual Report. There have been no new accounting policies, including the adoption of new accounting standards during the three and six months ended September 30, 2023, which would materially impact the Company's unaudited condensed consolidated financial statements.

On June 6, 2023, we implemented a stockholder-approved one-for-thirty (1-for-30) reverse split of our common stock (the *Reverse Stock Split*). All share and per share data for all periods presented in the accompanying condensed consolidated financial statements and related disclosures in this Report have been adjusted retrospectively to reflect the Reverse Stock Split. Refer to Note 5, *Capital Stock*, for additional information.

Liquidity

We had cash and cash equivalents of approximately $37.6 million at September 30, 2023 and as noted above, we received net proceeds of approximately $93.5 million from our October 2023 Public Offering, which we believe is sufficient to fund our planned operations for more than twelve months following the issuance of these condensed consolidated financial statements with primary emphasis on continuing to advance our potential U. S. New Drug Application (*NDA*)-enabling PALISADE Phase 3 program for the development of fasedienol for the acute treatment of anxiety in adults with social anxiety disorder (*SAD*) including our PALISADE-3, PALISADE-4 and PALISADE Repeat Dose Study clinical trials, as well as potential Phase 2B clinical development of itruvone for major depressive disorder (*MDD*) and various nonclinical studies of our other pherine candidates. However, as we have not yet developed products that generate recurring revenue and, in the event we successfully complete future clinical and/or nonclinical programs, we will need to obtain and invest substantial additional capital resources to develop and commercialize any of our product candidates. We may satisfy our future cash needs through the sale of equity or debt securities, government grants and research awards, and strategic development and commercialization collaborations involving drug candidates in the pipeline.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the condensed consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Significant estimates include those relating to revenue recognition, share-based compensation, right-of-use assets and lease liabilities and assumptions that have been used historically to value warrants and warrant modifications. Actual results could differ from those estimates. Changes in estimates are reflected in the reported results in the period in which they become known.

Comprehensive Loss

We have no components of other comprehensive loss other than net loss, and accordingly, our comprehensive loss is equivalent to our net loss for the periods presented.

Note 3. Fair Value Measurements

Our financial assets that are measured on a recurring basis at fair value were $25,307,400 and $5,010,800 at September 30, 2023 and March 31, 2023, respectively. These assets are held in money market funds and are classified within Level 1 of the fair value hierarchy. We had no financial liabilities that are measured on a recurring basis at fair value at September 30, 2023 or March 31, 2023.

Note 4. Note Payable

In May 2023, we executed a 7.43% promissory note in the principal amount of $879,500 in connection with certain insurance policy renewal premiums. The note was payable in monthly installments of $100,800, including principal and interest, through February 2024. We paid this note in full in August 2023.

In May 2022, we executed a 3.88% promissory note in the principal amount of $1,139,700 in connection with certain insurance policy premiums. The note was payable in monthly installments of $105,600, including principal and interest, and we paid this note in full in April 2023.

Note 5. Capital Stock

Reverse Split of Common Stock

On June 6, 2023, we implemented the stock-holder approved one-for-thirty (1-for-30) Reverse Stock Split. The Reverse Stock Split reduced the number of shares of our common stock outstanding. Additionally, the number of shares and exercise prices of outstanding options to purchase common stock granted under our stockholder-approved option plans and outstanding warrants to purchase common stock have been adjusted proportionately. Our authorized shares of common stock remain at 325,000,000 and our authorized shares of preferred stock remain at 10,000,000. The par value of each of our common stock and preferred stock remains at $0.001 per share. All share and per share data for all periods presented in the accompanying condensed consolidated financial statements and related disclosures in this Report have been adjusted retrospectively to reflect the Reverse Stock Split.

ATM Agreement

In May 2021, we entered into the Sales Agreement with Jefferies with respect to our Open Market Sale Agreement SM for the ATM program under which we may, in our sole discretion, offer and sell, from time to time, shares of our common stock having an aggregate offering price of up to $75.0 million. During the three and six months ended September 2023, we sold an aggregate of 4,137,077 and 4,698,495 shares, respectively, of our common stock and received net cash proceeds of $35.1 million and $36.2 million, respectively, under the ATM. We did not sell any shares of our common stock under the ATM during Fiscal 2023.

Warrants Outstanding

At September 30, 2023, there were a total of 45,686 warrants outstanding and exercisable, of which 33,334 warrants have an exercise price of $15.00 per share and expire on December 9, 2024, and the remaining 12,352 warrants have an exercise price of $21.90 and expire on July 25, 2025. The weighted average exercise price of the outstanding warrants at September 30, 2023 is $16.87 per share.

In May 2020, we filed a Registration Statement on Form S-3 covering the resale of the shares underlying all of the currently outstanding warrants (the *Warrant Registration Statement*). The SEC declared the Warrant Registration Statement effective on May 13, 2020. No outstanding warrant is subject to any down-round anti-dilution protection feature. All of the outstanding warrants are exercisable by the holders only by payment in cash of the stated exercise price per share.

Subsequent to September 30, 2023, we completed the October 2023 Public Offering pursuant to which we offered and sold 15,010,810 shares of common stock, Pre-Funded Warrants to purchase up to 3,577,240 shares of common stock, T1 Warrants to purchase up to 9,294,022 shares of common stock (or pre-funded warrants to purchase up to 9,294,022 shares of common stock in lieu thereof) and T2 warrants to purchase 11,265,086 shares of common stock (or pre-funded warrants to purchase up to 11,265,086 shares of common stock in lieu thereof). Refer to Note 10, *Subsequent Events*, for additional information regarding the securities offered, issued and sold in connection with the October 2023 Public Offering.

Stock-Based Compensation

The table below summarizes stock-based compensation expense included in operating expenses:

	Three Months Ended September 30,		Six Months Ended September 30,	
	2023	2022	2023	2022
Research and development expense	$ 304,600	$ 466,100	$ 614,100	$ 795,800
General and administrative expense	279,100	565,700	538,700	1,192,900
Total stock-based compensation expense	$ 583,700	$ 1,031,800	$ 1,152,800	$ 1,988,700

Note 6. Loss per Common Share

Basic net loss attributable to common stockholders per share of common stock excludes the effect of dilution and is generally computed by dividing net loss by the weighted-average number of shares of common stock outstanding for the period. Diluted net loss attributable to common stockholders per share of common stock reflects the potential dilution that could occur if securities or other contracts to issue shares of common stock were exercised or converted into shares of common stock.

As a result of our net loss for the three and six months presented, potentially dilutive securities were excluded from the computation of diluted net loss per share, as their effect would be antidilutive. Potentially dilutive securities excluded in determining diluted net loss per share at September 30, 2023 and 2022 are as follows:

	At September 30, 2023	At September 30, 2022
Outstanding options under the Company's Amended and Restated 2016 (formerly 2008) Stock Incentive Plan and 2019 Omnibus Equity Incentive Plan	724,554	664,511
Outstanding warrants to purchase common stock	45,686	309,195
Total	770,240	973,706

Note 7. Sublicensing and Collaborative Agreements

We recognized sublicense revenue of $277,700 and $455,300 for the three and six months ended September 30, 2023, respectively, and ($892,500) and ($582,500) for the three and six months ended September 30, 2022, respectively.

The following table presents the balances of our contract assets and liabilities related to our sublicensing agreement:

	Balance at September 30, 2023	Balance at March 31, 2023
Contract assets included in "Deferred contract acquisition costs"	$ 241,900	$ 284,700
Contract liabilities included in "Deferred revenue"	2,573,600	3,028,900

AffaMed

In June 2020, we entered into a license and collaboration agreement (the *AffaMed Agreement*) with EverInsight Therapeutics Inc., a company incorporated under the laws of the British Virgin Islands, now AffaMed Therapeutics, Inc. (*AffaMed*), pursuant to which we granted AffaMed an exclusive license to develop and commercialize fasedienol for SAD and other anxiety-related disorders in Greater China, South Korea and Southeast Asia (which includes Indonesia, Malaysia, Philippines, Thailand and Vietnam) (collectively, the *Territory*). We retain exclusive development and commercialization rights for fasedienol in the U.S. and throughout the rest of the world.

Under the terms of the AffaMed Agreement, AffaMed paid to us a non-refundable upfront license payment of $5.0 million in August 2020. Additionally, upon successful development and commercialization of fasedienol in the Territory, we are eligible to receive milestone payments of up to $172.0 million. Further, we are eligible to receive royalty payments on a country-by-country basis on net sales for the later of ten years or the expiration of market or regulatory exclusivity in the jurisdiction, except that payments will be reduced on a country-by-country basis in the event that there is no market exclusivity in the period. Royalty payments may also be reduced if there is generic competitive product in the period.

We have determined that we have one combined performance obligation for the license to develop and commercialize fasedienol in the Territory and related development and regulatory services. In addition, AffaMed has an option that will create manufacturing obligations for us during development upon exercise by AffaMed. This option for manufacturing services was evaluated and determined not to include a material right.

Development and commercialization milestones were not considered probable at inception and therefore were excluded from the initial transaction price. The royalties were excluded from the initial transaction price because they relate to a license of intellectual property and are subject to the royalty constraint.

We recognize revenue as the combined performance obligation is satisfied over time using an output method. The measure of progress is stand-ready straight-line over the period in which we expect to perform the services related to the license of fasedienol. Accordingly, we recognize revenue on a straight-line basis over the period in which we expect to perform the services.

Significant management judgment is required to determine the level of effort attributable to the performance obligation included in the AffaMed Agreement and the period over which we expect to complete our performance obligation. The performance period or measure of progress is estimated at the inception of the arrangement and re-evaluated in subsequent reporting periods. This re-evaluation may shorten or lengthen the period over which we recognize revenue. At September 30, 2022, we extended the date in our estimate to complete the performance obligation. As a result of the change in our estimate of the time required to complete our performance obligation, we recorded a cumulative catch-up adjustment at September 30, 2022 resulting in derecognition of $892,500 of previously recognized revenue.

Unless earlier terminated due to certain material breaches of the contract, or otherwise, the AffaMed Agreement will expire on a jurisdiction-by-jurisdiction basis until the latest to occur of expiration of the last valid claim under a licensed patent of fasedienol in such jurisdiction, the expiration of regulatory exclusivity in such jurisdiction or ten years after the first commercial sale of fasedienol in such jurisdiction.

Fuji Pharma

On September 1, 2023, we entered into an Exclusive Negotiation Agreement (the *Negotiation Agreement*) with Fuji Pharma Co., Ltd. (*Fuji Pharma*), a Tokyo Stock Exchange listed, Japan-based pharmaceutical company. Pursuant to the terms and conditions of the Negotiation Agreement, we agreed, for a limited period of time (described below), to negotiate exclusively with Fuji Pharma a potential license to develop and commercialize PH80 product candidate in Japan, including for the acute treatment of moderate to severe vasomotor symptoms (hot flashes) due to menopause and potentially other indications. The Negotiation Agreement provides for a term of the later to occur of (i) fourteen (14) months beginning on the date of receipt of the Purchase Price (defined below) by the Company or (ii) ninety (90) days from the date that the U.S. Food and Drug Administration accepts an Investigational New Drug application for PH80 for the treatment of vasomotor symptoms (hot flashes) due to menopause (*Exclusive Negotiation Period*).

As consideration for the Exclusive Negotiation Period provided by the Company to Fuji Pharma under the Negotiation Agreement, Fuji Pharma agreed to make a payment of $1.5 million (*Purchase Price*), payable upon selection of a contract development and manufacturing organization (*CDMO*), which occurred in October 2023. We received the Purchase Price in full in November 2023. The Purchase Price is not refundable, except upon a material breach of the Negotiation Agreement by the Company. Should the Company and Fuji Pharma enter into a definitive license agreement during the Exclusive Negotiation Period for the development and commercialization of PH80 in Japan (a *Potential Definitive Agreement*), the Purchase Price will be credited against the fee paid by Fuji Pharma to the Company in connection with the execution of such agreement. Neither the Company nor Fuji Pharma is obligated to enter into the Potential Definitive Agreement, and if the Company and Fuji Pharma have not entered into the Potential Definitive Agreement on or before the end of the Exclusive Negotiation Period, either the Company or Fuji Pharma may terminate any further negotiations.

Note 8. Related Party Transactions

In August 2023, we entered into a consulting agreement with our former Chief Financial Officer, Jerrold D. Dotson, to assist in transition matters related to the employment of our new Chief Financial Officer. Pursuant to the agreement, Mr. Dotson received an initial payment of $100,000 and $10,000 per month from September 2023 through August 2024. We recorded expense of $110,000 for the three and six months ended September 30, 2023.

During the fourth quarter of Fiscal 2022, we entered into a consulting agreement with FitzPatrick Co. LLC, a consulting firm for which Margaret FitzPatrick, an independent member of our Board, is Chief Executive Officer, to provide corporate development and public relations advisory services. The consulting agreement, as amended, was set to expire on December 31, 2023. However, the Company and FitzPatrick Co. LLC mutually agreed to conclude the term of the agreement effective October 1, 2023, as all matters set forth in the statement of work were completed as of that date. We recorded expense of $30,000 and $60,000 for the three and six months ended September 30, 2023, respectively, as compared to $45,000 and $90,000 for the three and six months ended September 30, 2022, respectively.

On November 11, 2022, Ann Cunningham resigned as our Chief Commercial Officer, but remains a member of our Board. Following Ms. Cunningham's resignation as Chief Commercial Officer, i3 Strategy Partners, a consulting firm for which Ms. Cunningham is the Managing Partner, began providing certain advisory services to us pursuant to a consulting agreement. The initial term of the consulting agreement will end on March 31, 2024, and, pursuant to the agreement, i3 Strategy Partners received a fee of $120,000 for the period from the effective date of the agreement through March 31, 2023. During the three and six months ended September 30, 2023, we recorded expense of $30,000 and $60,000, respectively.

Note 9. Commitments and Contingencies

From time to time, we may be a party to litigation, arbitration or other legal proceedings in the course of our business. The outcome of any such legal proceedings, regardless of the merits, is inherently uncertain. In addition, litigation and related matters are costly and may divert the attention of our management and other resources that would otherwise be engaged in other activities. If we were unable to prevail in any such legal proceedings, our business, results of operations, liquidity and financial condition could be adversely affected.

Note 10. Subsequent Events

On October 2, 2023, the Company entered into the Underwriting Agreement with the Underwriters, in connection with the underwritten offering, issuance and sale by of 15,010,810 shares of the Company's common stock, Pre-Funded Warrants to purchase up to 3,577,240 shares of common stock, T1 warrants to purchase up to 9,294,022 shares of common stock (or pre-funded warrants to purchase up to 9,294,022 shares of common stock in lieu thereof) and T2 warrants to purchase 11,265,086 shares of common stock (or pre-funded warrants to purchase up to 11,265,086 shares of common stock in lieu thereof). The combined offering price for each share of common stock, accompanying T1 Warrant and accompanying T2 Warrant was $5.38. The combined offering price per Pre-Funded Warrant, accompanying T1 Warrant and accompanying T2 Warrant was $5.379. The securities were issued pursuant to the Company's effective shelf registration statement on Form S-3 (File No. 333-254299) and a related prospectus supplement filed with the Securities and Exchange Commission. The October 2023 Public Offering closed on October 4, 2023.

Each Pre-Funded Warrant has an exercise price per share of common stock equal to $0.001 per share, subject to certain adjustments. The Pre-Funded Warrants are exercisable at any time after October 4, 2023 and will not expire. Under the Pre-Funded Warrants, the Company may not effect the exercise of any Pre-Funded Warrant, and a holder will not be entitled to exercise any portion of any Pre-Funded Warrant, which, upon giving effect to such exercise, would cause the aggregate number of shares of common stock beneficially owned by the holder of the Pre-Funded Warrant (together with its affiliates) to exceed 9.99% of the number of shares of common stock outstanding immediately after giving effect to the exercise. However, any holder may increase or decrease such percentage to any other percentage (but not in excess of 19.99% if exceeding such percentage would result in a change of control under Nasdaq Listing Rule 5636(b) or any successor rule) upon at least 61 days' prior notice from the holder to the Company subject to the terms of the Pre-Funded Warrant. At the holder's sole discretion, the Pre-Funded Warrants may be exercised through a cashless exercise.

Each T1 Warrant has an exercise price per share of common stock or pre-funded warrant equal to $5.38, subject to certain adjustments. The T1 Warrants are exercisable at any time on or after October 4, 2023 and will expire 60 days after the later of (i) the date on which the Company first publicly discloses, whether by press release or Form 8-K filing, the top-line data for its PALISADE-3 Phase 3 clinical trial of fasedienol for the acute treatment of anxiety in adults with SAD and (ii) the date on which the Company first publicly discloses, whether by press release or Form 8-K filing, the top-line data for its PALISADE-4 Phase 3 clinical trial of fasedienol for the acute treatment of anxiety in adults with SAD. However, under the T1 Warrant, the Company may not effect the exercise of any T1 Warrant, and a holder will not be entitled to exercise any portion of any T1 Warrant, which, upon giving effect to such exercise, would cause the aggregate number of shares of common stock beneficially owned by the holder of the T1 Warrant (together with its affiliates) to exceed 9.99% of the number of shares of the common stock outstanding immediately after giving effect to the exercise. However, any holder may increase or decrease such percentage to any other percentage (but not in excess of 19.99% if exceeding such percentage would result in a change of control under Nasdaq Listing Rule 5636(b) or any successor rule) upon at least 61 days' prior notice from the holder to the Company subject to the terms of the T1 Warrant. Generally, the T1 Warrants may only be exercised through a cash exercise, however, the holder may elect to exercise the T1 Warrant through a cashless exercise if, and only if, at the time of exercise hereof there is no effective registration statement registering, or the prospectus contained therein is not available for, the issuance of common stock or pre-funded warrants to the holder.

Each T2 Warrant has an exercise price per share of common stock or pre-funded warrant equal to $8.877, subject to certain adjustments. The T2 Warrants are exercisable at any time on or after October 4, 2023 and will expire on October 4, 2028. Under the T2 Warrant, the Company may not effect the exercise of any T2 Warrant, and a holder will not be entitled to exercise any portion of any T2 Warrant, which, upon giving effect to such exercise, would cause the aggregate number of shares of common stock beneficially owned by the holder of the T2 Warrant (together with its affiliates) to exceed 9.99% of the number of shares of common stock outstanding immediately after giving effect to the exercise. However, any holder may increase or decrease such percentage to any other percentage (but not in excess of 19.99% if exceeding such percentage would result in a change of control under Nasdaq Listing Rule 5636(b) or any successor rule) upon at least 61 days' prior notice from the holder to the Company subject to the terms of the T2 Warrant. The holder may, in its sole discretion, elect to exercise the T2 Warrant through a cashless exercise or exercise the T2 Warrant for cash.

The Company received approximately $93.5 million of net proceeds from the October 2023 Public Offering, after deducting underwriting discounts and commissions and estimated offering expenses payable by the Company.

Item 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Cautionary Note Regarding Forward-Looking Statements

This Quarterly Report on Form 10-Q (Report) includes forward-looking statements. All statements contained in this Report other than statements of historical fact, including statements regarding our future outcomes and results of operations and financial position, our business strategy and plans, and our objectives for future operations, are forward-looking statements. The words "believe," "may," "estimate," "continue," "anticipate," "intend," "expect" and similar expressions are intended to identify forward-looking statements. We have based these forward-looking statements largely on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, business strategy, short-term and long-term business operations and objectives and financial needs. These forward-looking statements are subject to a number of risks, uncertainties and assumptions. Our business is subject to significant risks including, but not limited to, our ability to obtain substantial additional financing, the results of our research and development efforts, the results of nonclinical and clinical testing, the effect of regulation by the U.S. Food and Drug Administration (FDA) and other domestic and foreign regulatory agencies, our ability to obtain, maintain and enforce patents on our products once approved for marketing, the impact of competitive products, product development, commercialization and technological difficulties, the effect of our accounting policies, and other risks as detailed in the section entitled "Risk Factors" in this Report. Further, even if our product candidates appear promising at various stages of development, our share price may decrease such that we are unable to raise additional capital without significant dilution or other terms that may be unacceptable to our management, and Board of Directors (Board) or disadvantageous to our stockholders.

Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management or Board to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties and assumptions, the future events and trends discussed in this Report may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

Accordingly, you should not rely upon forward-looking statements as predictions of future events. The events and circumstances reflected in the forward-looking statements may not be achieved or occur. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. We are under no duty to update any of these forward-looking statements after the date of this Report or to conform these statements to actual results or revised expectations. If we do update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect to those or other forward-looking statements.

Business Overview

We are a clinical-stage biopharmaceutical company aiming to transform the treatment landscape for individuals living with anxiety, depression and other central nervous system (*CNS*) disorders. We are advancing therapeutics with the potential to be faster-acting and with fewer side effects and safety concerns than those currently available. Our pipeline includes six product candidates with clinical-stage experience, including five investigational agents belonging to a new class of drugs known as pherines, in addition to AV-101, an oral prodrug candidate of 7-chloro-kynurenic acid (7-CI-KYNA), which is a potent and selective full antagonist (i.e., inhibitor) of the glycine coagonist site of the N-methyl-D-aspartate receptor (*NMDAR*). Pherines are neuroactive nasal sprays with an innovative mechanism of action (*MOA*). They activate chemosensory neurons in the nasal cavity which selectively modulate key neural circuits in the brain without requiring systemic absorption or direct activity on neurons in the brain. AV-101 inhibits the activity of the ion channel of the NMDAR but does not block it, unlike approved ion channel-blocking NMDAR antagonists which have significant side effects.

Our goal is to develop and commercialize, on our own and with strategic partners, a broad range of innovative therapies for neuropsychiatric, neurological and neuroendocrine disorders where current treatment options are inadequate to meet the medical needs of and improve the lives of millions of individuals affected by CNS disorders in numerous pharmaceutical markets worldwide.

Our Product Candidates

Pherine Product Candidates

Five of our product candidates – fasedienol (PH94B), ituruvone (PH10), PH15, PH80 and PH284 – belong to a new class of drug candidates referred to as pherines. Pherines are odorless and tasteless neuroactive nasal sprays with innovative proposed mechanisms of action that are differentiated from current standard of care. When administered in low microgram level doses to selectively engage chemosensory neurons in the nasal cavity, pherines induce rapid-onset pharmacological and behavioral benefits without requiring systemic absorption or direct activity on neurons in the brain. Specifically, each of our pherine product candidates is a distinct chemical entity that selectively modulates, directly or indirectly, particular areas of the brain, such as the limbic amygdala, hypothalamus, hippocampus, locus ceruleus, and/or prefrontal cortex, which we believe are involved with the pathophysiology of multiple different CNS disorders. We believe each of our pherine product candidates has the potential to be a differentiated therapy for one or more CNS disorders, including social anxiety disorder (fasedienol), major depressive disorder (itruvone), cognitive impairment caused by mental fatigue (PH15), vasomotor syndrome (hot flashes) due to menopause, premenstrual dysphoric disorder and migraine headaches (PH80) and wasting syndrome and appetite stimulation (cachexia) (PH284), all without requiring apparent systemic absorption, binding to classic abuse liability receptors or other neurons in the brain or steroidal hormone receptors.

Fasedienol Nasal Spray for Social Anxiety Disorder (SAD)

Fasedienol (PH94B) is a synthetic investigational pherine nasal spray from the androstane family in Phase 3 clinical development for the acute treatment of anxiety for adults with SAD. When administered intranasally in microgram doses, fasedienol activates receptors of peripheral nasal chemosensory neurons connected to subsets of neurons in the olfactory bulbs that, in turn, connect to neurons in the limbic amygdala involved in the pathophysiology of SAD, and potentially other anxiety and mood disorders. Fasedienol is pharmacologically active without requiring apparent systemic absorption or direct activity on neurons in the brain to achieve its rapid-onset and short duration of anxiolytic effects. We believe fasedienol has the potential to achieve these effects with significantly reduced risks of side effects and other safety concerns, such as potential drug-drug interactions, abuse, misuse and addiction, associated with certain other systemic pharmaceuticals that act directly on neurons in the brain and are sometimes prescribed for anxiety disorders.

The U.S. Food and Drug Administration (the *FDA*) has granted Fast Track designation for the development of fasedienol as a potential treatment for SAD.

Fasedienol PALISADE Phase 3 Program

Given how fasedienol's rapid-onset MOA is differentiated from all FDA-approved anxiety drugs, our primary target indication for fasedienol is the acute treatment of anxiety in adults with SAD. Currently, there is no FDA-approved drug therapy for the acute treatment of SAD. For that acute indication, we have aligned with the FDA that the Subjective Units of Distress Scale (*SUDS*) is an appropriate primary efficacy endpoint because it provides a measure of anxiety on a minute-by-minute basis immediately related to the specific stressor. We believe utilizing a simulated anxiety-provoking public speaking challenge study design provides the most appropriate and efficient path for the clinical development of fasedienol's potential to become the first FDA-approved acute treatment of anxiety for adult patients with SAD. Our PALISADE Phase 3 Program currently includes four randomized, double-blind, placebo-controlled, Phase 3 clinical studies designed to evaluate the efficacy, safety, and tolerability of a single dose of fasedienol to relieve anxiety symptoms in adult patients with SAD during a simulated, anxiety-provoking public speaking challenge in a clinical setting, as measured using the patient-reported SUDS, two of which Phase 3 studies (*PALISADE-1 and PALISADE-2*) were previously concluded and two of which Phase 3 studies (*PALISADE-3 and PALISADE-4*) will be initiated in 2024, each with open-label extension. Our PALISADE Phase 3 Program also includes an open-label safety study concluded in 2022 (*PALISADE OLS)*, a repeat dose study to be initiated in 2024 (*PALISADE Repeat Dose Study*), and a human factor study planned to be initiated in 2025.

PALISADE-1. In May 2021, we initiated PALISADE-1, which was designed to evaluate the efficacy, safety, and tolerability of the acute administration of fasedienol to relieve anxiety symptoms in adult patients with SAD during a simulated anxiety-provoking public speaking challenge, as measured using the patient-reported SUDS. Enrolled patients had a diagnosis of SAD and demonstrated marked social anxiety at enrollment, as evidenced by a baseline score on the Liebowitz Social Anxiety Scale (*LSAS*) of at least 70. We announced top-line results from PALISADE-1 in July 2022. Although the safety and tolerability of fasedienol during PALISADE-1 was favorable and consistent with results from previously reported clinical trials, PALISADE-1 did not achieve its primary efficacy endpoint, as measured by change from baseline using the SUDS as compared to placebo. We believe the unexpected outcome in PALISADE-1, which was inconsistent with positive placebo-controlled Phase 2 studies and the statistically significant results of our PALISADE-2 Phase 3 clinical trial discussed below, may have been due to the extraordinary multifaceted impact of the acute phase of the COVID-19 pandemic, which introduced into the typical study dynamic significant and unprecedented logistical challenges and systemic variability.

PALISADE-2. In October 2021, near the end of the acute phase of the COVID-19 pandemic, we initiated PALISADE-2. Like PALISADE-1, PALISADE-2 was a U.S. multi-center, randomized, double-blind, placebo-controlled, Phase 3 clinical study designed to evaluate the efficacy, safety, and tolerability of the acute administration of fasedienol to relieve anxiety symptoms in adult patients with SAD during a simulated anxiety-provoking public speaking challenge, as measured using the patient-reported SUDS. Enrolled patients had a diagnosis of SAD and demonstrated marked social anxiety at enrollment, as evidenced by a baseline score on the LSAS of at least 70. After receiving top-line results from PALISADE-1 in July 2022, we paused ongoing recruitment and enrollment in PALISADE-2 to enable independent third-party biostatisticians to conduct an interim analysis of available data from the 141 subjects who were randomized up to the date it was paused. In September 2022, the independent third-party biostatisticians who conducted the interim analysis recommended that we continue PALISADE-2 as originally planned, without revealing to us any of the underlying data they had reviewed. However, for business reasons, we elected to extend our pause of PALISADE-2 pending our assessment of the then impending top-line results of the PALISADE OLS, the results of two SAD public speaking challenge studies, each with SUDS as the primary efficacy endpoint, being conducted by two peer companies, discussions with the FDA regarding the continuing acceptability of the LSAS as a primary efficacy endpoint in Phase 3 studies for the treatment of SAD, as well as a comprehensive assessment of the expense, time, statistical and regulatory implications and logistical challenges associated with resuming PALISADE-2. Following positive results from our PALISADE OLS, after learning that the two SAD public speaking challenge studies conducted by peer companies did not meet their primary efficacy endpoint as measured by the SUDS, and after positive discussions with the FDA in early 2023 regarding the continuing validity and reliability of the LSAS as a primary efficacy endpoint, for business reasons, we closed PALISADE-2 with 141 completed subjects rather than resume the study.

In early August 2023, we received and reported positive topline results from PALISADE-2 based on the 141 subjects who completed the trial. Our PALISADE-2 Phase 3 trial met its primary efficacy endpoint, the difference in mean SUDS scores during the public speaking challenge at baseline (Visit 2) and treatment (Visit 3) for subjects treated with fasedienol versus placebo at Visit 3. Fasedienol-treated patients demonstrated a greater mean change from baseline (least-squares (*LS*) mean = -13.8) compared to placebo (LS mean = -8.0), for a statistically significant, and we believe clinically relevant, difference between groups of -5.8 (p=0.015). The trial also met its secondary endpoint, demonstrating a statistically significant difference in the proportion of clinician-assessed responders between fasedienol and placebo as measured by the CGI-I. Responders were identified as those who were rated 'very much less anxious' or 'much less anxious' and 37.7% of fasedienol-treated patients were rated as responders, as compared to 21.4% of those treated with placebo (p=0.033). The trial also met the important exploratory endpoint of the difference in the proportion of patient-assessed responders between fasedienol and placebo as measured by the PGI-C. Responders were identified as those who self-rated 'very much less anxious' or 'much less anxious' and 40.6% of fasedienol-treated patients were rated as responders, as compared to 18.6% of those treated with placebo (p=0.003). In addition, our PALISADE-2 trial also met the exploratory endpoint of the difference in the proportion of patients in each treatment group with a 20-point or greater improvement in patient-assessed SUDS score from baseline (Visit 2) to treatment (Visit 3). Of the fasedienol-treated patients, 35.7% demonstrated this statistically significant and clinically meaningful improvement in SUDS score, as compared to 18.6% in the placebo-treated group (p=0.020). Fasedienol was observed to be well-tolerated with no serious adverse events, and the adverse event (*AE*) profiles were comparable between fasedienol and placebo. Overall, no TEAEs, except for pyrexia in the placebo group (2.49%), was more prevalent than 2.0%.

PALISADE Open-Label Study. The PALISADE OLS was a large Phase 3, open-label safety trial conducted in a real-world setting and designed to evaluate the long-term safety and tolerability of multiple, patient-tailored administrations, of fasedienol in adults with SAD when they experienced social and performance stressors in their daily lives. Long-term administration of 3.2 µg of fasedienol, as-needed, up to four times per day, was generally safe and well-tolerated, with no new safety findings or trends identified, regardless of the number of doses administered by each subject (safety population: n=481). Headache was the most common treatment-emergent adverse event (*TEAE*) (17.0%; 8.7% drug-related); no other TEAE occurred in more than 5.0% of subjects, except for COVID-19 TEAEs (11.4%), which were not considered related to fasedienol. Over 30,000 doses of fasedienol were administered by patients during this study.

PALISADE-3 and PALISADE-4. To complement the positive topline results from PALISADE-2, we are preparing to launch two similar Phase 3 clinical trials in 2024, PALISADE-3 in the first half of 2024 and PALISADE-4 in the second half of 2024. Like PALISADE-2, both PALISADE-3 and PALISADE-4 will be multi-center, randomized, double-blind, placebo-controlled, Phase 3 clinical trials designed to evaluate the efficacy, safety, and tolerability of the acute administration of fasedienol to relieve anxiety symptoms in adult patients with SAD after a single dose of fasedienol during a simulated, anxiety-provoking public speaking challenge in a clinical setting, as measured using the patient-reported SUDS as the primary efficacy endpoint. Also, both PALISADE-3 and PALISADE-4 will have an open-label extension for a period of up to 12-months. If successful, we believe either PALISADE-3 or PALISADE-4, together with PALISADE-2, may establish substantial evidence of effectiveness of fasedienol in support of a potential fasedienol NDA submission for the acute treatment of anxiety in adults with SAD with the FDA in the first half of 2026.

PALISADE Repeat Dose Study. We are also planning to initiate a PALISADE repeat dose clinical trial (*PALISADE Repeat Dose Study*) in the second half of 2024. PALISADE Repeat Dose Study will be a multi-center, randomized, double-blind, placebo-controlled, clinical trial designed to evaluate repeated dosing of fasedienol in adult patients with SAD during a single simulated, anxiety-provoking public speaking challenge in a clinical setting. The PALISADE Repeat Dose Study trial will consist of three different dosing arms, with an open-label extension for a period of up to 12-months.

As a potential future expansion of our PALISADE Phase 3 program for fasedienol in SAD, we may conduct additional clinical trials of fasedienol in adult and/or pediatric populations in a real-world setting over a multiple week period, with the LSAS for adult subjects or the LSAS-CA, which is the version of the LSAS we believe is suitable for use with subjects who are children or adolescents, as the primary efficacy endpoint. If conducted, these studies will be part of our potential future FEARLESS program for fasedienol and will be designed to build on results from a previous randomized, double-blind, placebo-controlled, Phase 2 real-world crossover study of fasedienol in SAD and exploratory efficacy observations measured by the LSAS in a large cohort of subjects in our PALISADE OLS.

Initiation of all planned clinical trials of fasedienol remains subject to FDA feedback of our proposed study designs.

Itruvone Nasal Spray for Major Depressive Disorder

Itruvone (PH10) is an odorless, tasteless synthetic investigational neuroactive pherine nasal spray from the pregnane family with an innovative potential MOA that is fundamentally differentiated from the MOA of all currently approved treatments for depression disorders. Itruvone neuroactive nasal spray is administered at microgram-level doses and is designed to engage and activate chemosensory neurons in the nasal cavity, which are connected to neural circuits in the brain that produce antidepressant effects. Unlike all currently approved oral antidepressants (*ADs*) and rapid-onset ketamine-based therapy, we believe itruvone does not require systemic absorption or direct activity on neurons in the brain to produce antidepressant effects without the side effects and safety concerns that may be associated with current antidepressants therapies.

In June 2023, we completed a small U.S. single-center, randomized, double-blinded, placebo-controlled Phase 1 clinical trial to investigate the safety and tolerability of itruvone in healthy adult subjects. The trial was designed to confirm the favorable safety profile of itruvone established in three previous clinical trials conducted in Mexico, including a positive randomized, double-blind, placebo-controlled Phase 2A study of itruvone in MDD, and facilitate potential Phase 2B clinical development of itruvone, in the U.S., by us or by a strategic development and commercialization partner, as a fast-acting monotherapy for MDD. Positive data from this Phase 1 trial demonstrated that there were no reported treatment-related serious adverse events (*SAEs*) or discontinuations due to adverse events in the trial. Overall, itruvone was well-tolerated and continued to demonstrate a favorable safety profile.

The FDA has granted Fast Track designation for the development of itruvone as a potential treatment for MDD.

PH80 Nasal Spray for Women's Health Disorders and Migraine

PH80 is an odorless, tasteless synthetic investigational pherine nasal spray with a novel, rapid-onset potential MOA that is fundamentally differentiated from the MOA of all currently approved treatments for vasomotor symptoms (hot flashes) due to menopause, premenstrual dysphoric disorder (*PMDD*), and other women's health disorders and migraine headaches. PH80 activates chemosensory neurons in the nasal cavity connected to neural circuits that modulate the basal forebrain associated with the control of body temperature. Positive results from a previously unpublished exploratory randomized, double-blind, placebo-controlled Phase 2A study of PH80 for the acute treatment of vasomotor symptoms (hot flashes) due to menopause. The Phase 2A study demonstrated a statistically significant reduction in the daily number of menopausal hot flashes compared to placebo at the end of the first week of treatment ($p<.001$), and the improvement was maintained through each treatment week until the end of the four-week treatment period. We are preparing to conduct studies necessary to submit a U.S. IND for Phase 2B clinical development of PH80 in the U.S. for the treatment of patients with moderate to severe vasomotor symptoms (hot flashes) due to menopause.

We recently reported positive results from a previously unreported randomized, double-blind, placebo-controlled Phase 2A clinical study of PH80 in an exploratory Phase 2A study for acute management of the symptoms of PMDD, including negative mood and physical and behavioral symptoms, in subjects with a regular menstrual cycle and at least a one-year history of PMDD. This Phase 2A study demonstrated a statistically significant improvement versus placebo in acute management of the symptoms of PMDD, including negative mood and physical and behavioral symptoms. The initial study visit occurred after the onset of symptoms. All subjects were administered placebo nasal spray and those who showed no symptom improvement were eligible to return for the second visit, which occurred after the onset of symptoms during the next menstrual cycle. At the second study visit, subjects were randomized to receive a single dose of 0.9 µg PH80 nasal spray or placebo in the clinic. PH80 demonstrated statistically and clinically significant improvement versus placebo in symptoms of PMDD using the subject-rated Penn Daily Symptom Report (*DSR*) as early as day four and continuing to day six. PH80 was well-tolerated with no SAEs. The most common SAE was headache, reported by 17% in the placebo group and 7% in the PH80 group. No other treatment-emergent SAE occurred more than once per subject.

In addition, PH80 initiates neural impulses in the olfactory bulb transmitted by pathways that affect the function of multiple structures in the brain, including the amygdala and hypothalamus, that have been linked to the pathology of migraine.

PH15 Nasal Spray for Cognitive and Psychomotor Performance and Improvement

PH15 is an odorless, tasteless synthetic investigational pherine nasal spray with a novel, rapid-onset potential MOA that is fundamentally differentiated from the MOA of all currently approved treatments to improve cognitive impairment caused by mental fatigue and potentially other disorders. We believe intranasal PH15 has the potential to improve cognitive and psychomotor performance and improvement of reaction time in individuals with mental fatigue. We are currently evaluating the path forward for PH15, including an assessment of studies we believe will be necessary to submit a U.S. IND for further Phase 2 clinical development of PH15 in the U.S., on our own or with collaborators, including the appropriate indication for demonstrating improvement of cognitive function.

PH284 Nasal Spray for Cachexia

PH284 is an odorless, tasteless synthetic investigational pherine nasal spray with a novel, rapid-onset potential MOA that is fundamentally differentiated from the MOA of all currently approved treatments for the loss of appetite associated with chronic disorders such as cancer. Cachexia is a serious but under-recognized consequence of many chronic diseases with body mass loss of >10% and a prevalence of 5 to 15 %. We believe PH284 may have therapeutic potential for improving subjective feelings of hunger in patients with cachexia. We are currently evaluating the path forward for PH284, including planning for studies we believe will be necessary to submit a U.S. IND for further Phase 2 clinical development of PH15 for the treatment of cachexia, on our own or with collaborators, including the appropriate patient populations for demonstrating an increase in appetite and weight gain.

Initiation of all planned clinical trials of fasedienol remains subject to FDA feedback of our proposed study designs.

Recent Developments

October 2023 Public Offering

On October 2, 2023, we entered into an underwriting agreement (the *Underwriting Agreement*) with Jefferies LLC, Stifel, Nicolaus & Company, Incorporated, and William Blair & Company, L.L.C., as the representatives of the underwriters identified therein (the *Underwriters*), in connection with the underwritten offering, issuance and sale by the Company of 15,010,810 shares of our common stock, pre-funded warrants to purchase up to 3,577,240 shares of common stock (the *Pre-Funded Warrants*), warrants to purchase up to 9,294,022 shares of common stock (or pre-funded warrants to purchase up to 9,294,022 shares of common stock in lieu thereof) (the *T1 Warrants*) and warrants to purchase 11,265,086 shares of common stock (or pre-funded warrants to purchase up to 11,265,086 shares of common stock in lieu thereof) (the *T2 Warrants*). The combined offering price for each share of common stock, accompanying T1 Warrant and accompanying T2 Warrant was $5.38. The combined offering price per Pre-Funded Warrant, accompanying T1 Warrant and accompanying T2 Warrant was $5.379. The securities were issued pursuant to the Company's effective shelf registration statement on Form S-3 (File No. 333-254299) (the *S-3 Shelf Registration Statement*) and a related prospectus supplement filed with the Securities and Exchange Commission (the *October 2023 Public Offering*). The October 2023 Public Offering closed on October 4, 2023, at which time we received net proceeds of approximately $93.5 million, after deducting underwriting discounts and commissions and estimated offering expenses payable by the Company. Refer to Note 10, *Subsequent Events*, for additional information regarding the securities offered, issued and sold in connection with the October 2023 Public Offering.

ATM Sales

Between June 30, 2023 and September 14, 2023, we sold an aggregate of 4,137,077 shares of our common stock under the Open Market Sale Agreement SM (*Sales Agreement*) for an at-the-market offering (*ATM*) program with Jefferies LLC (*Jefferies*) for aggregate net cash proceeds of approximately $35.1 million.

Negotiation Agreement with Fuji Pharma

On September 1, 2023, we entered into an Exclusive Negotiation Agreement (the *Negotiation Agreement*) with Fuji Pharma Co., Ltd. (*Fuji Pharma*), a Tokyo Stock Exchange listed, Japan-based pharmaceutical company. Pursuant to the terms and conditions of the Negotiation Agreement, we agreed, for a limited period of time (described below), to negotiate exclusively with Fuji Pharma a potential license to develop and commercialize PH80, our pherine product candidate in Japan, including for the acute treatment of moderate to severe vasomotor symptoms (hot flashes) due to menopause and potentially other indications. The Negotiation Agreement provides for a term of the later to occur of (i) fourteen (14) months beginning on the date of receipt of the Purchase Price (defined below) by the Company or (ii) ninety (90) days from the date that the U.S. Food and Drug Administration accepts an Investigational New Drug application for PH80 for the treatment of vasomotor symptoms (hot flashes) due to menopause (*Exclusive Negotiation Period*).

As consideration for the Exclusive Negotiation Period provided by the Company to Fuji Pharma under the Negotiation Agreement, Fuji Pharma agreed to make a payment of $1.5 million (*Purchase Price*), we received the Purchase Price in full in November 2023. The Purchase Price is not refundable, except upon a material breach of the Negotiation Agreement by the Company. Should the Company and Fuji Pharma enter into a definitive license agreement during the Exclusive Negotiation Period for the development and commercialization of PH80 in Japan (a *Potential Definitive Agreement*), the Purchase Price will be credited against the fee paid by Fuji Pharma to the Company in connection with the execution of such agreement. Neither the Company nor Fuji Pharma is obligated to enter into the Potential Definitive Agreement, and if the Company and Fuji Pharma have not entered into the Potential Definitive Agreement on or before the end of the Exclusive Negotiation Period, either the Company or Fuji Pharma may terminate any further negotiations.

Subsidiaries

Our wholly-owned subsidiaries consist of Pherin Pharmaceuticals, Inc, a Delaware corporation (*Pherin*), and Vistastem, Inc., a California corporation founded in 1998 (*Vistastem*). For the relevant periods, our condensed consolidated financial statements in this Report also include the accounts of Vistastem's two wholly owned inactive subsidiaries, Artemis Neuroscience, Inc., a Maryland corporation (*Artemis*), which was dissolved in April 2022, and VistaStem Canada, Inc., a corporation organized under the laws of Ontario, Canada (*VistaStem Canada*), which was dissolved in June 2022.

Financial Operations Overview and Results of Operations

Our critical accounting policies are disclosed in our Annual Report on Form 10-K for the fiscal year ended March 31, 2023 (*Form 10-K*), as filed with the SEC on June 28, 2023. There have been no changes in significant accounting estimates during the six months ended September 30, 2023 since those disclosed in our Form 10-K.

Summary

Net Loss

Since inception, we have devoted substantial resources to advance initiatives related to research, development, and contract manufacturing of our intranasal investigational pherine product candidates, fasedienol and itruvone, including initiatives related to manufacturing processes, analytical methods and production programs for drug substance and finished drug product, as well as for preclinical studies and clinical studies focused on potential commercialization of these product candidates for neuropsychiatry indications. Throughout Fiscal 2022 and Fiscal 2023, we allocated significant resources to our PALISADE-1 and PALISADE-2 clinical trials conducted as a part of our PALISADE Phase 3 Program evaluating fasedienol for the acute treatment of anxiety in adults with SAD. In the first two quarters of our fiscal year ending March 31, 2024, (*Fiscal 2024*) we have continued to focus our efforts on fasedienol and preparing to launch the next Phase 3 clinical trials in our PALISADE Phase 3 Program for fasedienol. In addition, we are continuing to conduct various preclinical and clinical studies and manufacturing activities for other product candidates. We have on-going initiatives for creating, protecting and patenting intellectual property (*IP*) related to our product candidates and technologies and raising sufficient working capital to fund these studies, initiatives and other activities. At September 30, 2023, we had an accumulated deficit of approximately $340.3 million. Our net loss for Fiscal 2023 and Fiscal 2022 was approximately $59.2 million and $47.8 million, respectively, and we incurred a net loss of approximately $13.5 million for the six months ended September 30, 2023. We expect losses to continue for the foreseeable future as we engage in further research, development and regulatory activities related to fasedienol, itruvone and AV-101 and, potentially, the new multiple pherines we acquired as a result of our acquisition of Pherin in February 2023. We have not yet achieved recurring revenue-generating status from any of our product candidates or technologies in amounts sufficient to sustain our operations and enable our strategic business plans.

Results of Operations

The following table summarizes the results of our operations for the three and six months ended September 30, 2023 and 2022 (amounts in thousands).

	Three Months Ended September 30,		Six Months Ended September 30,	
	2023	**2022**	**2023**	**2022**
Sublicense revenue	$ 278	$ (892)	$ 455	$ (582)
Operating expenses:				
Research and development	3,851	12,895	8,048	28,186
General and administrative	3,207	3,702	6,185	8,494
Total operating expenses	7,058	16,597	14,233	36,680
Loss from operations	(6,780)	(17,489)	(13,778)	(37,262)
Interest income, net	192	6	290	8
Loss before income taxes	(6,588)	(17,483)	(13,488)	(37,254)
Income taxes	-	-	(3)	(6)
Net loss	$ (6,588)	$ (17,483)	$ (13,491)	$ (37,260)

Revenue

We recognized $277,700 and $455,300 in sublicense revenue for the three and six months ended September 30, 2023 as compared to ($892,500) and ($582,500) for the three and six months ended September 30, 2022. At September 30, 2022, we extended the date in our estimate to complete the performance obligation under the AffaMed Agreement. As a result of the change in our estimate of the time required to complete our performance obligation, we recorded a cumulative catch-up adjustment at September 30, 2022 which resulted in derecognition of an aggregate of $892,500 of previously recognized revenue.

While we may potentially receive additional cash payments and royalties in the future under the AffaMed Agreement in the event certain performance-based milestones and commercial sales are achieved, there can be no assurance that the AffaMed Agreement will provide any additional revenue beyond that noted or cash payments to us in the near term, or at all.

Research and Development Expense

Research and Development expenses consist of the following (amounts in thousands):

	Three Months Ended September 30,		Six Months Ended September 30,	
	2023	2022	2023	2022
Compensation and related	$ 1,379	$ 1,744	$ 2,772	$ 3,396
Stock-based compensation	305	466	614	796
Consulting and other professional services	319	174	513	445
Clinical and development expenses:				
Fasedienol and Itruvone	1,511	9,815	3,524	22,400
AV-101	85	484	162	732
All other	20	18	39	34
	1,616	10,317	3,725	23,166
Occupancy and all other	232	194	424	383
Total Research and Development Expense	$ 3,851	$ 12,895	$ 8,048	$ 28,186

For the three and six months ended September 30, 2023, the decrease in research and development expenses, as compared to the same periods in 2022, was primarily due to the following:

- Compensation and related expenses decreased by $365 thousand and $624 thousand for the three and six months ended September 30, 2023, respectively, primarily due to voluntary terminations following the results of the PALISADE-1 study in Fiscal 2023.
- Clinical and development expenses decreased by $8.7 million and $19.4 million for the three and six months ended September 30, 2023, respectively, primarily related to study closing processes for the PALISADE-1 and PALISADE-2 clinical trial components of our PALISADE Phase 3 Program for fasedienol, as well as nonclinical development, regulatory and outsourced manufacturing activities for both fasedienol and itruvone.

General and Administrative Expense

General and administrative expenses consist of the following (amounts in thousands):

	Three Months Ended September 30,		Six Months Ended September 30,	
	2023	2022	2023	2022
Compensation and related	$ 1,071	$ 1,051	$ 2,098	$ 2,162
Stock-based compensation	279	566	539	1,193
Consulting and professional services	1,257	1,665	2,409	4,210
Insurance, occupancy and all other expenses	600	420	1,139	929
	$ 3,207	$ 3,702	$ 6,185	$ 8,494

For the three and six months ended September 30, 2023, the decrease in general and administrative expenses, as compared to the same periods in 2022, was primarily due to the following:

- Stock-based compensation decreased by $287 thousand and $654 thousand for the three and six months ended September 30, 2023, respectively, primarily due to option grants becoming fully vested with no significant new option grants.
- Consulting and professional services decreased by $408 thousand and $1.8 million for the three and six months ended September 30, 2023, respectively, primarily due to professional service fees expensed in the three and six months ended September 30, 2022 for pre-commercial activities as well as service fees associated with a potential credit facility offering that was not consummated as a result of the outcome of our PALISADE-1 clinical trial.

We expect research and development and general and administrative expenses will increase during the remainder of fiscal year 2024 as we continue to advance our PALISADE Phase 3 program.

Interest Income, Net

Interest income, net increased in the three and six months ended September 30, 2023 as compared the same periods in 2022 due to increases in interest rates as well as interest earned on cash proceeds received from our ATM program.

Liquidity and Capital Resources

Since our inception in May 1998 through September 30, 2023, we have financed our operations and technology acquisitions primarily through the issuance and sale of our equity and debt securities for cash proceeds of approximately $245.0 million, as well as from an aggregate of approximately $22.7 million of government research grant awards (excluding the fair market value of government-sponsored and funded clinical trials), strategic collaboration payments and intellectual property licensing, and other revenues. Additionally, we have issued equity securities with an approximate value at issuance of $41.3 million in noncash acquisitions of product licenses, our acquisition of Pherin in February 2023, and in settlements of certain liabilities, including liabilities for professional services rendered to us or as compensation for such services.

During the six months ended September 30, 2023, we sold 4,698,495 shares of our common stock under the terms of our ATM program for net cash proceeds of approximately $36.2 million. In addition, as noted in Note 10, *Subsequent Events*, we received net proceeds of approximately $93.5 million from the October 2023 Public Offering subsequent to the quarter ended September 30, 2023, and through the date of the issuance of this Report. These financings and other transactions consummated in Fiscal 2024, as well as financings and other transactions consummated prior to Fiscal 2024, have provided the primary sources of our liquidity.

We had cash and cash equivalents of approximately $37.6 million at September 30, 2023 and as noted above, we received net proceeds of approximately $93.5 million from the October 2023 Public Offering, which we believe is sufficient to fund our planned operations for more than twelve months following the issuance of these condensed consolidated financial statements. We are continuing to manage our cash resources as we prepare to launch our PALISADE-3 and PALISADE-4 Phase 3 clinical trials of fasedienol as a potential new treatment of anxiety in adults with SAD, as well as a potential Phase 2B trial of itruvone and nonclinical studies of our other pherine candidates, and strategies for the further development and potential commercialization, on our own or with collaborators, of all of our product candidates. However, as we have not yet developed products that generate recurring revenue and, in the event we successfully complete future clinical and/or nonclinical programs, we will need to obtain and invest substantial additional capital resources to develop and commercialize any of our product candidates. We may satisfy our future cash needs through sale of equity or debt securities, government grants and research awards, and partnering collaborations or license agreements.

When necessary and advantageous, we will seek additional financial resources to fund our planned operations through (i) sales of our equity and/or debt securities in one or more public offerings and/or private placements, including sales of our securities under the ATM program, (ii) non-dilutive government grants and research awards and (iii) non-dilutive strategic partnering collaborations to advance development and commercialization of our product candidates. However, no assurance can be provided that any such sales of our securities, awards, agreements or collaborations will occur in the future. Subject to certain restrictions, our S-3 Shelf Registration Statement remains available for future sales of our equity securities in one or more public offerings from time to time. While we may make additional sales of our equity securities under the S-3 Shelf Registration Statement and/or under the Sales Agreement, we do not have an obligation to do so.

Our future working capital requirements will depend on many factors, including, without limitation, potential impacts related to adjustments in the size of our staff, the scope and nature of opportunities related to our success or failure and the success or failure of certain other companies in nonclinical and clinical trials, including the development and commercialization of our current product candidates, and the availability of, and our ability to enter into financing transactions and research, development and commercialization collaborations on terms acceptable to us. In the future, to further advance the clinical development of our product candidates, as well as support our operating activities, we plan to seek additional financing, including both equity-based capital and funding from non-dilutive sources, and continue to carefully manage our operating costs, including, but not limited to, our clinical and nonclinical programs.

Notwithstanding the foregoing, there can be no assurance that future financings will be available to us in sufficient amounts, in a timely manner, or on terms acceptable to us, if at all, or that current or future development and commercialization collaborations will generate revenue from future potential milestone payments or otherwise.

Cash and Cash Equivalents

The following table summarizes changes in cash and cash equivalents for the periods stated (in thousands):

	Six Months Ended September 30,	
	2023	2022
Net cash used in operating activities	$ (14,081)	$ (32,309)
Net cash used in investing activities	-	(200)
Net cash provided by (used in) financing activities	35,051	(339)
Net decrease in cash and cash equivalents	20,970	(32,848)
Cash and cash equivalents at beginning of period	16,638	68,136
Cash and cash equivalents at end of period	$ 37,608	$ 35,288

During the six months ended September 30, 2023, cash used in operations was $14.1 million compared to $32.3 million for the six months ended September 30, 2022. The decrease in cash used in operations is primarily due to our completion of fasedienol clinical trials including PALISADE-2 and a decrease in compensation and related expenses due to the results of PALISADE-1.

Cash provided by financing activities in the six months ended September 30, 2023 primarily reflects net proceeds from our transactions under our ATM program.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements.

Item 4. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) of the Exchange Act) as of the end of the period covered by this Report. Based on that evaluation, our Chief Executive Officer and our Chief Financial Officer concluded that our disclosure controls and procedures as of the end of the period covered by this Report were effective.

Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) of the Exchange Act) from that described in our Annual Report on Form 10-K for our fiscal year ended March 31, 2023, filed with the Securities and Exchange Commission *(SEC)* on June 28, 2023, that occurred during the quarter ended September 30, 2023, to which this Report relates, that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II: OTHER INFORMATION

Item 1. Legal Proceedings

None.

Item 1A. Risk Factors

Our business is subject to substantial risk and an investment in our securities involves various risks. Some of the material risks include those set forth below. You should consider carefully these risks, and those discussed under "Risk Factors" below, before investing in our securities. These risks include, among others:

- we have incurred significant net losses since inception and we will continue to incur substantial operating losses for the foreseeable future;
- we are a development stage biopharmaceutical company with no revenues from product sales or approved products, and limited experience developing new drug candidates, which makes it difficult to assess our future viability;
- failures of future clinical studies of our product candidates, or delays in the commencement or completion of our planned clinical trials, could result in increased costs to us and could delay, prevent or limit our ability to generate revenue and continue our business;
- we require additional financing to execute our long-term business plan either on our own or with collaborators, including further development of our product candidates;
- we depend heavily on the success of our product candidates, and we cannot be certain that we will be able to obtain regulatory approval for, or successfully commercialize, any of our current or future product candidates;
- if we are unable to retain or attract key management and scientific personnel, we may be unable to successfully produce and develop our product candidates;
- the successful completion of clinical or nonclinical studies in any of our development programs may not be sufficient to cause the FDA to approve any New Drug Application (*NDA*) that we may submit or cause any other agency to provide regulatory approval of any of our product candidates and, even if approved, does not ensure acceptance of such product candidates by clinicians leading to a revenue stream to support our operations;
- we face significant competition, and if we are unable to compete effectively, we may not be able to achieve or maintain significant market penetration or improve our results of operations;
- if we are unable to adequately protect our proprietary technology, or obtain and maintain issued patents that are sufficient to protect our product candidates, others could compete against us more directly, which would have a material adverse impact on our business, results of operations, financial condition and prospects;
- raising additional capital in equity-based financing transactions is likely to cause substantial dilution to our existing stockholders, may restrict our operations or require us to relinquish rights, and may require us to seek stockholder approval to authorize additional shares of our common stock; and
- other risks and uncertainties, including those described under *Risk Factors* below.

If we are unable to effectively manage the impact of these and other risks, our ability to operate and execute our business plan would be substantially impaired. In turn, the value of our securities would be materially reduced.

Risk Factors

You should consider carefully the risks and uncertainties described below, together with all of the other information in this Report before investing in our securities. The risks described below are not the only risks facing our Company. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial may also materially adversely affect our business, financial condition and/or operating results. If any of the following risks are realized, our business, financial condition and results of operations could be materially and adversely affected.

We are a development-stage biopharmaceutical company with no recurring revenues from product sales or approved products, and limited experience developing new therapeutic product candidates, including conducting clinical trials and other areas required for the successful development of therapeutic products, which makes it difficult to assess our future viability.

We are a development-stage biopharmaceutical company. We currently have no approved products and no revenue from product sales, and we have not yet fully demonstrated an ability to overcome many of the fundamental risks and uncertainties frequently encountered by development stage companies in new and rapidly evolving fields of technology, particularly biotechnology. To execute our business plan successfully, we will need to accomplish or continue to accomplish the following fundamental objectives, either on our own or with collaborators:

- develop and obtain required regulatory approvals for commercialization of any of our product candidates;
- maintain, leverage and expand our intellectual property portfolio;
- gain market acceptance for our product candidates; and
- obtain adequate capital resources and manage our spending as costs and expenses increase due to research, production, development and regulatory approval of product candidates.

We require additional financing to execute our long-term business plan.

From our inception through 2019, a substantial portion of our resources were dedicated to research and development of AV-101 and the stem cell technology platform of our wholly-owned subsidiary, Vistastem Therapeutics. Since 2019, we have expended a considerable portion of our resources for research, clinical development, manufacturing and regulatory expense related to fasedienol and itruvone, including costs related to the PALISADE Phase 3 Program and our Phase 1 study of itruvone in MDD. We expect to continue to expend substantial resources for the foreseeable future developing fasedienol, itruvone, AV-101 and our other product candidates, PH15, PH80 and PH284, on our own and in strategic collaborations. These expenditures will include costs associated with general and administrative costs, facilities costs, research and development, acquiring new technologies, manufacturing product candidates, conducting nonclinical experiments and clinical trials and obtaining regulatory approvals should the FDA approve any of such product candidates for sale.

We had cash and cash equivalents of approximately $37.6 million at September 30, 2023, and we have not yet developed products that generate recurring revenue. Assuming successful completion of our planned clinical and nonclinical programs, we will need to invest substantial additional capital resources to commercialize any of them.

During the next twelve months, subject to availability of adequate working capital, we plan to (i) continue to advance our PALISADE Phase 3 Program to develop and commercialize fasedienol as a new acute treatment of anxiety in adults with SAD, (ii) complete preparations, on our own or with a collaborator for further Phase 2B clinical development of itruvone, on our own or with a collaborator, as a potential stand-alone treatment for MDD, (iii) complete IND-enabling activities, either on our own with a collaborator, for Phase 2B development of PH80, PH15 and PH284 and Phase 2A development of AV-101 for one or more neurological disorders involving the NMDAR, and (iv) conduct various nonclinical studies involving each of our product candidates.

Although we received the $5 million upfront payment under the AffaMed Agreement in August 2020 and the $1.5 million Purchase Price from Fuji Pharma in November 2023 and expect to recognize those amounts as revenue in future periods, we have no other sources of revenue or recurring cash flows from product sales to sustain our present activities, and we do not expect to generate sustainable positive operating cash flows until, and unless, we (i) out-license or sell a product candidate to a third-party that is subsequently successfully developed and commercialized, (ii) enter into additional transactions involving our stem cell technology, or (iii) obtain approval from the FDA and other regulatory authorities and successfully commercialize fasedienol, or one of our other product candidates, on our own or through collaborations.

As the outcome of our ongoing research and development activities, including the outcome of future anticipated nonclinical studies and clinical trials is highly uncertain, we cannot reasonably estimate the actual amounts necessary to successfully complete the development and commercialization of any of our product candidates, on our own or in collaboration with others. As in prior periods, we will continue to incur substantial costs associated with other clinical and nonclinical development programs for our product candidates. In addition, other unanticipated costs may arise. As a result of these and other factors, we will need to seek additional capital to meet our future operating plans and requirements, including capital necessary to develop, obtain regulatory approval for fasedienol and our other product candidates, and may seek additional capital in the event there exists favorable market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans and requirements.

We have completed in the past a range of potential financing transactions, including public or private equity or debt financings, government or other third-party funding, marketing and distribution arrangements and other collaborations, strategic alliances and licensing arrangements or a combination of these approaches, and we intend to pursue and complete additional financing arrangements in the future. Our future capital requirements may depend on many factors, including:

- the number and characteristics of the product candidates we pursue;
- the scope, progress, results and costs of researching, developing and commercializing our product candidates, and conducting preclinical and clinical studies;
- the timing of, and the costs involved in, obtaining regulatory approvals for our product candidates;
- the cost of manufacturing and formulating our product candidates;
- our ability to establish and maintain strategic partnerships, licensing or other collaborative arrangements and the financial terms of such agreements;
- market acceptance of our product candidates;
- the effect of competing technological and market developments;
- our ability to obtain government funding for our research and development programs;
- the costs involved in obtaining, maintaining and enforcing patents to preserve our intellectual property;
- the costs involved in defending against such claims that we infringe third-party patents or violate other intellectual property rights and the outcome of such litigation;
- the timing, receipt and amount of potential future licensee fees, milestone payments, and sales of, or royalties on, our future products, if any; and
- the extent to which we may acquire or invest in additional businesses, product candidates and technologies.

Any additional fundraising efforts will divert certain members of our management team from their day-to-day activities, which may adversely affect our ability to develop our product candidates. We cannot guarantee that future financing will be available in sufficient amounts, in a timely manner, or on terms acceptable to us, if at all. The terms of any future financing may adversely affect the holdings or the rights of our stockholders and the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our shares to decline. The sale of additional equity securities and the conversion, exchange or exercise of certain of our outstanding securities will dilute all of our stockholders. The incurrence of debt could result in increased fixed payment obligations, and we could be required to agree to certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. We may also seek funds through arrangements with collaborative partners in certain territories, including the U.S., or at an earlier stage than otherwise would be desirable or aligned with our business plan, and we may be required to relinquish rights to some of our technologies or product candidates or otherwise agree to terms unfavorable to us, any of which may have a material adverse effect on our business, operating results and prospects.

When necessary, if we are unable to obtain additional funding on a timely basis and on acceptable terms, we may be required to significantly curtail, delay or discontinue one or more of our research or product development programs or be unable to continue or expand our operations or otherwise capitalize on our business opportunities, as desired, which could materially affect our business, financial condition and results of operations.

Our future success is highly dependent upon our ability to successfully develop, on our own or with collaborators, any of our current CNS product candidates or acquire or license additional CNS product candidates, and we cannot provide any assurance that we will successfully develop and obtain regulatory approval of any of our current CNS product candidates or future product candidates, or that, if approved, any of our CNS product candidates will be successfully commercialized.

Business development and research and development programs designed to identify, acquire or license additional product candidates require substantial technical, financial and human resources, whether or not any additional CNS product candidate is acquired or licensed. If beneficial, we may seek to collaborate with others to develop and commercialize any of our current or future CNS product candidates, if and when they are acquired and developed. If we enter into arrangements with third parties to perform sales, marketing and distribution services for our products, the resulting revenues or the profitability from these revenues to us are likely to be lower than if we had sold, marketed and distributed our products ourselves. In addition, we may not be successful entering into arrangements with third parties to sell, market and distribute our CNS product candidates or may be unable to do so on terms that are favorable to us. We likely will have little control over such third parties, and any of these third parties may fail to devote the necessary resources and attention to sell, market and distribute our products effectively. If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

Risks Related to Product Development, Regulatory Approval

Failures of clinical studies of our product candidates could result in increased costs to us and could delay, prevent or limit our ability to generate revenue and continue our business.

Our PALISADE-1 Phase 3 clinical study of fasedienol for the acute treatment of anxiety in adults with SAD did not achieve its primary endpoint, as measured by change from baseline using the SUDS as compared to placebo. Successful completion of our nonclinical and clinical trials is a prerequisite to submitting an NDA and, consequently, the ultimate approval required before commercial marketing of any product candidate we may develop. Failure of any of our current and/or future clinical and nonclinical trials to achieve the planned endpoints, such as our PALISADE-1 Phase 3 clinical trial of fasedienol, could result in increased costs to us and could delay, prevent or limit our ability to generate revenue and continue our business.

We depend heavily on the success of one or more of our current CNS drug candidates and we cannot be certain that we will be able to obtain regulatory approval for any of our product candidates.

We currently have no drug products for sale and may never be able to develop marketable drug products. Our business currently depends heavily on the successful development, manufacturing and regulatory approval of one or more of our current CNS drug candidates, as well as our ability to acquire, license or produce and develop additional product candidates. Each of our current investigational CNS drug candidates will require substantial additional nonclinical and clinical development, manufacturing and regulatory approval before any of them may be commercialized, and there can be no assurance that any of them will ever achieve regulatory approval. The nonclinical and clinical development of our product candidates are, and the manufacturing and marketing of our product candidates will be, subject to extensive and rigorous review and regulation by numerous government authorities in the U.S. and in other countries where we or our collaborators intend to test and, if approved, market any product candidate. Before obtaining regulatory approvals for the commercial sale of any product candidate, we must demonstrate through numerous nonclinical and clinical studies that the product candidate is safe and effective for use in each target indication. Research and development of product candidates in the pharmaceutical industry is a long, expensive and uncertain process, and delay or failure can occur at any stage of any of nonclinical or clinical studies. This process takes many years and may also include post-marketing studies, surveillance obligations and drug safety programs, which would require the expenditure of substantial resources beyond the proceeds we have raised to date. Of the large number of drug candidates in development in the U.S., only a small percentage will successfully complete the required FDA regulatory approval process and will be commercialized. Accordingly, we cannot assure you that any of our current drug candidates or any future product candidates will be successfully developed or commercialized in the U.S. or any market outside the U.S.

We are not permitted to market our product candidates in the U.S. until we receive approval of a NDA from the FDA, or in any foreign countries until we receive the requisite approval from such countries. Obtaining FDA approval of a NDA is a complex, lengthy, expensive and uncertain process. The FDA may refuse to permit the filing of our NDA, delay, limit or deny approval of a NDA for many reasons, including, among others:

- if we submit an NDA and it is reviewed by a FDA advisory committee, the FDA may have difficulties scheduling an advisory committee meeting in a timely manner or the advisory committee may recommend against approval of our application or may recommend that the FDA require, as a condition of approval, additional nonclinical or clinical studies, limitations on approved labeling or distribution and use restrictions;

- a FDA advisory committee may recommend, or the FDA may require, a Risk Evaluation and Mitigation Strategies (*REMS*) safety program as a condition of approval or post-approval;

- a FDA advisory committee or the FDA or applicable regulatory agency may determine that there is insufficient evidence of overall effectiveness or safety in a NDA and require additional clinical studies;

- the FDA or the applicable foreign regulatory agency may determine that the manufacturing processes or facilities of third-party contract manufacturers with which we contract do not conform to applicable requirements, including current Good Manufacturing Practices (*cGMPs*); or

- the FDA or applicable foreign regulatory agency may change its approval policies or adopt new regulations.

Any of these factors, many of which are beyond our control, could jeopardize our ability to obtain regulatory approval for any current or future drug product candidate we may develop. Any such setback in our pursuit of regulatory approval for any product candidate would have a material adverse effect on our business and prospects.

In addition, certain of our product candidates, including fasedienol and itruvone, will be subject to regulation as combination products, which means that they are composed of both a drug product and device product. Although we do not contemplate doing so, if marketed individually, each component would be subject to different regulatory pathways and reviewed by different centers within the FDA. Our product candidates that are considered to be drug-device combination products will require review and coordination by FDA's drug and device centers prior to approval, which may delay approval. In the U.S., a combination product with a drug primary mode of action generally would be reviewed and approved pursuant to the drug approval processes under the Federal Food, Drug and Cosmetic Act of 1938. In reviewing the NDA application for such a product, however, FDA reviewers in the drug center could consult with their counterparts in the device center to ensure that the device component of the combination product met applicable requirements regarding safety, effectiveness, durability and performance. Under FDA regulations, combination products are subject to cGMP requirements applicable to both drugs and devices, including the Quality System (*QS*) regulations applicable to medical devices. Problems associated with the device component of the combination product candidate may delay or prevent approval.

The COVID-19 pandemic has adversely impacted and may continue to adversely impact our business.

Beginning in late-2019, a new strain of coronavirus (*COVID-19*) spread across the world and caused considerable uncertainty about the potential effects of the virus and its variants, and the extent of and effectiveness of responses taken on international, national and local levels. Measures taken to limit the impact of the pandemic, including shelter-in-place orders, social distancing measures, travel bans and restrictions, and business and government shutdowns, resulted in significant negative economic impacts on a global basis. The COVID-19 pandemic has impacted our business and may continue to do so. Additionally, future outbreaks may have several adverse effects on our business, results of operations and financial condition.

- ***Adverse impact on product development****:* Recent medical literature has reported that the SARS-COV-2 virus, which causes COVID-19, may cause long-term and reversible olfactory dysfunction (*OD*) in approximately 30% of affected individuals. OD may occur in cases where the SARS-COV-2 virus damages the nasal chemosensory epithelium, a structure in the nose where the types of cells are found that respond to pherines such as fasedienol, itruvone, PH15, PH80 and PH284. Accordingly, there is a risk that the prevalence of OD caused by COVID-19 infections may interfere with the ability of our pherine nasal sprays to provide a therapeutic benefit, which, may, in turn, have a materially adverse impact on results of our clinical trials designed to assess the efficacy of these product candidates or a negative impact on potential future sales should any of our pherine nasal sprays be approved for commercialization.

- ***Negative impacts on our employees, collaborators and suppliers***: COVID-19 impacted, and variant and subvariant strains of COVID-19 or another highly transmissible and pathogenic infectious disease may impact or continue to impact, the health of our employees, collaborators, contractors or suppliers, reduce the availability of our workforce or those of companies with which we do business, divert our attention toward succession planning, or create disruptions in our supply or distribution networks. During the acute phase of the COVID-19 pandemic, we experienced delays of the delivery of supplies of active pharmaceutical product (*API*) required to continue development of fasedienol and itruvone. Although our supply of raw materials and API remains sufficiently operational, we may experience adverse effects of such events, which may result in a significant, material disruption to clinical development programs and our operations. Additionally, having substantially shifted to remote working arrangements, we also face a heightened risk of cybersecurity attacks or data security incidents and are more dependent on internet and telecommunications access and capabilities.

COVID-19 also created significant disruption and volatility in national, regional and local economies and markets. Uncertainties related to, and perceived or experienced negative effects from COVID-19, may cause significant volatility or decline in the trading price of our securities, capital markets conditions and general economic conditions. Our future results of operations and liquidity could be adversely impacted by supply chain disruptions and operational challenges faced by our CROs, CMOs, clinical sites involved in our clinical studies and other contractors. The COVID-19 pandemic, or another highly transmissible and pathogenic infectious disease, could result in a widespread health crisis that could adversely affect the economies and financial markets of many countries, resulting in a further economic downturn or a global recession. Such events may limit or restrict our ability to access capital on favorable terms, or at all, lead to consolidation that negatively impacts our business, weaken demand, increase competition, cause us to reduce our capital spend further, or otherwise disrupt our business or make it more difficult to implement our strategic plans.

We have been granted Fast Track designation from the FDA for development of fasedienol for the treatment of SAD, itruvone for the treatment of major depressive order (MDD) and AV-101 for the adjunctive treatment of MDD and for the treatment of neuropathic pain (NP). However, these designations may not actually lead to faster development or regulatory review or approval processes for fasedienol or AV-101. Further, there is no guarantee the FDA will grant Fast Track designation for fasedienol, itruvone or AV-101 as a treatment option for other CNS indications or for any of our other product candidates in the future.

The Fast Track designation is a program offered by the FDA, pursuant to certain mandates under the FDA Modernization Act of 1997, designed to facilitate drug development and to expedite the review of new drugs that are intended to treat serious or life-threatening conditions. Compounds selected must demonstrate the potential to address unmet medical needs. The FDA's Fast Track designation allows for close and frequent interaction with the FDA. A designated Fast Track drug may also be considered for priority review with a shortened review time, rolling submission, and accelerated approval if applicable. The designation does not, however, guarantee FDA approval or expedited approval of any application for the product candidate.

In December 2017, the FDA granted Fast Track designation for development of AV-101 for the adjunctive (add-on) treatment of MDD in patients with an inadequate response to current antidepressants. In September 2018, the FDA granted Fast Track designation for development of AV-101 for the treatment of NP. In December 2019, the FDA granted Fast Track designation for development of fasedienol for the treatment of SAD. In December 2022, the FDA granted Fast Track designation for the development of itruvone for the treatment of MDD. However, these FDA Fast Track designations may not lead to a faster development or regulatory review or approval process for fasedienol or AV-101 and the FDA may withdraw Fast Track designation of fasedienol, AV-101 or itruvone if it believes that the respective designation is no longer supported by data from our clinical development programs.

In addition, we may apply for Fast Track designation for fasedienol, AV-101, itruvone and any of our other product candidates as a treatment option for other CNS indications. The FDA has broad discretion whether or not to grant a Fast Track designation, and even if we believe our product candidates may be eligible for this designation, we cannot be sure that the FDA will grant it.

Results of earlier clinical trials may not be predictive of the results of later-stage clinical trials.

The results of preclinical studies and early clinical trials of our current and/or our other future product candidates, if any, including positive results, may not be predictive of the results of later-stage clinical trials. Each of our current or any other future product candidates in later stages of clinical development may fail to show the desired safety and efficacy results despite having progressed through nonclinical studies and initial clinical trials, as is the case for results from our PALISADE-1 clinical trial. Many companies in the biopharmaceutical industry have suffered significant setbacks in later-stage clinical trials due to adverse safety profiles or lack of efficacy, notwithstanding promising results in earlier studies. Similarly, our future clinical trial results may not be successful for these or other reasons.

Moreover, nonclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in nonclinical studies and clinical trials nonetheless failed to obtain FDA approval or approval from a similar regulatory authority in another country. With respect to our current product candidates, if our future nonclinical or clinical studies fail to produce positive results, the development timeline and regulatory approval and commercialization prospects for these candidates and, correspondingly, our business and financial prospects, could be materially adversely affected.

Any changes in planned timing or nature of clinical trials compared to completed clinical trials could impede our ability to meet our clinical development objectives for our product candidates.

As product candidates are developed through preclinical to early- and late-stage clinical trials towards regulatory approval and commercialization, it is customary that various aspects of the development program, such as manufacturing and methods of administration, are altered along the way in an effort to optimize processes and results. While these types of changes are common and are intended to optimize the product candidates for later stage clinical trials, approval and commercialization, such changes do carry the risk that they will not achieve these intended objectives.

For example, the timing of planned clinical trials were effected by delays caused by the COVID-19 pandemic, including delays in recruitment and enrollment in our planned clinical and nonclinical studies or supply chain disruptions experienced by certain of our CMOs and/or CROs. In addition, clinical development of our products may be further affected if we or any of our collaborators seek to optimize and scale-up production of a product candidate. In such case, we will need to demonstrate comparability between the newly manufactured drug substance and/or drug product relative to the previously manufactured drug substance and/or drug product. Demonstrating comparability may cause us to incur additional costs or delay initiation or completion of our clinical trials, including the need to initiate a dose escalation study and, if unsuccessful, could require us to complete additional nonclinical or clinical studies of our product candidates. In addition, health and safety precautions at clinical sites resulting from the COVID-19 pandemic could cause us to incur additional costs or delay initiation or completion of planned clinical and/or nonclinical trials.

If serious adverse events or other undesirable side effects or safety concerns attributable to our product candidates occur, the clinical development of our product candidates may be delayed or adversely affected.

Undesirable side effects or safety concerns caused by our product candidates could cause us or regulatory authorities to interrupt, delay or halt our clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval. Although no treatment-related serious adverse events (*SAEs*) were reported in any clinical trials of any of our product candidates completed to date, if treatment-related SAEs or other undesirable side effects or safety concerns, or unexpected characteristics attributable to any of our product candidates are reported in any future clinical trials involving our drug candidates, they may adversely affect or delay our clinical development and commercialization of the effected product candidate, and the occurrence of these events could have a material adverse effect on our business and financial prospects. Results of our future clinical trials could reveal a high and unacceptable severity and prevalence of adverse side effects. In such an event, our trials could be suspended or terminated, and the FDA or other regulatory agency could order us to cease further development of or deny approval of our product candidates for any or all targeted indications. The drug-related side effects could affect patient recruitment or the ability of enrolled patients to complete the trial or result in potential product liability claims.

Additionally, if any of our product candidates receives marketing approval and we or others later identify undesirable or unacceptable side effects or safety concerns caused by these product candidates, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw, suspend, or limit approvals of such product and require us to take them off the market;
- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- regulatory authorities may require a medication guide outlining the risks of such side effects for distribution to patients, or that we implement a REMS drug safety program or REMS-like plan to ensure that the benefits of the product outweigh its risks;
- we may be required to change the way a product is distributed or administered, conduct additional clinical trials or change the labeling of a product;
- we may be required to conduct additional post-marketing studies or surveillance;
- we may be subject to limitations on how we may promote the product;
- sales of the product may decrease significantly;
- we may be subject to regulatory investigations, government enforcement actions, litigation or product liability claims; and
- our products may become less competitive or our reputation may suffer.

Any of these events could prevent us or any collaborators from achieving or maintaining market acceptance of our product candidates or could substantially increase commercialization costs and expense, which in turn could delay or prevent us from generating significant revenue from the sale of our product candidates.

Failures or delays in the commencement or completion of our planned nonclinical and clinical studies of our product candidates could result in increased costs to us and could delay, prevent or limit our ability to generate revenue and continue our business.

We will need to successfully complete at least two Phase 3 clinical trials and certain other clinical and nonclinical studies prior to our potential submission of an NDA for regulatory approval of fasedienol as an as needed, over time, treatment of anxiety in adults with SAD. For itruvone, at present, we believe we will need to complete at least one additional Phase 2B clinical study, two adequate and well-controlled Phase 3 clinical trials, as well as standard nonclinical and long-term clinical safety studies, as well as other smaller clinical studies prior to the potential submission of a NDA for regulatory approval of itruvone as a stand-alone rapid-onset treatment for MDD, or any other depression disorder. For AV-101, we believe we will need to complete our ongoing exploratory Phase 1B clinical study, two Phase 2 clinical studies, two adequate and well-controlled Phase 3 clinical trials, additional toxicology and other standard nonclinical and long-term clinical safety studies, as well as certain standard smaller clinical studies prior to the potential submission of an NDA for regulatory approval in any CNS indication. For PH15, PH80 and PH284, we are in the process of determining the work required to successfully complete the clinical and nonclinical development of each of these product candidates. Successful completion of our nonclinical and clinical trials is a prerequisite to submitting an NDA and, consequently, the ultimate approval required before commercial marketing of any product candidate we may develop. We do not know whether any of our future-planned nonclinical and clinical trials of any of our product candidates will be completed on schedule, if at all, as the commencement and completion of nonclinical and clinical trials can be delayed or prevented for a number of reasons, including, among others:

- the regulatory authority may deny permission to proceed with planned clinical trials or any other clinical trials we may initiate, or may place a planned or ongoing clinical trial on hold;

- delays in filing or receiving approvals from regulatory authorities of additional INDs that may be required;
- negative or ambiguous results from nonclinical or clinical studies;
- delays in reaching or failing to reach agreement on acceptable terms with prospective CROs, investigators and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs, investigators and clinical trial sites;
- delays in the manufacturing of, or insufficient supply of product candidates necessary to conduct nonclinical or clinical trials, including delays in the manufacturing of sufficient supply of drug substance or finished drug product;
- inability to manufacture or obtain clinical supplies of a product candidate meeting required quality standards;
- difficulties obtaining Institutional Review Board (*IRB*) approval to conduct a clinical trial at a prospective clinical site or sites;
- challenges in recruiting and enrolling patients to participate in clinical trials, including the proximity of patients to clinical trial sites;
- eligibility criteria for a clinical trial, the nature of a clinical trial protocol, the availability of approved effective treatments for the relevant disease and competition from other clinical trial programs for similar indications;
- severe or unexpected adverse drug-related side effects experienced by patients in a clinical trial;
- delays in validating any endpoints utilized in a clinical trial;
- the regulatory authority may disagree with our clinical trial design and our interpretation of data from prior nonclinical studies or clinical trials, or may change the requirements for approval even after it has reviewed and commented on the design for our clinical trials;
- reports from nonclinical or clinical testing of other CNS indications or therapies that raise safety or efficacy concerns; and
- difficulties retaining patients who have enrolled in a clinical trial but may be prone to withdraw due to rigors of the clinical trial, lack of efficacy, side effects, personal issues or loss of interest.

Clinical trials may also be delayed or terminated prior to completion as a result of ambiguous or negative interim results. In addition, a clinical trial may be suspended or terminated by us, the regulatory authority, the IRBs at the sites where the IRBs are overseeing a clinical trial, a data and safety monitoring board (*DSMB*), overseeing the clinical trial at issue or other regulatory authorities due to a number of factors, including, among others:

- failure to conduct the clinical trial in accordance with regulatory requirements or approved clinical protocols;
- inspection of the clinical trial operations or trial sites by the regulatory authority that reveals deficiencies or violations that require us to undertake corrective action, including the imposition of a clinical hold;
- unforeseen safety issues, including any that could be identified in nonclinical carcinogenicity studies, adverse side effects or lack of effectiveness;
- changes in government regulations or administrative actions;
- problems with clinical supply materials that may lead to regulatory actions; and
- lack of adequate funding to continue nonclinical or clinical studies.

Changes in regulatory requirements, regulatory guidance or unanticipated events during our nonclinical studies and clinical trials of our CNS product candidates may occur, which may result in changes to nonclinical studies and clinical trial protocols or additional nonclinical studies and clinical trial requirements, which could result in increased costs to us and could delay our development timeline.

Changes in regulatory requirements, guidance or unanticipated events during our nonclinical studies and clinical trials of any of our CNS product candidates may force us to amend nonclinical studies and clinical trial protocols or the regulatory authority may impose additional nonclinical studies and clinical trial requirements. Amendments or changes to our clinical trial protocols would require resubmission to the regulatory authority and IRBs for review and approval, which may adversely impact the cost, timing or successful completion of clinical trials. Similarly, amendments to our nonclinical studies may adversely impact the cost, timing, or successful completion of those nonclinical studies. If we experience delays completing, or if we terminate, any of our nonclinical studies or clinical trials, or if we are required to conduct additional nonclinical studies or clinical trials, the commercial prospects for our CNS product candidates may be harmed and our ability to generate product revenue will be delayed.

We rely, and expect that we will continue to rely, on third parties to conduct our nonclinical and clinical trials of our current CNS product candidates and will continue to do so for any other future CNS product candidates. If these third parties do not successfully carry out their contractual duties and/or meet expected deadlines, completion of our nonclinical or clinical trials and development of our current and/or future CNS product candidates may be delayed and we may not be able to obtain regulatory approval for our current or future CNS product candidates and our business could be substantially harmed.

By strategic design, we do not have the extensive internal staff resources to independently conduct nonclinical and clinical trials of our product candidates completely on our own. We rely on our network of strategic relationships with various academic research centers, medical institutions, nonclinical and clinical investigators, contract laboratories, CROs and other third parties to assist us to conduct and complete nonclinical and clinical trials of our product candidates. We enter into agreements with third-party CROs to provide monitors for and to manage data for our clinical trials, as well as provide other services necessary to prepare for, conduct and complete clinical trials. We rely heavily on these and other third parties for efficient execution of nonclinical and clinical trials for our product candidates and we control only certain aspects of their activities. As a result, we have less direct control over the conduct, timing and completion of these nonclinical and clinical trials and the management of data developed through nonclinical and clinical trials than would be the case if we were relying entirely upon our own internal staff resources. Communicating with outside parties can also be challenging, potentially leading to mistakes as well as difficulties and inefficiencies in coordinating activities. CROs and other outside parties may:

- experience disruptions to their operations, such as staff attrition, reduced staffing and supply chain disruptions;
- have staffing difficulties and/or undertake obligations beyond their anticipated capabilities and resources;
- fail to comply with contractual obligations;
- experience regulatory compliance issues;
- undergo changes in priorities or become financially distressed; or
- form relationships with other entities, some of which may be our competitors.

These factors may materially adversely affect the willingness or ability of third parties to conduct our nonclinical and clinical trials and may subject us to unexpected cost increases that are beyond our control. Nevertheless, we are responsible for ensuring that each of our nonclinical studies and clinical trials is conducted and completed in accordance with the applicable protocol, legal, regulatory and scientific requirements and standards, and our reliance on CROs, or independent investigators does not relieve us of our regulatory responsibilities. We and our CROs, and any investigator in an investigator-sponsored study are required to comply with regulations and guidelines, including current Good Clinical Practice regulations (*cGCPs*) for conducting, monitoring, recording and reporting the results of clinical trials to ensure that the data and results are scientifically credible and accurate, and that the trial patients are adequately informed of the potential risks of participating in clinical trials. These regulations are enforced by the FDA, the Competent Authorities of the Member States of the European Economic Area and comparable foreign regulatory authorities for any products in clinical development. The FDA enforces cGCP regulations through periodic inspections of clinical trial sponsors, principal investigators and trial sites. If we, any of our CROs or any of our third-party collaborators fail to comply with applicable cGCPs, the clinical data generated in clinical trials involving our product candidates 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. We cannot assure you that, upon inspection, the FDA will determine that any of our clinical trials comply with cGCPs. In addition, our clinical trials must be conducted with product candidates produced under cGMPs and will require a large number of test patients. Our failure or the failure of our CROs or other third-party collaborators to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process and could also subject us to enforcement action up to and including civil and criminal penalties.

Although we design our clinical trials for our product candidates, our clinical development strategy involves having CROs and other third-party investigators and medical institutions conduct clinical trials of our product candidates. As a result, many important aspects of our drug development programs are outside of our direct control. In addition, although CROs, or independent investigators or medical institutions, as the case may be, may not perform all of their obligations under arrangements with us or in compliance with applicable regulatory requirements, under certain circumstances, we may be responsible and subject to enforcement action that may include civil penalties up to and including criminal prosecution for any violations of FDA laws and regulations during the conduct of clinical trials of our product candidates. If such third parties do not perform clinical trials of our product candidates in a satisfactory manner, breach their obligations to us or fail to comply with applicable regulatory requirements, the development and commercialization of our product candidates may be delayed or our development program materially and irreversibly harmed. In certain cases, including investigator-sponsored clinical studies, we cannot control the amount and timing of resources these third parties devote to clinical trials involving our product candidates. If we are unable to rely on nonclinical and clinical data collected by our third-party collaborators, we could be required to repeat, extend the duration of, or increase the size of our clinical trials and this could significantly delay commercialization and require significantly greater expenditures.

If our relationships with one or more of our third-party collaborators terminates, we may not be able to enter into arrangements with alternative third-party collaborators. If such third-party collaborators, including our CROs, do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to their failure to adhere to applicable clinical protocols, regulatory requirements or for other reasons, any clinical trials that such third-parties are associated with may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully develop and commercialize our product candidates. As a result, we believe that our financial results and the commercial prospects for our product candidates in the subject indication would be harmed, our costs would increase and our ability to generate revenue would be delayed.

We rely completely on third parties to manufacture, formulate, analyze, hold and distribute supplies of our CNS product candidates for all nonclinical and clinical studies, and we intend to continue to rely on third parties to produce all nonclinical, clinical and commercial supplies of our CNS product candidates in the future.

By strategic design, we do not currently have, nor do we plan to acquire or develop, extensive internal infrastructure or technical capabilities to manufacture, formulate, analyze, hold or distribute supplies of our product candidates, for use in nonclinical and clinical studies or commercial scale. As a result, with respect to all of our product candidates, we rely, and will continue to rely, completely on CMOs to manufacture API and formulate, hold and distribute final drug product. The facilities used by our CMOs to manufacture API and formulate final drug product for any of pir product candidates are subject to a pre-approval inspection by the FDA and other comparable foreign regulatory agencies to assess compliance with applicable regulatory guidelines and requirements, including cGMPs, and may be required to undergo similar inspections by the FDA or other comparable foreign regulatory agencies, after we submit INDs, NDAs or relevant foreign regulatory submission equivalent to the applicable regulatory agency.

We do not directly control the manufacturing process, or the supply or quality of materials used in the manufacturing, analysis and formulation of our product candidates, and, with respect to all of our product candidates, we are completely dependent on our CMOs to comply with all applicable cGMPs for the manufacturing of both API and finished drug product. If our CMOs cannot secure adequate supplies of suitable raw materials due to supply chain disruptions, or successfully manufacture our product candidates, including API and finished drug product, that conforms to our specifications and the strict regulatory requirements of the FDA or applicable foreign regulatory agencies, production of sufficient supplies of our product candidates, including API and finished drug product, may be delayed and our CMOs may not be able to secure and/or maintain regulatory approval for their manufacturing facilities, or the FDA may take other actions, including the imposition of a clinical hold. In addition, we have no direct control over our CMOs' ability to maintain adequate quality control, quality assurance and qualified personnel. All of our CMOs are engaged with other companies to supply and/or manufacture materials or products for such other companies, which exposes our CMOs to regulatory risks for the production of such materials and products. As a result, failure to satisfy the regulatory requirements for the production of those materials and products may affect the regulatory clearance of our CMO's facilities generally or affect the timing of manufacture of any of our product candidates for required or planned nonclinical and/or clinical studies. If the FDA or an applicable foreign regulatory agency determines now or in the future that our CMOs' facilities are noncompliant, we may need to find alternative manufacturing facilities, which would adversely impact our ability to develop, obtain regulatory approval for or market our product candidates. Our reliance on CMOs also exposes us to the possibility that they, or third parties with access to their facilities, will have access to and may appropriate our trade secrets or other proprietary information.

We do not yet have long-term supply agreements in place with our CMOs and each batch manufactured of our product candidates is or will be individually contracted under a separate supply agreement. If we engage new CMOs, such contractors must complete an inspection by the FDA and other applicable foreign regulatory agencies. We plan to continue to rely upon CMOs and, potentially, collaboration partners, to manufacture research and development scale, and, if approved, commercial quantities of our product candidates. Although we believe our current scale of API manufacturing for AV-101, and our contemplated scale of API manufacturing for fasedienol, itruvone, PH15, PH80 and PH284, and the current and projected supply of API and finished drug product for each of our product candidates will be adequate to support our planned nonclinical and clinical studies, no assurance can be given that unanticipated supply shortages or CMO-related delays in the manufacture and formulation of API and/or finished drug product for any or all of our product candidates will not occur in the future.

Additionally, fasedienol, itruvone, PH15, PH80 and PH284 will be considered drug-device combination products. Third-party manufacturers may not be able to comply with cGMP requirements applicable to drug/device combination products, including applicable provisions of the FDA's or a comparable foreign regulatory authority's drug cGMP regulations, device cGMP requirements embodied in the Quality System Regulation (*QSR*) or similar regulatory requirements outside the U.S. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates, operating restrictions and criminal prosecutions, any of which could significantly affect supplies of our product candidates. The facilities used by our CMOs to manufacture our product candidates must be approved by the FDA and comparable foreign regulatory authorities pursuant to inspections that will or may be conducted after we submit our NDA. We do not control the manufacturing process of, and are completely dependent on, our CMO partners for compliance with cGMPs and QSRs. If our CMOs cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or other comparable foreign regulatory authorities, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved. CMOs may face manufacturing or quality control problems causing drug substance production and shipment delays or a situation where the contractor may not be able to maintain compliance with the applicable cGMP and QSR requirements. Any failure to comply with cGMP or QSR requirements or other FDA, EMA and comparable foreign regulatory requirements could adversely affect our clinical research activities and our ability to develop our product candidates and market our products following approval.

Even if we receive marketing approval for any of our CNS product candidate in the U.S., we may never receive regulatory approval to market the same CNS product candidate outside of the U.S.

In order to market any of our CNS product candidate outside of the U.S., we must establish and comply with the numerous and varying safety, efficacy and other regulatory requirements of other countries. Approval procedures vary among countries and can involve additional product candidate testing and additional administrative review periods. The time required to obtain approvals in other countries might differ from that required to obtain FDA approval. The marketing approval processes in other countries may implicate all of the risks detailed above regarding FDA approval in the U.S. as well as other risks. In particular, in many countries outside of the U.S., products must receive pricing and reimbursement approval before the product can be commercialized. Obtaining this approval can result in substantial delays in bringing products to market in such countries. Marketing approval in one country does not ensure marketing approval in another, but a failure or delay in obtaining marketing approval in one country may have a negative effect on the regulatory process in others. Failure to obtain marketing approval in other countries or any delay or other setback in obtaining such approval would impair our ability to market our product candidates in such foreign markets. Any such impairment would reduce the size of our potential market, which could have a material adverse impact on our business, results of operations and prospects.

If any of our CNS product candidates are ultimately regulated as controlled substances, we, our CMOs, as well as future distributors, prescribers, and dispensers will be required to comply with additional regulatory requirements which could delay the marketing of our product candidates, and increase the cost and burden of manufacturing, distributing, dispensing, and prescribing our product candidates.

Before we can commercialize our product candidates in the U.S. or any market outside the U.S., the U.S. Drug Enforcement Administration (*DEA*) or its foreign counterpart may need to determine whether such product candidates will be considered to be a controlled substance, taking into account the recommendation of the FDA or its foreign counterpart, as the case may be. This may be a lengthy process that could delay our marketing of a product candidate and could potentially diminish any regulatory exclusivity periods for which we may be eligible, which would increase the cost associated with commercializing such products and, in turn, may have an adverse impact on our results of operations. Although we currently do not know whether the DEA or any foreign counterpart will consider any of our current or future product candidate to be controlled substances, we cannot yet give any assurance that such product candidates will not be regulated as controlled substances.

If any of our product candidates are regulated as controlled substances, depending on the DEA controlled substance schedule in which the product candidates are placed or that of its foreign counterpart, we, our CMOs, and any future distributers, prescribers, and dispensers of the scheduled product candidates may be subject to significant regulatory requirements, such as registration, security, recordkeeping, reporting, storage, distribution, importation, exportation, inventory, quota and other requirements administered by the DEA or a foreign counterpart of the DEA as the case may be. Moreover, if any of our product candidates are regulated as controlled substances, we and our CMOs would be subject to initial and periodic DEA inspection. If we or our CMOs are not able to obtain or maintain any necessary DEA registrations or comparable foreign registrations, we may not be able to commercialize any product candidates that are deemed to be controlled substances or we may need to find alternative CMOs, which would take time and cause us to incur additional costs, delaying or limit our commercialization efforts.

Because of their restrictive nature, these laws and regulations could limit commercialization of our product candidates, should they be deemed to contain controlled substances. Failure to comply with the applicable controlled substance laws and regulations can also result in administrative, civil or criminal enforcement. The DEA or its foreign counterparts may seek civil penalties, refuse to renew necessary registrations, or initiate administrative proceedings to revoke those registrations. In some circumstances, violations could result in criminal proceedings or consent decrees. Individual states also independently regulate controlled substances.

If we are unable to establish broad sales and marketing capabilities on our own or enter into agreements with third parties to market and sell our CNS product candidates, we may not be able to generate any revenue from product sales.

We currently have limited internal resources for the sale, marketing and distribution of pharmaceutical products, and we may not be able to create broad internal capabilities in the foreseeable future. Therefore, to market our CNS product candidates, if approved by the FDA or any other regulatory body, we must establish broad internal capabilities related to sales, marketing, managerial and other non-technical capabilities relating to the commercialization of our product candidates or make contractual arrangements with third parties to perform such services, prior to market approval. If we are unable to establish adequate internal sales, marketing and distribution capabilities, or if we are unable to do so contractually on commercially reasonable terms, our business, results of operations, financial condition and prospects will be materially adversely affected. Moreover, creating broad sales and marketing capabilities will require substantial capital, which we may not be able to obtain.

Even if we receive marketing approval for our CNS product candidates, our product candidates may not achieve broad market acceptance, which would limit the revenue that we generate from their sales.

The commercial success of our CNS product candidates, if approved by the FDA or other regulatory authorities, will depend upon the awareness and acceptance of our product candidates among the medical community, including physicians, patients and healthcare payers. Market acceptance of our product candidates, if approved, will depend on a number of factors, including, among others:

- the efficacy and safety of our product candidates as demonstrated in clinical trials, and, if required by any applicable regulatory authority in connection with the approval for the applicable indications, to provide patients with incremental health benefits, as compared with other available therapies;
- limitations or warnings contained in the labeling approved for our product candidates by the FDA or other applicable regulatory authorities;
- the clinical indications for which our product candidates are approved;
- availability of alternative treatments already approved or expected to be commercially launched in the near future;
- the potential and perceived advantages of our product candidates over current treatment options or alternative treatments, including future alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing and distribution support and timing of market introduction of competitive products;
- publicity concerning our products or competing products and treatments;
- pricing and cost effectiveness;
- the effectiveness of our sales and marketing strategies;
- our ability to increase awareness of our product candidates through marketing efforts;
- our ability to obtain sufficient third-party coverage or reimbursement; or
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage.

If our CNS product candidates are approved but do not achieve an adequate level of acceptance by patients, physicians and payers, we may not generate sufficient revenue from our product candidates to become or remain profitable. Before granting reimbursement approval, healthcare payers may require us to demonstrate that our product candidates, in addition to treating these target indications, also provide incremental health benefits to patients. Our efforts to educate the medical community and third-party payers about the benefits of our product candidates may require significant resources and may never be successful.

Our CNS product candidates may cause undesirable safety concerns and side effects that could delay or prevent their regulatory approval, limit the commercial profile of an approved label, or result in significant negative consequences following marketing approval, if any.

If our product candidates are determined to cause undesirable side effects and safety concerns, we or regulatory authorities may interrupt, delay or halt nonclinical studies and clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by regulatory authorities.

Further, clinical trials by their nature utilize a sample of potential patient populations. With a limited number of patients and limited duration of exposure, rare and severe side effects of our product candidates may only be uncovered with a significantly larger number of patients exposed to the product candidate. If our product candidates receive marketing approval and we or others identify undesirable safety concerns or side effects caused by such product candidates (or any other similar products) after such approval, a number of potentially significant negative consequences could result, including:

- regulatory authorities may withdraw or limit their approval of such product candidates;
- regulatory authorities may require the addition of labeling statements, such as a "black box" warning or a contraindication;
- we may be required to change the way such product candidates are distributed or administered, conduct additional clinical trials or change the labeling of the product candidates;
- we may be subject to regulatory investigations and government enforcement actions;
- we may decide to remove such product candidates from the marketplace;
- we could be sued and held liable for injury caused to individuals exposed to or taking our product candidates; and
- our reputation may suffer.

We believe that any of these events could prevent us from achieving or maintaining market acceptance of the affected product candidates and would substantially increase the costs of commercializing our product candidates and significantly impact our ability to successfully commercialize our product candidates and generate revenues.

Even if we receive marketing approval for our CNS product candidates, we may still face future development and regulatory difficulties.

Even if we receive marketing approval for our CNS product candidates, regulatory authorities may still impose significant restrictions on our product candidates, indicated uses or marketing or impose ongoing requirements for potentially costly post-approval studies. Our product candidates will also be subject to ongoing regulatory requirements governing the labeling, packaging, storage and promotion of the product and record keeping and submission of safety and other post-market information. The FDA and other regulatory authorities have significant post-marketing authority, including, for example, the authority to require labeling changes based on new safety information and to require post-marketing studies or clinical trials to evaluate serious safety risks related to the use of a drug. The FDA and other regulatory authorities also have the authority to require, as part of an NDA or post-approval, the submission of a REMS or comparable drug safety program. Any REMS or comparable drug safety program required by the FDA or other regulatory authority may lead to increased costs to assure compliance with new post-approval regulatory requirements and potential requirements or restrictions on the sale of approved products, all of which could lead to lower sales volume and revenue.

Manufacturers of drug and device products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMPs and other regulations. If we or a regulatory agency discover problems with our product candidates, such as adverse events of unanticipated severity or frequency, or problems with the facility where our product candidates are manufactured, a regulatory agency may impose restrictions on our product candidates, the manufacturer or us, including requiring withdrawal of our product candidates from the market or suspension of manufacturing. If we, our product candidates, or the manufacturing facilities for our product candidates fail to comply with applicable regulatory requirements, a regulatory agency may, among other things:

- issue warning letters or untitled letters;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend or withdraw marketing approval;
- suspend any ongoing clinical trials;
- refuse to approve pending applications or supplements to applications submitted by us;
- suspend or impose restrictions on operations, including costly new manufacturing requirements; or
- seize or detain products, refuse to permit the import or export of products, or require that we initiate a product recall.

Competing therapies could emerge adversely affecting our opportunity to generate revenue from the sale of our CNS product candidates.

The pharmaceutical industry is highly competitive. There are many public and private pharmaceutical companies, universities, governmental agencies and other research organizations actively engaged in the research and development of product candidates that may be similar to and compete with our product candidates or address similar markets. It is probable that the number of companies seeking to develop product candidates similar to and competitive with our product candidates will increase in the future.

Currently, management is unaware of any FDA-approved rapid-onset, treatment of anxiety in adults with SAD having the same mechanism of pharmacological action and safety profile as fasedienol. Also, management is currently unaware of any FDA-approved oral treatment for MDD having the same mechanism of pharmacological action and safety profile as our intranasally-administered itruvone or our orally administered AV-101 in combination with probenecid. However, new antidepressant products with other mechanisms of pharmacological action or products approved for other indications, including the FDA-approved anesthetic ketamine hydrochloride administered intravenously, are being or may be used for treatment of MDD, as well as other CNS indications for which itruvone or AV-101 in combination with probenecid may have therapeutic potential. Additionally, other non-pharmaceutical treatment options, such psychotherapy and electroconvulsive therapy (*ECT*) are used before or instead of standard antidepressant medications to treat patients with MDD.

With respect to fasedienol and current treatment options for SAD in the U.S., our competition may include, but is not limited to, current generic oral antidepressants approved by the FDA for treatment of SAD, as well as certain classes of drugs prescribed on an off-label basis for treatment of SAD, including benzodiazepines such as alprazolam, and beta blockers such as propranolol, and certain investigational oral drug candidates in Phase 2 development. In the field of new generation, oral treatments for adult patients with MDD, we believe our principal competitors may be Axsome, Alkermes, Relmada and Sage. Additional potential competitors may include, but not be limited to, academic and private commercial clinics providing intravenous ketamine therapy on an off-label basis and Janssen's intranasally-administered esketamine. We are still assessing our competition for PH80 for the treatment of hot flashes due to menopause and for migraine headaches, PH15 to improve cognitive impairment and PH284 for the loss of appetite.

Many of our potential competitors, alone or with their collaborators, have substantially greater financial, technical and human resources than we do and significantly greater experience in the discovery and development, obtaining FDA and other regulatory approvals, and the commercialization of investigational product candidates. With respect to fasedienol, in addition to potential competition from certain current FDA-approved antidepressants and off-label use of benzodiazepines and beta blockers, we believe additional drug candidates in development for SAD may include, but potentially not be limited to, an oral fatty acid amide hydrolase inhibitor in development by Janssen, and two oral drug candidates in Phase 2 development that act on the alpha-7 nicotinic acetylcholine receptor, one in development by Bionomics and the other in development by Vanda. With respect to itruvone and AV-101 in combination with probenecid for treatment of depression disorders, including MDD, and AV-101 in combination with probenecid for treatment of certain neurological disorders, including levodopa-induced dyskinesia associated with therapy for Parkinson's disease, neuropathic pain, and epilepsy, we believe a range of pharmaceutical and biotechnology companies have programs to develop new drug candidates and/or medical device technologies for such indications, including, but not limited to, Abbott Laboratories, Acadia, Allergan, Alkermes, Aptynix, AstraZeneca, Axsome, Eli Lilly, GlaxoSmithKline, IntraCellular, Janssen, Lundbeck, Merck, Neurocrine, Novartis, Ono, Otsuka, Pfizer, Relmada, Roche, Sage, Sumitomo Dainippon, Takeda and Xenon, as well as any affiliates of the foregoing companies. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated among a smaller number of our competitors. Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

We may seek to establish collaborations, and, if we are not able to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.

Our drug development programs and the potential commercialization of our investigational product candidates will require substantial additional cash to fund expenses. We may decide to collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of those product candidates, such as the AffaMed Agreement.

We may derive revenue from research and development fees, license fees, milestone payments and royalties under any collaborative arrangement into which we enter, including the AffaMed Agreement. However, our ability to generate revenue from such arrangements will depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements. In addition, our collaborators have the right to abandon research or development projects and terminate applicable agreements, including funding obligations, prior to or upon the expiration of the agreed upon terms. As a result, we can expect to relinquish some or all of the control over the future success of a product candidate that we license to a third party in the territories included in the licenses.

We face significant competition in seeking appropriate collaborators. Whether we reach additional definitive agreements for collaborations will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of nonclinical and clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the U.S., the potential markets for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge and industry and market conditions generally. The collaborator may also consider alternative product candidates or technologies for similar indications that may be available to collaborate on and whether such collaboration could be more attractive than the one with us for our product candidate. The terms of any collaboration or other arrangements that we may establish may not be favorable to us.

We may also be restricted under existing collaboration agreements from entering into future agreements on certain terms with potential collaborators. Collaborations are complex and time-consuming to negotiate and document. In addition, there have been a significant number of recent business combinations among large pharmaceutical companies that have resulted in a reduced number of potential future collaborators.

We may not be able to negotiate additional collaborations on a timely basis, on acceptable terms, or at all. If we are unable to do so, we may have to curtail the development of the product candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we will need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our product candidates or bring them to market and generate product revenue.

In addition, any future collaboration 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. Collaborators generally have significant discretion in determining the efforts and resources that they will apply to these collaborations. Disagreements between parties to a collaboration arrangement regarding clinical development and commercialization matters can lead to delays in the development process or commercializing the applicable product candidate and, in some cases, termination of the collaboration arrangement. These disagreements can be difficult to resolve if neither of the parties has final decision-making authority. Collaborations with pharmaceutical or biotechnology companies and other third parties often are terminated or allowed to expire by the other party. Any such termination or expiration would adversely affect us financially and could harm our business reputation.

We may not be successful in our efforts to identify or discover additional CNS product candidates, or we may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

The success of our business depends primarily upon our ability to identify, develop and commercialize CNS product candidates with therapeutic and commercial potential. We may fail to pursue additional development opportunities for our current CNS product candidates or identify additional CNS product candidates for development and commercialization for a number of reasons. Our research methodology may be unsuccessful in identifying new product candidates or our product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval.

We strategically focus on a limited number of research and development programs and product candidates and are currently focused primarily on development of fasedienol and itruvone. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other potential CNS-related indications for fasedienol and/or itruvone that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial drugs or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable drugs. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through future collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

If any of these events occur, we may be forced to abandon our development efforts for a program or programs, which would have a material adverse effect on our business and could potentially cause us to cease operations. Research and development programs to identify and advance new product candidates require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs or product candidates that ultimately prove to be unsuccessful.

We are subject to healthcare laws and regulations, which could expose us to criminal sanctions, civil penalties, contractual damages, reputational harm and diminished profits and future earnings.

Although we do not currently have any products on the market, once we begin commercializing our CNS product candidates, we may be subject to additional healthcare statutory and regulatory requirements and enforcement by the federal government and the states and foreign governments in which we conduct our business. Healthcare providers, physicians and others will play a primary role in the recommendation and prescription of our product candidates, if approved. Our future arrangements with third-party payers will 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 market, sell and distribute our product candidates, if we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations include the following:

- The federal anti-kickback statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made under federal healthcare programs such as Medicare and Medicaid.

- The federal False Claims Act imposes criminal and civil penalties, including those from civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease, or conceal an obligation to pay money to the federal government.

- The federal Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program and also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information.

- The federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services.

- The federal transparency requirements, sometimes referred to as the "Sunshine Act," under the Patient Protection and Affordable Care Act, require manufacturers of drugs, devices, biologics and medical supplies that are reimbursable under Medicare, Medicaid, or the Children's Health Insurance Program to report to the Department of Health and Human Services information related to physician payments and other transfers of value and physician ownership and investment interests.

- Analogous state laws and regulations, such as state anti-kickback and false claims laws and transparency laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payers, including private insurers, and some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance.

- Guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other healthcare providers or marketing expenditures and drug pricing.

- Foreign Corrupt Practices Act and its application to marketing and selling practices as well as to clinical trials.

Ensuring that our future business arrangements with third parties comply with applicable healthcare laws and regulations could be costly. It is possible that governmental authorities will conclude that our business practices do not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations were found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines and exclusion from government funded healthcare programs, such as Medicare and Medicaid, any of which could substantially disrupt our operations. If any of the physicians or other providers or entities with whom we expect to do business are found to be out of compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

The FDA and other regulatory agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. If we are found to have improperly promoted off-label uses, we may become subject to significant liability.

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

Even if approved, reimbursement policies could limit our ability to sell our CNS product candidates.

Market acceptance and sales of our product candidates will depend heavily on reimbursement policies and may be affected by healthcare reform measures. Government authorities and third-party payers, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels for those medications. Cost containment is a primary concern in the United States healthcare industry and elsewhere. Government authorities and these third-party payers have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. We cannot be sure that reimbursement will be available for our product candidates and, if reimbursement is available, the level of such reimbursement. Reimbursement may impact the demand for, or the price of, our product candidates. If reimbursement is not available or is available only at limited levels, we may not be able to successfully commercialize our product candidates.

In some foreign countries, particularly in Canada and European countries, the pricing of prescription pharmaceuticals is subject to strict governmental control. In these countries, pricing negotiations with governmental authorities can take six months or longer after the receipt of regulatory approval and product launch. To obtain favorable reimbursement for the indications sought or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidates with other available therapies. If reimbursement for our product candidates is unavailable in any country in which we seek reimbursement, if it is limited in scope or amount, if it is conditioned upon our completion of additional clinical trials, or if pricing is set at unsatisfactory levels, our operating results could be materially adversely affected.

We may seek FDA Orphan Drug designation for one or more of our CNS product candidates. Even if we have obtained FDA Orphan Drug designation for a product candidate, there may be limits to the regulatory exclusivity afforded by such designation.

We may, in the future, choose to seek FDA Orphan Drug designation for one or more of our current or future CNS product candidates. Even if we obtain Orphan Drug designation from the FDA for a product candidate, there are limitations to the exclusivity afforded by such designation. In the U.S., the company that first obtains FDA approval for a designated orphan drug for the specified rare disease or condition receives orphan drug marketing exclusivity for that drug for a period of seven years. This orphan drug exclusivity prevents the FDA from approving another application, including a full NDA to market the same drug for the same orphan indication, except in very limited circumstances, including when the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. For purposes of small molecule drugs, the FDA defines “same drug” as a drug that contains the same active moiety and is intended for the same use as the drug in question. To obtain Orphan Drug status for a drug that shares the same active moiety as an already approved drug, it must be demonstrated to the FDA that the drug is safer or more effective than the approved orphan designated drug, or that it makes a major contribution to patient care. In addition, a designated orphan drug may not receive orphan drug exclusivity if it is approved for a use that is broader than the indication for which it received orphan designation. In addition, orphan drug exclusive marketing rights in the U.S. may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the drug to meet the needs of patients with the rare disease or condition or if another drug with the same active moiety is determined to be safer, more effective, or represents a major contribution to patient care.

Our future growth may depend, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties.

Our future profitability may depend, in part, on our ability to commercialize our product candidates in foreign markets for which we may rely on collaboration with third parties such as our collaboration with AffaMed to develop and commercialize fasedienol in key Asian markets. If we commercialize our product candidates in foreign markets, we would be subject to additional risks and uncertainties, including:

- our customers’ ability to obtain reimbursement for our product candidates in foreign markets;
- our inability to directly control commercial activities because we are relying on third parties;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements;
- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- import or export licensing requirements;
- longer accounts receivable collection times;
- longer lead times for shipping;

- language barriers for technical training;
- reduced protection of intellectual property rights, different standards of patentability and different availability of prior art in some foreign countries as compared with the U.S.;
- the existence of additional potentially relevant third-party intellectual property rights;
- foreign currency exchange rate fluctuations; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

Foreign sales of our product candidates could also be adversely affected by the imposition of governmental controls, political and economic instability, trade restrictions and changes in tariffs.

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of 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. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

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

In addition, we may incur substantial costs to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development, or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties, or other sanctions, which could have a material adverse effect on our operations.

Risks Related to Our Financial Position

We have incurred significant net losses since inception, and we will continue to incur substantial operating losses for the foreseeable future. We may never achieve or sustain profitability, which would depress the market price of our common stock and could cause you to lose all or a part of your investment.

We have incurred significant net losses in each fiscal year since our inception in 1998, including net losses of approximately $59.2 million and $47.8 million during our fiscal years ended March 31, 2023 and 2022, respectively, and approximately $13.5 million during the six months ended September 30, 2023. At March 31, 2023, we had an accumulated deficit of approximately $326.9 million and our auditors have included a qualification to their opinion on our Financial Statements at March 31, 2023 as a result of the uncertainty of our ability to continue as a going concern. Our accumulated deficit increased to approximately $340.3 million at September 30, 2023. We do not know whether or when we will become profitable. Substantially all of our operating losses have resulted from costs incurred in connection with our research and development programs and from general and administrative costs associated with our operations. We expect to incur increasing levels of operating losses over the next several years and for the foreseeable future. Our prior losses, combined with expected future losses, have had and will continue to have an adverse effect on our stockholders' equity and working capital. We expect our research and development expense to significantly increase in connection with planned nonclinical and clinical studies, and out-sourced manufacturing, of our product candidates. As a public company, we incur additional costs associated with operating as a public company. As a result, we expect to continue to incur significant and increasing operating losses for the foreseeable future. Because of the numerous risks and uncertainties associated with developing pharmaceutical products, we are unable to predict the extent of any future losses or when we will become profitable, if at all. Even if we do become profitable, we may not be able to sustain or increase our profitability on a quarterly or annual basis.

Our ability to become profitable depends upon our ability to generate recurring revenues. Through September 30, 2023, we have received approximately $23.0 million, consisting of receipts of non-dilutive cash payments from collaborators, sublicense revenue, including the $5.0 million cash payment received under the AffaMed Agreement during the quarter ended September 30, 2020, approximately $2.6 million of which remains recorded as deferred revenue at September 30, 2023, and research and development grant awards from the U.S. National Institute of Health (*NIH*). We have not yet commercialized any product or generated any revenues from product sales, and we do not know when, or if, we will generate any revenue from product sales. We do not expect to generate significant revenue unless and until we obtain marketing approval of, and begin to experience sales of our current and/or future CNS product candidate, or we enter into one or more development and commercialization agreements with respect our current CNS product candidates or one or more other future CNS product candidates. Our ability to generate recurring revenue depends on a number of factors, including, but not limited to, our ability to:

- initiate and successfully complete nonclinical and clinical trials that meet their prescribed endpoints;
- initiate and successfully complete all safety studies required to obtain U.S. and foreign marketing approval for our CNS product candidates;
- timely complete and compose successful regulatory submissions such as NDAs or comparable documents for both the U.S. and foreign jurisdictions;
- commercialize our CNS product candidates, if approved, by developing a sales force and/or entering into collaborations with third parties for sales and marketing capabilities; and
- achieve market acceptance of our CNS product candidates in the medical community and with third-party payers.

Current volatile and/or recessionary economic conditions in the U.S. or abroad could adversely affect our business or our access to capital markets in a material manner.

To date, our principal sources of capital used to fund our development programs and other operations have been the net proceeds we received from sales of equity securities. We have and will continue to use significant capital for the development of our product candidates, and, as such, we expect to seek additional capital from future issuance(s) of our securities, which may consist of issuances of equity and/or debt securities, to fund our planned operations.

Accordingly, our results of operations and the implementation of both our short-term and long-term business plan could be adversely affected by general conditions in the global economy, including conditions that are outside of our control. A prolonged economic downturn could result in a variety of risks to our business and may have a material adverse effect on us, including limiting or restricting our ability to access capital on favorable terms, or at all, which would limit our ability to obtain adequate financing to maintain our operations.

We may identify future material weaknesses in our internal control over financial reporting. If we are unable to remediate these material weaknesses, or if we fail to establish and maintain adequate internal control over financial reporting, we may not be able to produce timely and accurate financial statements, and we may conclude that our internal control over financial reporting is not effective, which may adversely affect our business.

Ensuring that we have adequate internal control over financial reporting so that we can produce accurate financial statements on a timely basis is a costly and time-consuming effort that needs to be re-evaluated frequently. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with generally accepted accounting principles.

Implementing any future changes to our internal control over financial reporting may entail substantial costs to hire additional personnel, modify our existing processes and will take significant time to fully implement. These changes may not, however, be effective in establishing and maintaining the adequacy of our internal control, and any failure to maintain that adequacy, or consequent inability to produce accurate financial statements on a timely basis, could increase our operating costs and harm our business.

Any failure to maintain or implement required effective internal control over financial reporting, or any difficulties we encounter in their implementation, could result in material weaknesses, cause us to fail to meet our reporting obligations or result in material misstatements in our financial statements. Furthermore, if we cannot provide reliable financial reports or prevent material misstatements due to fraud or error, our business and results of operations could be harmed, and investors could lose confidence in our reported financial information. We also could become subject to investigations by The Nasdaq Stock Market, the Securities and Exchange Commission or other regulatory authorities, which could require additional financial and management resources.

Raising additional capital is likely to cause substantial dilution to our existing stockholders, may restrict our operations or require us to relinquish rights, and may require us to seek stockholder approval to authorize additional shares of our common stock.

We may pursue private and public equity offerings, debt financings, and strategic acquisitions, collaborations and licensing arrangements in the future. To the extent that we raise additional capital through the sale of common stock or securities convertible or exchangeable into common stock, or to the extent, for strategic purposes or in the context of strategic acquisitions, we issue shares of common stock, our current stockholders' ownership interest in our company will be substantially diluted. In addition, the terms of any such securities may include liquidation or other preferences that materially adversely affect the rights of our stockholders. Debt financing, if available, would increase our fixed payment obligations and would involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through collaboration, strategic acquisitions, partnerships and licensing arrangements with third parties, we may have to relinquish valuable rights to our product candidates, our intellectual property, future revenue streams or grant licenses on terms that are not favorable to us.

We may be required to raise additional financing by issuing new securities with terms or rights superior to those of our existing securityholders, which could adversely affect the market price of shares of our common stock and our business.

We will require substantial additional financing to fund future operations, including research and development activities for our CNS product candidates, assuming our clinical development programs are successful and we receive necessary regulatory approvals from the FDA. We may not be able to obtain financing on favorable terms, if at all. If we raise additional funds by issuing equity securities, the percentage ownership of our current stockholders will be reduced, and the holders of the new equity securities may have rights superior to those of our existing security holders, which could adversely affect the market price of our common stock and the voting power of shares of our common stock. If we raise additional funds by issuing debt securities, the holders of these debt securities would similarly have some rights senior to those of our existing securityholders, and the terms of these debt securities could impose restrictions on operations and create a significant interest expense for us, which could have a materially adverse effect on our business.

Our ability to use net operating losses to offset future taxable income is subject to certain limitations.

As of March 31, 2023, we had federal and state net operating loss carryforwards of approximately $191.9 million and $65.2 million, respectively, which began to expire in the year ended March 31, 2022 and will continue to expire in future periods. Under Section 382 of the Internal Revenue Code of 1986, as amended (the *Code*), changes in our ownership may limit the amount of our net operating loss carryforwards that could be utilized annually to offset our future taxable income, if any. This limitation would generally apply in the event of a cumulative change in ownership of our company of more than 50% within a three-year period. Any such limitation may significantly reduce our ability to utilize our net operating loss carryforwards and tax credit carryforwards before they expire. Any such limitation, whether as the result of prior or future offerings of our debt and/or equity securities, private placements, sales of our common stock by our existing stockholders or additional sales of our common stock by us could have a material adverse effect on our results of operations in future years. Although we have completed significantly dilutive equity offerings, including the October 2023 Public Offering, we have not yet completed a study to assess whether an ownership change for purposes of Section 382 has occurred, or whether there have been multiple ownership changes since our inception, due to the significant costs and complexities associated with such study.

General Company-Related Risks

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

Our success depends in part on our continued ability to attract, retain and motivate highly qualified management and technical personnel across multiple key functions, including, but not limited to clinical operations, finance, legal, human resources, information technology, CMC and quality assurance, regulatory affairs and medical affairs. We are highly dependent upon our Chief Executive Officer and Chief Financial Officer, as well as our other senior management personnel, advisors, consultants and scientific and clinical collaborators. As of the date of this Report, we have 33 full-time employees, which may make us more reliant on our individual employees than companies with a greater number of employees. The loss of services of any of these individuals could delay or prevent the successful development of our product candidates or disrupt our administrative functions.

Although we have not historically experienced unique difficulties attracting and retaining qualified employees, we could experience such problems following our change in business plans as a result of the negative results of our PALISADE-1 clinical trial or in the future. As of the date of this Report, a total of nine employees have voluntarily resigned from their positions within the Company since the PALISADE-1 outcome was reported, including our Chief Commercial Officer and Chief Medical Officer. Work conducted by these individuals that furthers our current business plan has assumed by other employees and, when appropriate, based on clinical, regulatory and financial considerations, may be resumed by personnel hired in the future. However, competition for qualified personnel in the pharmaceuticals field is intense, and we may not be able to attract and retain quality personnel on acceptable terms.

In addition, we rely on a broad and diverse range of strategic consultants and advisors, including manufacturing, nonclinical and clinical development and regulatory advisors and CMOs and CROs, to assist us in designing and implementing our research and development and regulatory strategies and plans for our product candidates. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us.

As we seek to advance development of our product candidates, we will need to further expand our research and development capabilities and our contractual arrangements with third parties to provide these capabilities for us. As our operations expand, we expect that we will need to manage additional relationships with various strategic partners and other third parties. Future growth will impose significant added responsibilities on members of management.

Our future financial performance and our ability to develop our product candidates and to compete effectively will depend, in part, on our ability to manage any future growth effectively. To that end, we must be able to manage our research, development and regulatory efforts effectively, and hire, train and integrate additional management, administrative, research and development, regulatory and other personnel. The hiring, training and integration of new employees may be more difficult, costly and/or time-consuming for us because we have fewer resources than a larger organization. We may not be able to accomplish these tasks, and our failure to accomplish any of them could prevent us from successfully growing the Company.

If product liability lawsuits are brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.

As we develop our product candidates. Either on our own or in collaboration with others, we will face inherent risks of product liability as a result of the required clinical testing of such product candidates and will face an even greater risk if we or our collaborators commercialize any such product candidates. For example, we may be sued if any of the product candidates we or our collaborators develop allegedly causes injury or is found to be otherwise unsuitable during product testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability, and a breach of warranties. Claims could also be asserted under state consumer protection acts. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for product candidates that we may develop;
- injury to our reputation;
- withdrawal of clinical trial participants;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients; or
- product recalls, withdrawals or labeling, marketing or promotional restrictions.

Our inability to obtain and retain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop. Although we currently maintain general and product liability insurance, any claim that may be brought against us could result in a court judgment or settlement in an amount that is not covered, in whole or in part, by our insurance or that is in excess of the limits of our insurance coverage. Our insurance policies also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. We will have to pay any amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts.

Unfavorable global economic or political conditions could adversely affect our business, financial condition or results of operations.

Our results of operations could be adversely affected by global political conditions, as well as general conditions in the global economy and in the global financial and stock markets. Global financial and political crises cause extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn, such as the economic downturn triggered by the COVID-19 pandemic, could result in a variety of risks to our business, including, weakened demand for our product candidates and our ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our suppliers, possibly resulting in supply disruption, or cause our customers to delay making payments for our services. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

We or the third parties upon whom we depend may be adversely affected by natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Natural disasters could severely disrupt our operations, and have a material adverse effect on our business, results of operations, financial condition and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure, such as the manufacturing facilities of our third-party CMOs, or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business.

Our business and operations would suffer in the event of cybersecurity or other system failures. Our business depends on complex information systems, and any failure to successfully maintain these systems or implement new systems to handle our changing needs could result in a material disruption of our product candidates' development programs or otherwise materially harm our operations.

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, our proprietary business information and that of our suppliers, as well as personally identifiable information of employees. Similarly, our third-party CROs, CMOs and other contractors and consultants possess certain of our sensitive data. The secure maintenance of this information is material to our operations and business strategy. Despite the implementation of security measures, our internal computer systems and those of our third-party CROs, CMOs and other contractors and consultants are vulnerable to attacks by hackers, damage from computer viruses, unauthorized access, breach due to employee error, malfeasance or other disruptions, natural disasters, terrorism and telecommunication and electrical failures. Additionally, having shifted substantially to remote working arrangements, we also face a heightened risk of cybersecurity attacks or data security incidents and are more dependent on internet and telecommunications access and capabilities. Any such attack or breach could compromise our networks and the information stored there could be accessed, publicly disclosed, lost or stolen. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing amount of focus on privacy and data protection issues with the potential to affect our business, including recently enacted laws in a majority of states requiring security breach notification. Thus, any access, disclosure or other loss of information, including our data being breached at our partners or third-party providers, could result in legal claims or proceedings and liability under laws that protect the privacy of personal information, disruption of our operations, and damage to our reputation, which could adversely affect our business.

While we have not experienced any such system failure, accident, or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our programs. For example, the loss of clinical trial data for fasedienol, itruvone, AV-101 or other product candidates could result in substantial delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or damage to our data or applications or other data or applications relating to our technology or product candidates, or inappropriate disclosure of confidential or proprietary information, we could incur liabilities and the further development of our product candidates could be delayed.

Remote working arrangements could significantly increase the Company's digital and cybersecurity risks.

Most of our employees are geographically dispersed from our headquarters facility in South San Francisco and now routinely work remotely. With the continuing shift to remote working, and the use of virtual board and executive management meetings, cybersecurity risks are exponentially greater, including increased risk of phishing and other cybersecurity attacks as well as increased risk of unauthorized dissemination of sensitive personal information or proprietary or confidential information about us or our customers, employees, or business partners. Despite our cybersecurity measures, we may be more susceptible to security breaches and other security incidents because we have less capability to implement, monitor, and enforce our information security and data protection policies. Techniques or software used to gain unauthorized access, and/or disable, degrade, or harm our systems may be difficult to detect for prolonged periods of time, and we may be unable to anticipate these techniques or put in place protective or preventive measures. The damage or disruption of our systems, or the theft or compromise of our technology, data, or intellectual property, may negatively impact our business, financial condition and results of operations, reputation, stock price and long-term value, which could adversely affect our Company's business.

We may acquire businesses or product candidates, or form strategic alliances, in the future, and we may not realize the benefits of such acquisitions.

We may acquire additional businesses or CNS product candidates, form strategic alliances, or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new product candidates resulting from a strategic alliance, licensing transaction or acquisition that delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition or licensing transaction, we will achieve the expected synergies to justify the transaction.

Current politics in the U.S. could diminish the value of the pharmaceutical industry, thereby diminishing the value of our securities.

The current political environment in the U.S. has led many incumbents and political candidates to propose various measures to reduce the prices for pharmaceuticals. These proposals may receive increasing publicity which, in turn, may cause the investing public to reduce the perceived value of pharmaceutical companies. Any decrease in the overall perception of the pharmaceutical industry may have an adverse impact on our share price and may limit our ability to raise capital needed to continue our drug development programs.

Risks Related to Our Intellectual Property Rights

If we are unable to adequately protect our proprietary technology or obtain and maintain issued patents that are sufficient to protect our product candidates, others could compete against us more directly, which would have a material adverse impact on our business, results of operations, financial condition and prospects.

We strive to protect and enhance the proprietary technologies that we believe are important to our business, including seeking patents intended to cover our product candidates, their compositions and formulations, their methods of use and methods of manufacturing, delivery devices and any other inventions we consider important to the development of our business. We also rely on trade secrets to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection.

Our success will depend significantly on our ability to obtain and maintain patent and other proprietary protection for commercially important technology, inventions and know-how related to our business, to defend and enforce our patents, to preserve the confidentiality of our trade secrets and to operate without infringing the valid and enforceable patents and proprietary rights of third parties. We also rely on know-how, continuing technological innovation and in-licensing opportunities to develop, strengthen and maintain the proprietary position of our product candidates. We own patents and patent applications related to product candidates fasedienol (PH94B), itruvone (PH10), PH80, PH15 and AV-101 and have licensed patents and patent applications related to certain stem cell technology.

Although we own and have licensed issued and patents and pending patent applications relating to our product candidates in the U.S. and selected countries in other markets, we cannot provide any assurances that our pending U.S. and corresponding foreign patent applications will mature into issued patents and, if they do, that any of our patents will include claims with a scope sufficient to protect our product candidates or otherwise provide any competitive advantage.

Moreover, other parties may have developed technologies that may be related or competitive to our product candidates and may have filed or may file patent applications and may have granted or may be granted patents that overlap or conflict with our patent properties, for example, either by claiming the same methods or formulations or by claiming subject matter that could dominate our patent position. Such third-party patent positions may limit or even eliminate our ability to obtain or maintain patent protection and may limit or eliminate our ability to commercialize our product candidates.

The uncertainty about adequate protection includes changes to the patent laws through either legislative action to change statutory patent law or court action that may reinterpret existing law in ways affecting the scope or validity of issued patents. Moreover, relevant laws differ from country to country.

The patent positions of biopharmaceutical companies, including our patent portfolio with respect to our product candidates, involve complex legal and factual questions, and, therefore, the issuance, scope, validity, and enforceability of any patent claims that we may be granted cannot be predicted with certainty.

Our ability to obtain valid and enforceable patents depends, among other factors, on whether the differences between our technology and the prior art allow our inventions to be patentable over the relevant prior art. Such prior art includes, for example, scientific publications, investment blogs, granted patents, and published patent applications. Patent uncertainty cannot be eliminated because of the potential existence of other prior art, about which we are currently unaware, that may be relevant to our patent applications and patents and that may prevent a pending patent application from being granted or result in an issued patent being held invalid or unenforceable. Moreover, the relevant standards for granting and reviewing patents vary among the countries in which we pursue patents.

In addition, some patent-related uncertainty exists because of the challenge of finding and addressing all of the relevant and material prior art in the biotechnology and pharmaceutical fields. For example, there are numerous reports in the scientific literature of compounds that target similar cellular receptors as do certain of our product candidates or that were evaluated in early (often pre-clinical) studies that did not progress to regulatory approval. In addition, even some reports in the trade press and public announcements made by us before the filing date of our AV-101 patent applications mentioned that AV-101 was in development for certain therapeutic purposes. For example, we published a web post on the NIH clinical trials website prior to the filing of our initial AV-101 patent application, which describes unit doses for a then future study but does not mention the treatment of depression and does not provide any preclinical or clinical study data relating to depression or any other medical condition, disease or disorder. This post was not submitted to the United States Patent and Trademark Office (*USPTO*) in our two granted U.S. patents related to (i) unit dose formulations of AV-101 effective to treat depression and (ii) methods of treating depression with AV-101, respectively. However, it was submitted in two continuation depression-related AV-101 patent applications that have similar claims, and the USPTO did not make further rejections based on that post. Another source of uncertainty pertains to patent properties that were in-licensed by us for which prior art submissions were under the control of the licensor. We rely on these licensors to satisfy the relevant disclosure obligations.

In the event any previously published prior art is deemed to be invalidating prior art, it may cause certain of our issued patents to be invalid and/or unenforceable, which would cause us to lose at least part, and perhaps all, of the patent protection on relevant product candidates. Such a loss of patent protection would have a material adverse impact on our business.

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

The USPTO and various other foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment, and other provisions during the patent process. There are situations in which noncompliance can result in the abandonment or lapse of a patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case.

Even if patents do successfully issue, third parties may challenge the validity, enforceability, or scope of such issued patents or any other issued patents we own or license, which may result in such patents being narrowed, invalidated, or held unenforceable.

United States and foreign patents and patent applications may be subject to various types of infringement and validity proceedings, including interference proceedings, *ex parte* reexamination, *inter partes* review proceedings, supplemental examination, and challenges in district court. Patents may be subjected to opposition, post-grant review, invalidity actions, or comparable proceedings lodged in various foreign, both national and regional, patent offices or courts. These proceedings could result in loss of the patent or denial of the patent application or loss or reduction in the scope of one or more of the claims of the patent or patent in such a way that they no longer cover our product candidates or competitive products.

Furthermore, though an issued patent is presumed valid and enforceable, its issuance is not conclusive as to its validity or its enforceability, and the patent may not provide us with adequate proprietary protection or competitive advantages against competitors with similar products. Even if a patent is granted and is held to be valid and enforceable, competitors may be able to design around our patents, for example, by using pre-existing or newly developed technology. Other parties may develop and obtain patent protection for more effective technologies, designs, or methods.

If we or one of our licensing partners initiated legal proceedings against a third-party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge include alleged failures to meet any of several statutory requirements, including lack of novelty, obviousness, and non-enablement. Grounds for unenforceability assertions include allegations that someone connected with the prosecution of the patent withheld relevant information from the USPTO or made a misleading statement during prosecution.

Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection would have a material adverse impact on our business.

In addition, such patent-related proceedings may be costly. Thus, any patent properties that we may own or exclusively license ultimately may not provide commercially meaningful protection against competitors. Furthermore, an adverse decision in an interference proceeding can result in a third party receiving the patent right sought by us, which in turn could affect our ability to develop, market, or otherwise commercialize our product candidates.

We may not be able to prevent the unauthorized disclosure or use of our technical knowledge or trade secrets by consultants, vendors, or former or current employees. The laws of some foreign countries do not protect our proprietary rights to the same extent as the laws of the United States, and we may encounter significant problems in protecting our proprietary rights in these countries. If these developments were to occur, they could have a material adverse effect on our sales.

Our ability to enforce our patent rights also depends on our ability to detect infringement. It is difficult to detect infringers who do not advertise the components or manufacturing processes that are used in their products. Moreover, it may be difficult or impossible to obtain evidence of infringement by a competitor’s or potential competitor’s product. Any litigation to enforce or defend our patent rights, even if we were to prevail, could be costly and time-consuming and would divert the attention of our management and key personnel from our business operations. We may not prevail in any lawsuits we initiate, and the damages or other remedies awarded if we prevailed may not be commercially meaningful.

In addition, proceedings to enforce or defend our patents could put our patents at risk of being invalidated, held unenforceable, or interpreted narrowly. Such proceedings could also provoke third parties to assert claims against us, including that some or all of the claims in one or more of our patents are invalid or otherwise unenforceable. If any patents covering our product candidates are invalidated or found unenforceable, our financial position and results of operations could be materially and adversely impacted. In addition, if a court found that valid, enforceable patents held by third parties covered our product candidates, our financial position and results of operations could also be materially and adversely impacted.

Overall, the degree of future protection for our proprietary rights is uncertain, and we cannot ensure that:

- any granted patents related to our product candidates or any pending patent applications, if granted and challenged by others, will include or maintain claims having a scope sufficient to protect[?]-----these product candidates or any other products or product candidates against generic or other competition, particularly considering that any patent rights to these compounds *per se* have expired;
- any of our pending patent applications will issue as patents at all;
- we will be able to successfully commercialize our product candidates, if approved, before our relevant patents expire;
- we were the first to make the inventions covered by each of our patents and pending patent applications;
- we were the first to file patent applications for these inventions;
- others will not develop similar or alternative technologies that do not infringe our patents;
- others will not use pre-existing technology to effectively compete against us;
- any of our patents, if issued, will ultimately be found to be valid and enforceable, including on the basis of prior art relating to our patent applications and patents;
- any patents currently held or issued to us in the future will provide a basis for an exclusive market for our commercially viable products, will provide us with any competitive advantages or will not be challenged by third parties;
- we will develop additional proprietary technologies or product candidates that are separately patentable; or
- our commercial activities or products will not infringe upon the patents or proprietary rights of others.

We also may rely upon unpatented trade secrets, unpatented know-how, and continuing technological innovation to develop and maintain our competitive position, which we seek to protect, in part, by confidentiality agreements with our employees and our collaborators and consultants. It is possible that technology relevant to our business will be independently developed by a person that is not a party to such an agreement. Furthermore, if the employees, collaborators, and consultants who are parties to these agreements breach or violate the terms of these agreements, we may not discover or have adequate remedies for any such breach or violation, and we could lose our trade secrets through such breaches or violations. Further, our trade secrets could otherwise become known or be independently discovered by our competitors.

Third parties may initiate legal proceedings against us, alleging that we infringe their intellectual property rights, which may prevent or delay our product development efforts and stop us from commercializing candidate products or increase the costs of commercializing them if approved. Also, we may file counterclaims or initiate other legal proceedings against third parties to challenge the validity or scope of their intellectual property rights, the outcomes of which also would be uncertain and could have a material adverse effect on the success of our business.

We cannot assure that our business, product candidates, and proprietary methods do not or will not infringe the patents or other intellectual property rights of third parties. Third parties may initiate legal proceedings against us or our licensors or collaborators, alleging that we or our licensors or collaborators infringe their intellectual property rights. In addition, we or our licensors or collaborators may file counterclaims in such proceedings or initiate separate legal proceedings against third parties to challenge the validity or scope of their intellectual property rights, including in oppositions, interferences, reexaminations, *inter partes* reviews, or derivation proceedings before the United States or other jurisdictions.

Our success will depend in part on our ability to operate without infringing the intellectual property and proprietary rights of third parties. Success also will depend on our ability to prevail in litigation if we are sued for infringement or to resolve litigation matters with rights and at costs favorable to us.

The biopharmaceutical industry is characterized by extensive litigation regarding patents and other intellectual property rights. Other parties may allege that our product candidates or the use of our technologies infringes their patent claims or other intellectual property rights held by them or that we are employing their proprietary technology without authorization. As we continue to develop and, if approved, commercialize our current product candidates and future product candidates, competitors may claim that our technology infringes their intellectual property rights as part of their business strategies designed to impede our successful commercialization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, third parties may have currently pending patent applications that later result in issued patents that our product candidates may infringe, or that such third parties assert are infringed by our technologies.

The foregoing types of proceedings can be expensive and time-consuming and many of our own or our licensors' or collaborators' adversaries in these proceedings may have the ability to dedicate substantially greater resources to prosecuting these kinds of legal actions than we or our licensors or collaborators can dedicate. Our defense of litigation or other proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, the misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States or the European Union.

The outcome of intellectual property litigation is subject to uncertainties that cannot be adequately quantified in advance. The coverage of patents is subject to interpretation by the courts, and the interpretation is not always uniform. If we are sued for patent infringement, we would need to demonstrate that our product candidates, products, or methods either do not infringe the patent claims of the relevant patent or that the patent claims are invalid, and we may not be able to do this. 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 pursuing these proceedings, which could have a material adverse effect on us. In addition, we may not have sufficient financial resources to bring these actions to a successful conclusion.

An unfavorable outcome in the foregoing kinds of proceedings could require us or our licensors or collaborators to cease using the related technology or developing or commercializing our product candidates or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us or our licensors or collaborators a license on commercially reasonable terms or at all. Even if we or our licensors or collaborators obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us or our licensors or collaborators.

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.

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

Patent litigation and other types of intellectual property litigation can involve complex factual and legal questions, and litigation outcomes are uncertain. Any claim relating to intellectual property infringement that is successfully asserted against us may require us to pay substantial damages, including treble damages and attorney's fees if we are found to have willfully infringed a third party's patents, for past use of the asserted intellectual property and royalties and other consideration going forward if we are forced to take a license. In addition, if any such claim is successfully asserted against us and we are unable to obtain such a license, we may be forced to stop or delay developing, manufacturing, selling or otherwise commercializing our product candidates.

Patent litigation and other types of intellectual property litigation is costly and time-consuming. We may not have sufficient resources to bring these actions to a successful conclusion. Even if we are successful in these proceedings, we may incur substantial costs and divert management time and attention in pursuing these proceedings, which could have a material adverse effect on us. If we are unable to avoid infringing the patent rights of others, we may be required to seek a license, defend an infringement action or challenge the validity of the patents in court, or redesign our products.

In addition, intellectual property litigation or claims could force us to do one or more of the following:

- cease developing, selling or otherwise commercializing our product candidates;
- pay substantial damages for past use of the asserted intellectual property;
- obtain a license from the holder of the asserted intellectual property, which license may not be available on commercially reasonable terms, if at all; and
- in the case of trademark claims, redesign, or rename, some or all of our product candidates to avoid infringing the intellectual property rights of third parties, which may not be possible and, even if possible, could be costly and time-consuming.

Any of these risks coming to fruition could have a material adverse effect on our business, results of operations, financial condition and prospects.

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

We enter into confidentiality and intellectual property assignment agreements with our employees, consultants, outside scientific collaborators, sponsored researchers, and other advisors. These agreements generally provide that inventions conceived by the party in the course of rendering services to us will be our exclusive property. However, these agreements may not be honored and may not effectively assign intellectual property rights to us. For example, even if we have a consulting agreement in place with an academic advisor pursuant to which such academic advisor is required to assign any inventions developed in connection with providing services to us, such academic advisor may not have the right to assign such inventions to us, as it may conflict with his or her obligations to assign their intellectual property to his or her employing institution.

Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

We do not seek to protect our intellectual property rights in all jurisdictions throughout the world, and we may not be able to adequately enforce our intellectual property rights even in the jurisdictions where we seek protection.

Filing, prosecuting, and defending patents on product candidates in all countries and jurisdictions throughout the world is prohibitively expensive, and our intellectual property rights in some countries outside the U.S. could be less extensive than those in the U.S., assuming that rights are obtained in the U.S. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the U.S. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the U.S., or from selling or importing products made using our inventions in and into the U.S. or other jurisdictions. The statutory deadlines for pursuing patent protection in individual foreign jurisdictions are based on the priority filing date of each of our patent applications and the time periods allowed for filing related applications in a given country. Thus, for each of the patent families that we believe provide coverage for our lead product candidates or technologies, we will need to decide where and when to pursue protection outside the U.S.

Competitors may use our technologies in jurisdictions where we do not pursue and obtain 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 U.S. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing. Even if we pursue and obtain issued patents in particular jurisdictions, our patent claims or other intellectual property rights may not be effective or sufficient to prevent third parties from so competing.

The laws of some foreign countries do not protect intellectual property rights to the same extent as the laws of the U.S. Many companies have encountered significant problems in protecting and defending intellectual property rights in certain foreign jurisdictions. The legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, especially those relating to biotechnology and pharmaceuticals. This could make it difficult for us to stop the infringement of our patents if obtained, or the misappropriation of our other intellectual property rights. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties under certain circumstances. In addition, many countries limit the enforceability of patents against third parties, including government agencies or government contractors. In these countries, patents may provide limited or no benefit. Patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries.

An unfavorable outcome could require us or our licensors or collaborators to cease using the related technology or developing or commercializing our product candidates, or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us or our licensors or collaborators a license on commercially reasonable terms or at all. Even if we or our licensors or collaborators obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us or our licensors or collaborators. 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.

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

Furthermore, proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put 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 in relevant foreign jurisdictions may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

We are dependent, in part, on licensed intellectual property. If we were to lose our rights to licensed intellectual property, we may not be able to continue developing or commercializing our product candidates if approved. If we breach any of the agreements under which we license the use, development, and commercialization rights to our product candidates or technology from third parties or, in certain cases, we fail to meet certain development or payment deadlines, we could lose license rights that are important to our business.

For certain stem cell technologies, we are a party to a number of license agreements under which we are granted rights to intellectual properties that are or could become important to our business. Our existing license agreements impose, and we expect that any future license agreements will impose on us, various development, regulatory, and/or commercial diligence obligations, payment of fees, milestones and/or royalties, and other obligations. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to develop or market products, which could be covered by the license. Our business could suffer, for example, if any current or future licenses terminate, if the licensors fail to abide by the terms of the license, if the licensed patents or other rights are found to be invalid or unenforceable, or if we are unable to enter into necessary licenses on acceptable terms.

As we have done previously, we may need to obtain licenses from third parties to advance our research or allow the commercialization of our product candidates, and we cannot provide any assurances that third-party patents do not exist that might be enforced against our current product candidates or future products in the absence of such a license. We may fail to obtain any of these licenses on commercially reasonable terms, if at all. Even if we are able to obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop or commercialize the affected product candidates, which could materially harm our business, and the third parties owning such intellectual property rights could seek either an injunction prohibiting our sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation.

Licensing of intellectual property is of critical importance to our business and involves complex legal, business and scientific issues. Disputes may arise between us and our licensors regarding intellectual property subject to a license agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- whether and the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- our right to sublicense patent and other rights to third parties under collaborative development relationships;
- our diligence obligations with respect to the use of the licensed technology in relation to our development and commercialization of our product candidates, and what activities satisfy those diligence obligations; and
- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

We have entered into several licenses, both in-license agreements and out-license agreements, to support and leverage our various stem cell technology-related programs. We may enter into additional license(s) to third-party intellectual property that are necessary or useful to our business. Our current licenses, and any future licenses that we may enter into, impose various royalty payments, milestone, and other obligations on us. For example, the licensor may retain control over patent prosecution and maintenance under a license agreement, in which case, we may not be able to adequately influence patent prosecution or prevent inadvertent lapses of coverage due to failure to pay maintenance fees. If we fail to comply with any of our obligations under a current or future license agreement, our licensor(s) may allege that we have breached our license agreement and may accordingly seek to terminate our license with them. In addition, future licensor(s) may decide to terminate our license at will. Termination of any of our current or future licenses could result in our loss of the right to use the licensed intellectual property, which could materially adversely affect our ability to develop and commercialize a product candidate or product, if approved, as well as harm our competitive business position and our business prospects.

In addition, if our licensors fail to abide by the terms of the license, if the licensors fail to prevent infringement by third parties, if the licensed patents or other rights are found to be invalid or unenforceable, or if we are unable to enter into necessary licenses on acceptable terms our business could suffer.

Some intellectual property that we have licensed may have been discovered through government-funded programs and thus may be subject to federal regulations such as "march-in" rights, certain reporting requirements, and a preference for U.S. industry. Compliance with such regulations may limit our exclusive rights, subject us to an expenditure of resources with respect to reporting requirements and limit our ability to contract with non-U.S. manufacturers.

Some of the intellectual property rights we have licensed or will license in the future may have been generated through the use of U.S. government funding and may therefore be subject to certain federal regulations. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future product candidates pursuant to the Bayh-Dole Act of 1980 (*Bayh-Dole Act*). These U.S. government rights in certain inventions developed under a government-funded program include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose.

In addition, the U.S. government has the right to require us to grant exclusive, partially exclusive, or non-exclusive licenses to any of these inventions to a third party if it determines that: (i) adequate steps have not been taken to commercialize the invention; (ii) government action is necessary to meet public health or safety needs; or (iii) government action is necessary to meet requirements for public use under federal regulations (also referred to as "march-in rights"). The U.S. government also has the right to take title to these inventions if we fail, or the applicable licensor fails, to disclose the invention to the government and fail to file an application to register the intellectual property within specified time limits. Also, the U.S. government may acquire title to these inventions in any country in which a patent application is not filed within specified time limits.

Intellectual property generated under a government funded program is further subject to certain reporting requirements, compliance with which may require us, or the applicable licensor, to expend substantial resources. In addition, the U.S. government requires that any products embodying the subject invention or produced through the use of the subject invention be manufactured substantially in the U.S. The manufacturing preference requirement can be waived if the owner of the intellectual property can show that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the U.S. or that under the circumstances domestic manufacture is not commercially feasible. This preference for U.S. manufacturers may limit our ability to contract with non-U.S. product manufacturers for products covered by such intellectual property.

In the event that we apply for additional U.S. government funding and we discover compounds or drug candidates as a result of such funding, intellectual property rights to such discoveries may be subject to the applicable provisions of the Bayh-Dole Act.

If we do not obtain additional protection under the Hatch-Waxman Amendments and similar foreign legislation by extending the patent terms and obtaining data exclusivity for our product candidates, our business may be materially harmed.

In the U.S., depending upon the timing, duration and specifics of FDA marketing approval of our product candidates, one or more of the U.S. patents we own or license may be eligible for limited patent term restoration under the Drug Price Competition and Patent Term Restoration Act of 1984, referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, we may not be granted an extension because of, for example, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. For example, we may not be granted an extension if the active ingredient of PH94B, PH10 or AV-101 is used in another drug company's product candidate and that product candidate is the first to obtain FDA approval.

Moreover, the applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or restoration or the term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our ability to generate revenues could be materially adversely affected.

Similar kinds of patent term and regulatory and data protection periods are available outside of the U.S. We will pursue such opportunities to extend the exclusivity of our products, but we cannot predict the availability of such exclusivity pathways or that we will be successful in pursuing them.

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

As is the case with other pharmaceutical and biotechnology companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity and is therefore costly, time-consuming, and inherently uncertain. In addition, the U.S., in recent years, enacted and is currently implementing wide-ranging patent reform legislation: the Leahy-Smith America Invents Act, referred to as the America Invents Act. The America Invents 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. It is not yet clear what, if any, impact the America Invents Act will have on the operation of our business. However, the America Invents Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of any patents that may issue from our patent applications, all of which could have a material adverse effect on our business and financial condition.

In addition, recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. The full impact of these decisions is not yet known. For example, on March 20, 2012, in *Mayo Collaborative Services, DBA Mayo Medical Laboratories, et al. v. Prometheus Laboratories, Inc.*, the Court held that several claims drawn to measuring drug metabolite levels from patient samples and correlating them to drug doses were not patentable subject matter. The decision appears to impact diagnostics patents that merely apply a law of nature via a series of routine steps, and it has created uncertainty around the ability to obtain patent protection for certain inventions. Additionally, on June 13, 2013 in *Association for Molecular Pathology v. Myriad Genetics, Inc*., the Court held that claims to isolated genomic DNA are not patentable but claims to complementary DNA molecules are patent eligible because they are not a natural product. The effect of the decision on patents for other isolated natural products is uncertain.

Additionally, on March 4, 2014, the USPTO issued a memorandum to patent examiners providing guidance for examining claims that recite laws of nature, natural phenomena, or natural products under the Myriad and Prometheus decisions. This guidance did not limit the application of Myriad to DNA but, rather, applied the decision to other natural products. Further, in 2015, in *Ariosa Diagnostics, Inc. v. Sequenom, Inc*., the Court of Appeals for the Federal Circuit held that methods for detecting fetal genetic defects were not patent-eligible subject matter. Other more recent court decisions and related USPTO examination guidelines must be considered, particularly as they relate to changes in what types of inventions are eligible for patent protection. Foreign patent and intellectual property laws are also evolving and are not predictable as to their impact on the Company and other biopharmaceutical companies.

In addition to increasing uncertainty regarding our ability to obtain future patents, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on these and other decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce any patents that may issue in the future.

We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

Certain of our current employees have been, and certain of our future employees may have been, previously employed at other biotechnology or pharmaceutical companies, including our competitors or potential competitors. We also engage advisors and consultants who are concurrently employed at universities or who perform services for other entities.

Although we are not aware of any claims currently pending or threatened against us, we may be subject to claims that we or our employees, advisors, or consultants have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of a former employer or another third party. We have and may in the future also be subject to claims that an employee, advisor or consultant performed work for us that conflicts with that person’s obligations to a third party, such as an employer, and thus, that the third party has an ownership interest in the intellectual property arising out of work performed for us. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management. If we fail to defend such claims, in addition to paying monetary claims, we may lose valuable intellectual property rights or personnel. A loss of key personnel or their work product could hamper or prevent our ability to commercialize our product candidates, which would materially adversely affect our commercial development efforts.

Numerous factors may limit any potential competitive advantage provided by our intellectual property rights.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and may not adequately protect our business, provide a barrier to entry against our competitors or potential competitors, or permit us to maintain our competitive advantage. Moreover, if a third party has intellectual property rights that cover the practice of our technology, we may not be able to fully exercise or extract value from our intellectual property rights. The following examples are illustrative:

- others may be able to develop and/or practice technology that is similar to our technology or aspects of our technology but that is not covered by the claims of patents, should such patents issue from our patent applications;

- we might not have been the first to make the inventions covered by a pending patent application that we own;

- we might not have been the first to file patent applications covering an invention;
- others may independently develop similar or alternative technologies without infringing our intellectual property rights;
- pending patent applications that we own or license may not lead to issued patents;
- patents, if issued, that we own or license may not provide us with any competitive advantages, or may be held invalid or unenforceable or be narrowed, as a result of legal challenges by our competitors;
- third parties may compete with us in jurisdictions where we do not pursue and obtain patent protection;
- we may not be able to obtain and/or maintain necessary or useful licenses on reasonable terms or at all; and
- the patents of others may have an adverse effect on our business.

Should any of these events occur, they could significantly harm our business and results of operations.

Risks Related to our Securities

If we fail to comply with the continued listing requirements of the Nasdaq Capital Market, our common stock may be delisted and the price of our common stock and our ability to access the capital markets could be negatively impacted.

Although we are currently in compliance with Nasdaq's continued listing standards, no assurance can be given that we will continue to meet applicable Nasdaq continued listing standards. Failure to meet applicable Nasdaq continued listing standards could result in a delisting of our common stock, which could materially reduce the liquidity of our common stock and result in a corresponding material reduction in the price of our common stock. In addition, delisting could harm our ability to raise capital through alternative financing sources on terms acceptable to us, or at all, and may result in the inability to advance our drug development programs, potential loss of confidence by investors and employees, and fewer business development opportunities.

Market volatility may affect our stock price and the value of your investment.

The market price for our common stock, similar to that of other biopharmaceutical companies, is likely to remain highly volatile. The market price of our common stock may fluctuate significantly in response to a number of factors, most of which we cannot control, including, among others:

- volatility resulting from uncertainty and general economic conditions;
- plans for, progress of or results from nonclinical and clinical development activities related to our product candidates;
- the failure of the FDA or other regulatory authority to approve our product candidates;
- announcements of new products, technologies, commercial relationships, acquisitions or other events by us or our competitors;
- the success or failure of other CNS therapies;
- regulatory or legal developments in the U.S. and other countries;
- announcements regarding our intellectual property portfolio;
- failure of our product candidates, if approved, to achieve commercial success;
- fluctuations in stock market prices and trading volumes of similar companies;
- general market conditions and overall fluctuations in U.S. equity markets;
- variations in our quarterly operating results;
- changes in our financial guidance or securities analysts' estimates of our financial performance;
- changes in accounting principles;

- our ability to raise additional capital and the terms on which we can raise it;
- sales or purchases of large blocks of our common stock, including sales or purchases by our executive officers, directors and significant stockholders;
- establishment of short positions by holders or non-holders of our stock or warrants;
- additions or departures of key personnel;
- discussion of us or our stock price by the press and by online investor communities; and
- other risks and uncertainties described in these risk factors.

Future sales and issuances of our common stock may cause our stock price to decline.

Sales or issuances of a substantial number of shares of our common stock in the public market, or the perception that such sales or issuances are occurring or might occur, including under our Sales Agreement, could significantly reduce the market price of our common stock and impair our ability to raise adequate capital through the sale of additional equity securities.

The stock market in general, and small biopharmaceutical companies like ours in particular, have frequently experienced significant volatility in the market prices for securities that often has been unrelated to the operating performance of the underlying companies. These broad market and industry fluctuations may adversely affect the market price of our common stock, regardless of our actual operating performance. In certain situations in which the market price of a stock has been volatile, holders of that stock have instituted securities class action litigation against the company that issued the stock. If any of our stockholders were to bring a lawsuit against us, the defense and disposition of the lawsuit could be costly and divert the time and attention of our management and harm our operating results. Additionally, if the trading volume of our common stock remains low and limited there will be an increased level of volatility and you may not be able to generate a return on your investment.

If equity research analysts do not publish research or reports about our business or if they issue unfavorable commentary or downgrade our common stock, the price of our common stock could decline.

The trading market for our common stock relies in part on the research and reports that equity research analysts publish about us and our business. We do not control these analysts. The price of our common stock could decline if one or more equity research analysts downgrade our common stock or if such analysts issue other unfavorable commentary or cease publishing reports about us or our business.

There may be additional issuances of shares of preferred stock in the future.

Our Restated Articles of Incorporation, as amended (the *Articles*), permit us to issue up to 10.0 million shares of preferred stock. As a result, our Board could authorize the issuance of additional series of preferred stock in the futures and such preferred stock could grant holders preferred rights to our assets upon liquidation, the right to receive dividends before dividends would be declared to holders of our common stock, and the right to the redemption of such shares, possibly together with a premium, prior to the redemption of the common stock. In the event and to the extent that we do issue additional preferred stock in the future, the rights of holders of our common stock could be impaired thereby, including without limitation, with respect to liquidation.

We do not intend to pay dividends on our common stock and, consequently, our stockholders' ability to achieve a return on their investment will depend on appreciation in the price of our common stock.

We have never declared or paid any cash dividend on our common stock and do not currently intend to do so in the foreseeable future. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate declaring or paying any cash dividends in the foreseeable future. Therefore, the success of an investment in shares of our common stock will depend upon any future appreciation in their value. There is no guarantee that shares of our common stock will appreciate in value or even maintain the price at which our stockholders purchased them.

We incur significant costs to ensure compliance with corporate governance, federal securities law and accounting requirements.

We are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended (*Exchange Act*), which requires that we file annual, quarterly and current reports with respect to our business and financial condition, and the rules and regulations implemented by the SEC, the Sarbanes-Oxley Act of 2002, the Dodd-Frank Act, and the Public Company Accounting Oversight Board, each of which imposes additional reporting and other obligations on public companies. We have incurred and will continue to incur significant costs to comply with these public company reporting requirements, including accounting and related audit costs, legal costs to comply with corporate governance requirements and other costs of operating as a public company. These legal and financial compliance costs will continue to require us to divert significant resources that we could otherwise use to achieve our research and development and other strategic objectives.

The filing and internal control reporting requirements imposed by federal securities laws, rules and regulations on companies that are not "smaller reporting companies" under federal securities laws are rigorous and, once we are no longer a smaller reporting company, we may not be able to meet them, resulting in a possible decline in the price of our common stock and our inability to obtain future financing. Certain of these requirements may require us to carry out activities we have not done previously and complying with such requirements may divert management's attention from other business concerns, which could have a material adverse effect on our business, results of operations, financial condition and cash flows. Any failure to adequately comply with applicable federal securities laws, rules or regulations could subject us to fines or regulatory actions, which may materially adversely affect our business, results of operations and financial condition.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We will continue to invest resources to comply with evolving laws, regulations and standards, however this investment may result in increased general and administrative expense and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

None.

Item 3. Defaults upon Senior Secured Securities

None.

Item 5. Other Information.

During the fourth quarter of Fiscal 2022, we entered into a consulting agreement (the "*FitzPatrick Co. Consulting Agreement*") with FitzPatrick Co. LLC, a consulting firm for which Margaret FitzPatrick, an independent member of our Board, is Chief Executive Officer, to provide corporate development and public relations advisory services. The FitzPatrick Co. Consulting Agreement, as amended, was set to expire on December 31, 2023. However, the Company and FitzPatrick Co. LLC mutually agreed to conclude the term of the FitzPatrick Co Consulting Agreement effective October 1, 2023 by entering into Amendment No. 4 to the FitzPatrick Co Consulting Agreement on November 9, 2023 (the "*FitzPatrick Co Amendment*") as all matters set forth in the statement of work were completed as of that date.

The foregoing description of the FitzPatrick Co Amendment is not complete and is qualified in its entirety by reference to the full text of the FitzPatrick Co Amendment, which is attached to this Report as Exhibit 10.2.

Item 6. Exhibits

Exhibit Number	Description
1.1	Underwriting Agreement, dated as of October 2, 2023, by and among the Company, Jefferies LLC, Stifel, Nicolaus & Company, Incorporated and William Blair & Company, L.L.C., incorporated by reference from Exhibit 1.1 to the Company's Current Report on Form 8-K filed on October 4, 2023.
4.1	Form of Pre-Funded Warrant (October 2023 Public Offering), incorporated by reference from Exhibit 4.1 to the Company's Current Report on Form 8-K filed on October 4, 2023.
4.2	Form of T1 Warrant (October 2023 Public Offering), incorporated by reference from Exhibit 4.2 to the Company's Current Report on Form 8-K filed on October 4, 2023.
4.3	Form of T2 Warrant (October 2023 Public Offering), incorporated by reference from Exhibit 4.3 to the Company's Current Report on Form 8-K filed on October 4, 2023.
10.1	Indemnification Agreement, dated October 24, 2023, by and between Vistagen Therapeutics, Inc. and Joshua Prince, incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K filed on October 26, 2023.
10.2*	Amendment No. 4 to Consulting Agreement by and between the Company and FitzPatirck Co. LLC, dated November 9, 2023.
31.1*	Certification of the Principal Executive Officer required by Rule 13a-14(a) under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of the Principal Financial Officer required by Rule 13a-14(a) under the Securities Exchange Act of 1934, as amended, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32*	Certification of the Principal Executive and Financial Officers required by Rule 13a-14(b) and Section 1350 of Chapter 63 of Title 18 of the United States Code, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS *	The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH*	Inline XBRL Taxonomy Extension Schema
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase
101.PRE*	Inline XBRL Taxonomy Extension Presentation Linkbase
104*	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

* Filed herewith.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned thereunto duly authorized.

VISTAGEN THERAPEUTICS, INC.

Dated: November 9, 2023

/s/ Shawn K. Singh
Shawn K. Singh
Chief Executive Officer
(Principal Executive Officer)

/s/ Cynthia L. Anderson
Cynthia L. Anderson
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 10.2

AMENDMENT NO. 4

TO

CONSULTING SERVICES AGREEMENT

This Amendment ("Amendment No. 4") is made between **Vistagen Therapeutics, Inc.**, a Nevada corporation having an address at 343 Allerton Avenue, South San Francisco, California 94080 ("Vistagen"), and **FitzPatrick & Co. LLC**, a Delaware limited liability company, having an address at 2023 Allen Place, NW, Washington DC 20009 ("Consultant"), and is effective as of October 1, 2023.

WHEREAS, Vistagen and Consultant entered into a Consulting Services Agreement dated January 21, 2022, as amended by Amendment No. 1 dated June 1, 2022, as amended by Amendment No. 2 dated January 1, 2023, and as amended by Amendment No. 3 dated July 1, 2023 (collectively, the "Agreement"); and

WHEREAS, the parties mutually wish to conclude the term of the Agreement.

Vistagen and Consultant, therefore, agree as follows:

AMENDMENT

1. The term of this Agreement shall expire on October 1, 2023.

Except as expressly provided in this Amendment No. 4, the terms of the Agreement remain unchanged.

Each party is signing this agreement with the party's authorized signature.

AGREED TO:	**AGREED TO:**
VISTAGEN THERAPEUTICS, INC.	**FITZPATRICK & CO., LLC**
By: /s/ Shawn K. Singh, J.D.	By: /s/ Margaret Mary FitzPatrick
Name: Shawn K. Singh, J.D.	Name: Margaret Mary FitzPatrick
Title: Chief Executive Officer	Title: Chief Executive Officer
Date: November 9, 2023	Date: November 9, 2023

EXHIBIT 31.1

CERTIFICATION

I, Shawn K. Singh, certify that;

1. I have reviewed this quarterly report on Form 10-Q of Vistagen Therapeutics, Inc.;

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

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

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

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

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

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

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

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

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

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

November 9, 2023

/s/ *Shawn K. Singh*
Shawn K. Singh
Principal Executive Officer

EXHIBIT 31.2

CERTIFICATION

I, Cynthia L. Anderson, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Vistagen Therapeutics, Inc.;

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

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

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

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

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

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

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

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

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

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

November 9, 2023

/s/ *Cynthia L. Anderson*
Cynthia L. Anderson
Principal Financial Officer

EXHIBIT 32

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

In connection with the Quarterly Report on Form 10-Q of Vistagen Therapeutics, Inc. (the "*Company*") for the quarter ended September 30, 2023, as filed with the Securities and Exchange Commission on the date hereof (the "*Report*"), Shawn K. Singh, JD, the Company's Principal Executive Officer, and Cynthia L. Anderson, the Company's Principal Financial Officer, certify, pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that to the best of their knowledge:

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

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

November 9, 2023

/s/ *Shawn K. Singh*
Shawn K. Singh
Principal Executive Officer

/s/ *Cynthia L. Anderson*
Cynthia L. Anderson
Principal Financial Officer