

VistaGen Therapeutics, Inc.  
Form 10-Q  
February 12, 2018

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 December 31, 2017  
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 (I.R.S. Employer  
incorporation or organization) 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)

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

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

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

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

(do not check if a smaller reporting 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 February 9, 2018, 22,902,615 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 December 31, 2017

TABLE OF CONTENTS

	Page
<u>PART I. FINANCIAL INFORMATION</u>	
<u>Item 1. Condensed Consolidated Financial Statements (Unaudited)</u>	
<u>Condensed Consolidated Balance Sheets at December 31, 2017 and March 31, 2017</u>	1
<u>Condensed Consolidated Statements of Operations and Comprehensive Loss for the three and nine months ended December 31, 2017 and 2016</u>	2
<u>Condensed Consolidated Statements of Cash Flows for the nine months ended December 31, 2017 and 2016</u>	3
<u>Condensed Consolidated Statement of Changes in Stockholders' Equity for the nine months ended December 31, 2017</u>	4
<u>Notes to the Condensed Consolidated Financial Statements</u>	5
<u>Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	16
<u>Item 4. Controls and Procedures</u>	31
<u>PART II. OTHER INFORMATION</u>	
<u>Item 1. Legal Proceedings</u>	31
<u>Item 1A. Risk Factors</u>	31
<u>Item 2. Unregistered Sales of Equity Securities and Use of Proceeds</u>	66
<u>Item 3. Defaults Upon Senior Secured Securities</u>	66
<u>Item 6. Exhibits</u>	67
<u>SIGNATURES</u>	68



Table of Contents

## PART I. FINANCIAL INFORMATION

## Item 1. Condensed Consolidated Financial Statements (Unaudited)

VISTAGEN THERAPEUTICS, INC.  
Condensed Consolidated Balance Sheets  
Amounts in Dollars

	December 31,	March 31,
	2017	2017
	(Unaudited)	
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$13,031,800	\$2,921,300
Prepaid expenses and other current assets	940,400	456,600
Total current assets	13,972,200	3,377,900
Property and equipment, net	222,800	286,500
Security deposits and other assets	47,800	47,800
Total assets	\$14,242,800	\$3,712,200
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$509,300	\$867,300
Accrued expenses	770,900	443,000
Current notes payable	43,700	54,800
Capital lease obligations	2,600	2,400
Total current liabilities	1,326,500	1,367,500
Non-current liabilities:		
Accrued dividends on Series B Preferred Stock	2,344,400	1,577,800
Deferred rent liability	299,100	139,200
Capital lease obligations	10,000	11,900
Total non-current liabilities	2,653,500	1,728,900
Total liabilities	3,980,000	3,096,400

Commitments and contingencies

Stockholders' equity:

Preferred stock, \$0.001 par value; 10,000,000 shares authorized at December 31, 2017 and March 31, 2017:

Series A Preferred, 500,000 shares authorized, issued and outstanding at December 31, 2017 and March 31, 2017	500	500
Series B Preferred; 4,000,000 shares authorized at December 31, 2017 and March 31, 2017; 1,160,240 shares issued and outstanding at December 31, 2017 and March 31, 2017	1,200	1,200
Series C Preferred; 3,000,000 shares authorized at December 31, 2017 and March 31, 2017; 2,318,012 shares issued and outstanding at December 31, 2017 and March 31, 2017	2,300	2,300
Common stock, \$0.001 par value; 100,000,000 and 30,000,000 shares authorized at December 31, 2017 and March 31, 2017, respectively; 22,723,504 and 8,974,386 shares issued and outstanding at December 31, 2017 and March 31, 2017, respectively	22,700	9,000
Additional paid-in capital	166,669,200	146,569,600
Treasury stock, at cost, 135,665 shares of common stock held at December 31, 2017 and March 31, 2017	(3,968,100)	(3,968,100)
Accumulated deficit	(152,465,000)	(141,998,700)
Total stockholders' equity	10,262,800	615,800
Total liabilities and stockholders' equity	\$14,242,800	\$3,712,200

See accompanying notes to Condensed Consolidated Financial Statements.





Table of Contents

VISTAGEN THERAPEUTICS, INC.  
 STATEMENT OF OPERATIONS  
 Amounts in Dollars, except share amounts

## UNAUDITED

	Three Months Ended December 31,		Nine Months Ended December 31,	
	2017	2016	2017	2016
Revenues:				
Sublicense revenue	\$-	\$1,250,000	\$-	\$1,250,000
Total revenues	-	1,250,000	-	1,250,000
Operating expenses:				
Research and development	1,601,800	1,611,000	5,124,600	4,042,800
General and administrative	1,266,000	2,276,600	4,997,400	4,907,800
Total operating expenses	2,867,800	3,887,600	10,122,000	8,950,600
Loss from operations	(2,867,800)	(2,637,600)	(10,122,000)	(7,700,600)
Other expenses, net:				
Interest expense, net	(2,000)	(900)	(7,700)	(3,700)
Loss on extinguishment of accounts payable	(135,000)	-	(135,000)	-
Loss before income taxes	(3,004,800)	(2,638,500)	(10,264,700)	(7,704,300)
Income taxes	-	-	(2,400)	(2,400)
Net loss and comprehensive loss	(3,004,800)	(2,638,500)	(10,267,100)	(7,706,700)
Accrued dividend on Series B Preferred stock	(263,000)	(237,700)	(766,600)	(1,018,500)
Deemed dividend from trigger of down round provision feature	(199,200)	-	(199,200)	-
Deemed dividend on Series B Preferred Units	-	-	-	(111,100)
Net loss attributable to common stockholders	\$(3,467,000)	\$(2,876,200)	\$(11,232,900)	\$(8,836,300)
Basic and diluted net loss attributable to common stockholders per common share	\$(0.25)	\$(0.34)	\$(1.03)	\$(1.23)
Weighted average shares used in computing basic and diluted net loss attributable to common stockholders per common share	13,895,642	8,381,824	10,947,556	7,181,307

See accompanying notes to Condensed Consolidated Financial Statements.





Table of Contents

VISTAGEN THERAPEUTICS INC.  
 STATEMENT OF CASH FLOWS  
 Amounts in Dollars  
 UNAUDITED

	Nine Months Ended December 31,	
	2017	2016
Cash flows from operating activities:		
Net loss	\$(10,267,100)	\$(7,706,700)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	65,300	37,600
Stock-based compensation	1,386,900	573,900
Expense related to modification of warrants, including exchange of warrants		
for common stock	292,700	427,500
Amortization of deferred rent	159,900	20,400
Fair value of common stock granted for services	1,554,800	1,217,500
Fair value of Series B Preferred stock granted for services	-	375,000
Fair value of warrants granted for services	-	240,300
Loss on extinguishment of accounts payable	135,000	-
Changes in operating assets and liabilities:		
Sublicense fee receivable	-	(1,250,000)
Prepaid expenses and other current assets	259,600	22,000
Accounts payable and accrued expenses, including accrued interest	(41,800)	74,200
Net cash used in operating activities	(6,454,700)	(5,968,300)
Cash flows from property and investing activities:		
Purchases of equipment	(1,600)	(9,900)
Net cash used in investing activities	(1,600)	(9,900)
Cash flows from financing activities:		
Net proceeds from issuance of common stock and warrants, including Units	16,721,900	9,785,000
Net proceeds from issuance of Series B Preferred Units	-	278,000
Repayment of capital lease obligations	(1,700)	(800)
Repayment of notes payable	(153,400)	(140,500)
Net cash provided by financing activities	16,566,800	9,921,700
Net increase in cash and cash equivalents	10,110,500	3,943,500

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

Cash and cash equivalents at beginning of period	2,921,300	428,500
Cash and cash equivalents at end of period	\$13,031,800	\$4,372,000
Supplemental disclosure of noncash activities:		
Insurance premiums settled by issuing note payable	\$142,400	\$117,500
Accrued dividends on Series B Preferred	\$766,600	\$780,800
Accrued dividends on Series B Preferred settled upon conversion by issuance		
of common stock	\$-	\$1,768,800
Deemed dividend from trigger of down round provision feature	\$199,200	\$-

See accompanying notes to Condensed Consolidated Financial Statements.



Table of Contents

VISTAGEN THERAPEUTICS, INC.  
 CONSOLIDATED STATEMENT OF STOCKHOLDERS EQUITY  
 FOR THE NINE MONTHS ENDED DECEMBER 31, 2017  
 AMOUNTS IN DOLLARS, except shares

	Series A Preferred Stock		Series B Preferred Stock		Series C Preferred Stock		Common Stock		Additional Paid-in Capital	Treasury Stock
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Capital	Stock
Balances at March 31, 2017	500,000	\$500	1,160,240	\$1,200	2,318,012	\$2,300	8,974,386	\$9,000	\$146,569,600	\$(3,900,000)
Proceeds from sale of common stock and warrants for cash in September 2017 Public Offering, net of underwriting discount and expenses	-	-	-	-	-	-	1,371,430	1,300	2,023,200	-
Proceeds from sale of common stock and warrants for cash in December 2017 Public Offering, net of underwriting discount and expenses	-	-	-	-	-	-	10,000,000	10,000	13,614,000	-

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

Proceeds from sale of common stock and warrants for cash in private placement offerings	-	-	-	-	-	-	616,323	600	1,072,600	-
Accrued dividends on Series B Preferred stock	-	-	-	-	-	-	-	-	(766,600)	-
Stock-based compensation expense	-	-	-	-	-	-	-	-	1,386,900	-
Fair value of common stock granted for services	-	-	-	-	-	-	1,072,500	1,100	1,693,100	-
Fair value of common stock granted in settlement of accounts payable	-	-	-	-	-	-	500,000	500	584,500	-
Increase in fair value attributable to warrant modifications	-	-	-	-	-	-	-	-	292,700	-
Deemed dividend from trigger of down round provision feature	-	-	-	-	-	-	-	-	199,200	-
Proceeds from exercise of warrants	-	-	-	-	-	-	188,865	200	-	-
Net loss for the nine months ended December 31, 2017	-	-	-	-	-	-	-	-	-	-
Balances at December 31, 2017	500,000	\$500	1,160,240	\$1,200	2,318,012	\$2,300	22,723,504	\$22,700	\$166,669,200	\$(3,900,000)



See accompanying notes to Condensed Consolidated Financial Statements.

-4-



Table of Contents

VISTAGEN THERAPEUTICS, INC.  
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS  
(Unaudited)

Note 1. Description of Business

Overview

VistaGen Therapeutics, Inc. (NASDAQ: VTGN), a Nevada corporation, is a clinical-stage biopharmaceutical company focused on developing new generation medicines for depression and other central nervous system (CNS) disorders.

AV-101 is our oral CNS product candidate in Phase 2 clinical development in the United States, initially as a new generation adjunctive treatment for Major Depressive Disorder (MDD) in patients with an inadequate response to standard antidepressants approved by the U.S. Food and Drug Administration (FDA). AV-101's mechanism of action (MOA) involves both NMDA (N-methyl-D-aspartate) and AMPA (alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid) receptors in the brain responsible for fast excitatory synaptic activity throughout the CNS. AV-101's MOA is fundamentally different from all standard FDA-approved antidepressants, as well as all atypical antipsychotics, such as aripiprazole, often used adjunctively with standard antidepressants. We believe AV-101 also has potential to treat several additional CNS indications where modulation of the NMDA receptors, activation of AMPA pathways and/or key active metabolites of AV-101 may achieve therapeutic benefit, including, among others, as a non-opioid alternative for neuropathic pain and for Parkinson's disease levodopa -induced dyskinesia (PD LID).

Clinical studies conducted at the U.S. National Institute of Mental Health (NIMH), part of the U.S. National Institutes of Health (NIH), by Dr. Carlos Zarate, Jr., Chief of the NIMH's Experimental Therapeutics & Pathophysiology Branch and its Section on Neurobiology and Treatment of Mood and Anxiety Disorders, have focused on the antidepressant effects of ketamine hydrochloride injection (ketamine), an ion-channel blocking NMDA receptor antagonist approved by the FDA as an anesthetic, in MDD patients with inadequate responses to multiple standard antidepressants. These NIMH studies, as well as clinical research at Yale University and other academic institutions in the U.S., have demonstrated ketamine's robust antidepressant effects in treatment-resistant MDD patients within twenty-four hours of a single sub-anesthetic dose administered by intravenous (IV) injection.

We believe orally administered AV-101 may have potential to deliver ketamine-like antidepressant effects, without ketamine's psychological side effects and other safety concerns, and without the need for IV administration. As published in the October 2015 issue of the peer-reviewed, Journal of Pharmacology and Experimental Therapeutics, in an article titled, The prodrug 4-chlorokynurenine causes ketamine-like antidepressant effects, but not side effects, by NMDA/glycineB-site inhibition, using well-established preclinical models of depression, AV-101 was shown to induce fast-acting, dose-dependent, persistent and statistically significant antidepressant-like responses following a single treatment. These responses were equivalent to those seen with a single sub-anesthetic control dose of ketamine. In addition, these studies confirmed that the fast-acting antidepressant effects of AV-101 were mediated through both inhibiting the glycine binding (GlyB) site of the NMDA receptor and activating the AMPA receptor pathway in the brain.

In October 2017, we received FDA authorization to launch our 180-patient Phase 2 multi-center, multi-dose, double blind, placebo-controlled efficacy and safety study of AV-101 as a new generation adjunctive treatment for MDD patients with an inadequate therapeutic response to standard, FDA-approved antidepressants (the AV-101 MDD Phase 2 Adjunctive Treatment Study), and in December 2017 the FDA granted Fast Track Designation to AV-101 for

development as a potential adjunctive treatment for MDD. We intend to launch the AV-101 MDD Phase 2 Adjunctive Treatment Study in the first quarter of 2018 with Dr. Maurizio Fava, Professor of Psychiatry at Harvard Medical School and Director, Division of Clinical Research, Massachusetts General Hospital (MGH) Research Institute, as the Principal Investigator. Dr. Fava was the co-Principal Investigator with Dr. A. John Rush of the STAR\*D study, the largest clinical trial conducted in depression to date, whose findings were published in journals such as the New England Journal of Medicine (NEJM) and the Journal of the American Medical Association (JAMA). We expect top line results of the AV-101 MDD Phase 2 Adjunctive Treatment Study to be available in the first half of 2019. In addition, pursuant to our Cooperative Research and Development Agreement (CRADA) with the NIMH, the NIMH is currently funding, and Dr. Zarate, as Principal Investigator, and his team are currently conducting, a small Phase 2 clinical study of AV-101 as a monotherapy in subjects with treatment-resistant MDD (the NIMH AV-101 MDD Phase 2 Monotherapy Study).

VistaStem Therapeutics (VistaStem) is our wholly owned subsidiary focused on applying human pluripotent stem cell (hPSC) technology to discover, rescue, develop and commercialize (i) proprietary new chemical entities (NCEs) for CNS and other diseases and (ii) regenerative medicine (RM) involving hPSC-derived blood, cartilage, heart and liver cells. Our internal drug rescue programs are designed to utilize CardioSafe 3D, our customized cardiac bioassay system, to develop small molecule NCEs for our pipeline. To advance potential RM applications of our cardiac stem cell technology, in December 2016, we exclusively sublicensed to BlueRock Therapeutics LP, a next generation RM company established by Bayer AG and Versant Ventures (BlueRock Therapeutics), rights to certain proprietary technologies relating to the production of cardiac stem cells for the treatment of heart disease (the BlueRock Agreement). In a manner similar to our exclusive sublicense agreement with BlueRock Therapeutics, we may pursue additional RM collaborations or out-licensing transactions involving blood, cartilage, and/or liver cells derived from hPSCs for (A) cell-based therapy, (B) cell repair therapy, and/or (C) tissue engineering.



Table of Contents

Subsidiaries

As noted above, VistaStem is our wholly-owned subsidiary. Our Condensed Consolidated Financial Statements in this Quarterly Report on Form 10-Q (Report) also include the accounts of VistaStem's two wholly-owned inactive subsidiaries, Artemis Neuroscience, Inc., a Maryland corporation, and VistaStem Canada, Inc., a corporation organized under the laws of Ontario, Canada.

Note 2. Basis of Presentation

The accompanying unaudited Condensed Consolidated Financial Statements have been prepared in accordance with accounting principles generally accepted in the United States (U.S. GAAP) for interim financial information and with the instructions to Form 10-Q and Rule 8-03 of Regulation S-X. Accordingly, they do not contain all of the information and footnotes required for complete consolidated financial statements. In the opinion of management, the accompanying unaudited Condensed Consolidated Financial Statements reflect all adjustments, which include only normal recurring adjustments, necessary to present fairly our interim financial information. The accompanying Condensed Consolidated Balance Sheet at March 31, 2017 has been derived from our audited consolidated financial statements at that date but does not include all disclosures required by U.S. GAAP. The operating results for the three and nine months ended December 31, 2017 are not necessarily indicative of the operating results to be expected for our fiscal year ending March 31, 2018, or for any other future interim or other period.

The accompanying unaudited Condensed Consolidated Financial Statements and notes to Condensed Consolidated Financial Statements should be read in conjunction with our audited Consolidated Financial Statements for our fiscal year ended March 31, 2017 contained in our Annual Report on Form 10-K, as filed with the Securities and Exchange Commission (SEC) on June 29, 2017.

The accompanying unaudited Condensed Consolidated Financial Statements have been prepared assuming we will continue as a going concern. As a company having not yet developed commercial products or achieved sustainable revenues, we have experienced recurring losses and negative cash flows from operations resulting in a deficit of \$152.5 million accumulated from inception (May 1998) through December 31, 2017. We expect losses and negative cash flows from operations to continue for the foreseeable future as we engage in further development of AV-101, initially as an adjunctive treatment for MDD, and subsequently as a potential new treatment alternative for other CNS-related conditions, as well as exploring and potentially executing drug rescue and development opportunities using CardioSafe 3D.

From our inception through December 31, 2017, 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 \$61.4 million, as well as from an aggregate of approximately \$17.6 million of government research grant awards, strategic collaboration payments, intellectual property sublicensing and other revenues. We have also issued equity securities with an approximate value at issuance of \$33.6 million in non-cash settlements of certain liabilities, including liabilities for professional services rendered to us or as compensation for such services. Additionally, pursuant to our February 2015 CRADA with the NIH, substantial ongoing Phase 2 clinical development activities relating to the NIMH AV-101 MDD Phase 2 Monotherapy Study are being sponsored in full, at no cost to us other than supplying clinical trial material, by the NIMH under the direction of Dr. Carlos Zarate Jr. as Principal Investigator.

At December 31, 2017, we had a cash and cash equivalents balance of \$13.0 million. We believe this amount is sufficient to enable us to fund our planned operations for at least 12 months following the issuance of the financial statements included in this Report.

In December 2017, we completed an underwritten public offering of shares of our common stock and warrants to purchase shares of our common stock at a combined public offering price of \$1.50 per share and related warrant under our Registration Statement on Form S-1 (Registration No. 333-221009), resulting in gross proceeds of \$15.0 million (the December 2017 Public Offering). In September 2017, we completed an underwritten public offering pursuant to which we offered and sold shares of our common stock and warrants resulting in gross proceeds of approximately \$2.4 million (the September 2017 Public Offering) under our Registration Statement on Form S-3 (Registration No. 333-215671) (the S-3 Registration Statement). (See Note 7, Capital Stock, for additional information regarding the December 2017 Public Offering and the September 2017 Public Offering.) Subject to certain restrictions, the S-3 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 Registration Statement, we do not have an obligation to do so. As we have been in the past, we expect that, if necessary, we will be successful in raising additional capital from the sale of our equity securities either in one or more public offerings or in one or more private placement transactions with individual accredited investors or institutions.





## Table of Contents

In addition to the sale of our equity securities, we may also seek to enter additional research and development collaborations that could generate revenue or provide substantial funding for development of AV-101 and additional product candidates. We may also seek additional government grant awards or agreements similar to our current CRADA with the NIMH, which provides for the NIMH to fully fund the NIMH AV-101 MDD Phase 2 Monotherapy Study. Such strategic collaborations may provide non-dilutive resources to advance our strategic initiatives while reducing a portion of our future cash outlays and working capital requirements. In a manner similar to the BlueRock Agreement, we may also pursue similar arrangements with third-parties covering other of our intellectual property. Although we may seek additional collaborations with the U.S. government or other third-parties that could generate revenue and/or non-dilutive funding for development of AV-101 and other product candidates and technologies, as well as new government grant awards and/or agreements similar to our CRADA with NIMH, no assurance can be provided that any such collaborations, awards or agreements will occur in the future.

Our future working capital requirements will depend on many factors, including, without limitation, the scope and nature of opportunities related to our success and the success of certain other companies in clinical trials, including our development and commercialization of AV-101, initially as an adjunctive treatment for MDD, and as a potential treatment option for other CNS conditions, as well as various potential applications of our stem cell technology platform, the availability of, and our ability to obtain, government grant awards and agreements, and our ability to enter into collaborations on terms acceptable to us. To further advance the clinical development of AV-101 and opportunities related to our stem cell technology platform, as well as support our operating activities, we plan to continue to carefully manage our routine operating costs, including our employee headcount and related expenses, as well as costs relating to regulatory consulting, contract research and development, investor relations and corporate development, legal, acquisition and protection of intellectual property, public company compliance and other professional services and operating costs.

Notwithstanding the foregoing, there can be no assurance that, if needed, future financing will be available in sufficient amounts, in a timely manner, or on terms acceptable to us, if at all. If we are unable to obtain substantial additional financing on a timely basis when needed, our business, financial condition, and results of operations may be harmed, the price of our stock may decline, we may be required to reduce, defer, or discontinue certain of our research and development activities and we may not be able to continue as a going concern. As noted above, these Condensed Consolidated Financial Statements do not include any adjustments that might result from the negative outcome of this uncertainty.

### Note 3. Summary of Significant Accounting Policies

#### 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 financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Significant estimates include those relating to share-based compensation, and assumptions that have been used historically to value warrants and warrant modifications. With the exception of the \$1.25 million of sublicense revenue recorded in the quarter ended December 31, 2016 under the BlueRock Agreement, we do not currently have, nor have we had during the periods covered by this report, any arrangements requiring the recognition of revenue.

#### Research and Development Expenses

Research and development expenses are composed of both internal and external costs. Internal costs include salaries and employment-related expenses of our scientific personnel and direct project costs. External research and development expenses consist primarily of costs associated with nonclinical and clinical development of AV-101, now in Phase 2 clinical development, initially for MDD, stem cell technology-related research and development costs, and costs related to the filing, maintenance and prosecution of patents and patent applications, technology licenses and protection of other intellectual property. All such costs are charged to expense as incurred.

#### Stock-Based Compensation

We recognize compensation cost for all stock-based awards to employees or consultants based on the grant date fair value of the award. Non-cash stock-based compensation expense is recognized over the period during which the employee or consultant is required to perform services in exchange for the award, which generally represents the scheduled vesting period. We have no awards with market or performance conditions. For equity awards to non-employees, we re-measure the fair value of the awards as they vest and the resulting change in value is recognized as an expense during the period over which the services are performed.



Table of Contents

The table below summarizes stock-based compensation expense included in the accompanying Condensed Consolidated Statements of Operations and Comprehensive Loss for the three and nine months ended December 31, 2017 and 2016.

	Three Months Ended		Nine Months Ended	
	December 31,		December 31,	
	2017	2016	2017	2016
Research and development expense:				
Stock option grants	\$299,100	\$113,900	\$627,400	\$239,900
	299,100	113,900	627,400	239,900
General and administrative expense:				
Stock option grants	390,200	153,300	759,500	334,000
	390,200	153,300	759,500	334,000
Total stock-based compensation expense	\$689,300	\$267,200	\$1,386,900	\$573,900

In April 2017, our Board approved the grant of options to purchase an aggregate of 880,000 shares of our common stock at an exercise price of \$1.96 per share to the independent members of our Board, our officers and our employees. In September 2017, our stockholders approved an amendment to our 2016 Amended and Restated Stock Incentive Plan (the 2016 Plan) to increase the number of shares issuable thereunder from 3.0 million shares to 10.0 million shares. Following that approval, our Board authorized the grant of options to purchase an aggregate of 770,000 shares of our common stock at an exercise price of \$1.56 per share to the independent members of our Board, our officers, employees and certain consultants. We valued the options granted in April 2017 and September 2017 using the Black-Scholes Option Pricing Model and the following weighted average assumptions:

Assumption:	April 2017	September 2017
Market price per share at grant date	\$1.96	\$1.56
Exercise price per share	\$1.96	\$1.56
Risk-free interest rate	2.02%	1.99%
Contractual or estimated term in years	6.48	6.70
Volatility	83.24%	92.29%
Dividend rate	0.0%	0.0%
Shares	880,000	770,000
Fair Value per share	\$1.42	\$1.20

In June 2016, our Board approved the grant of options to purchase an aggregate of 655,000 shares of our common stock at an exercise price of \$3.49 per share to the independent members of our Board and to our officers, including

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

our then-newly-hired Chief Medical Officer. In September 2016, the Board approved the grant of an option to purchase 125,000 shares of our common stock at an exercise price of \$4.27 per share to another then-newly-hired officer. We valued the options granted in June 2016 and September 2016 using the Black-Scholes Option Pricing Model and the following weighted average assumptions:

Assumption:	June 2016	September 2016
Market price per share at grant date	\$3.49	\$4.27
Exercise price per share	\$3.49	\$4.27
Risk-free interest rate	1.34%	1.29%
Contractual or estimated term in years	6.68	6.25
Volatility	81.69%	83.26%
Dividend rate	0.0%	0.0%
Shares	655,000	125,000
Fair Value per share	\$2.50	\$3.05

At December 31, 2017, there were stock options outstanding to purchase 3,279,871 shares of our common stock at a weighted average exercise price of \$3.23 per share.

See Note 9, Subsequent Events, for information regarding option grants made during February 2018.

#### 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.



Table of Contents

## Income (Loss) per Common Share

Basic net income (loss) per share of common stock excludes the effect of dilution and is computed by dividing net income (loss) by the weighted-average number of shares of common stock outstanding for the period. Diluted net income (loss) 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 periods presented, potentially dilutive securities were excluded from the computation of net loss per share, as their effect would be antidilutive. For the three and nine-month periods ended December 31, 2017 and 2016, the accrual for dividends on our Series B 10% Convertible Preferred Stock (Series B Preferred) is treated as a deduction from our net loss to arrive at net loss attributable to common stockholders for those periods. Additionally, in 2017, the deemed dividend attributable to the trigger of the down round provision feature, and, in 2016, the deemed dividend attributable to our sale and issuance of Series B Preferred Units, each consisting of one share of Series B Preferred and a five-year warrant to purchase one share of our common stock for \$7.00, each represent further deductions from our net loss to arrive at net loss attributable to common stockholders for those periods.

Potentially dilutive securities excluded in determining diluted net loss attributable to common stockholders per common share are as follows:

	As of December 31,	
	2017	2016
Series A Preferred stock issued and outstanding (1)	750,000	750,000
Series B Preferred stock issued and outstanding (2)	1,160,240	1,160,240
Series C Preferred stock issued and outstanding (3)	2,318,012	2,318,012
Outstanding options under the Amended and Restated 2016 (formerly 2008) and 1999 Stock Incentive Plans	3,279,871	1,659,324
Outstanding warrants to purchase common stock	16,918,292	4,550,370
Total	24,426,415	10,437,946

(1) Assumes exchange under the terms of the October 11, 2012 Note Exchange and Purchase Agreement, as amended

(2) Assumes exchange under the terms of the

Certificate of  
Designation of the  
Relative Rights and  
Preferences of the  
Series B 10%  
Convertible  
Preferred Stock,  
effective May 5,  
2015

(3) Assumes  
exchange under the  
terms of the  
Certificate of  
Designation of the  
Relative Rights and  
Preferences of the  
Series C  
Convertible  
Preferred Stock,  
effective January  
25, 2016

#### Fair Value Measurements

We do not use derivative instruments for hedging of market risks or for trading or speculative purposes. We carried no assets or liabilities at fair value at December 31, 2017 or March 31, 2017.





Table of Contents

## Recent Accounting Pronouncements

Except as described below, there have been no recent accounting pronouncements or changes in accounting pronouncements during the nine months ended December 31, 2017, as compared to the recent accounting pronouncements described in our Form 10-K for the fiscal year ended March 31, 2017, that are of significance or potential significance to us.

In July 2017, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2017-11, “Earnings Per Share (Topic 260); Distinguishing Liabilities from Equity (Topic 480); Derivatives and Hedging (Topic 815): Part I: Accounting for Certain Financial Instruments with Down Round Features; Part II: Replacement of the Indefinite Deferral for Mandatorily Redeemable Financial Instruments of Certain Nonpublic Entities and Certain Mandatorily Redeemable Noncontrolling Interests with a Scope Exception” (ASU 2017-11). Part I of this ASU provides that an entity will no longer have to consider “down round” features (i.e., a provision in an equity-linked financial instrument, such as a free-standing warrant, or an embedded feature, such as a conversion option in a convertible instrument, that reduces the exercise price of such instrument if the entity subsequently sells stock for a lower price or issues an equity-linked instrument with a lower exercise price) when determining whether certain equity-linked financial instruments or embedded features are indexed to its own stock. The definition of a down round feature in ASU 2017-11 excludes standard anti-dilution provisions related to changes in an entity’s capital structure. Accounting Standards Codification Topic 815-40, “Derivatives and Hedging—Contracts in Entity’s Own Equity” (ASC 815-40) requires that a freestanding equity-linked financial instrument be indexed to the issuer’s own stock to be classified as equity. An equity-linked embedded feature that meets the definition of a derivative may avoid bifurcation and derivative accounting if it is indexed to the issuer’s own stock. Under the terms of prior guidance, a freestanding financial instrument or embedded feature was not considered indexed to the issuer’s own stock if it had a down round provision. Consequently, the freestanding financial instrument was classified as a liability (or asset), and if it met the definition of a derivative, was measured at fair value with changes in fair value recorded through earnings. Similarly, an embedded feature was bifurcated and separately accounted for as a derivative if it met all other criteria for bifurcation under ASC 815-40. The bifurcated embedded feature was also measured at fair value through earnings. Under the provisions of ASU 2017-11, an entity that presents earnings per share (EPS) under Accounting Standards Codification Topic 260, “Earnings Per Share” will recognize the effect of a down round feature in a freestanding equity-classified financial instrument only when it is triggered. The effect of triggering such a feature will be recognized as a dividend and a reduction to income available to common shareholders in basic EPS. The new guidance requires new disclosures for financial instruments with down round features and other terms that change conversion or exercise prices. Part I of ASU 2017-11 is effective for fiscal years beginning after December 15, 2018, and interim periods therein, however early adoption is permitted. We early-adopted ASU 2017-11 effective with our quarter ended September 30, 2017 and applied its guidance to certain of the warrants issued in the September 2017 Public Offering, as described more completely in Note 7, Capital Stock. No retrospective adjustments to our financial statements were required as a result of our adoption of ASU 2017-11.

In February 2016, the FASB issued ASU No. 2016-2, “Leases.” This ASU requires substantially all leases, including operating leases, to be recognized by lessees on their balance sheet as a right-of-use asset and corresponding lease liability. This ASU is effective for our interim and annual reporting periods beginning April 1, 2019 and early adoption is permitted. We are currently evaluating the impact that the adoption of this ASU will have on our financial statements.

In March 2016, the FASB issued ASU No. 2016-09, “Improvements to Employee Share-Based Payment Accounting,” which simplified several aspects of the accounting for share-based payments, including immediate recognition of all excess tax benefits and deficiencies in the income statement, changing the threshold to qualify for equity classification up to the employees’ maximum statutory tax rates, allowing an entity-wide accounting policy election to either

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

estimate the number of awards that are expected to vest or account for forfeitures as they occur, and clarifying the classification on the statement of cash flows for the excess tax benefit and employee taxes paid when an employer withholds shares for tax-withholding purposes. This ASU became effective for our interim and annual reporting periods beginning April 1, 2017, and the adoption of this standard did not have a material impact on our financial statements. Pursuant to our adoption of this standard, we elected to account for the impact of option forfeitures as they occur.

Note 4. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets are composed of the following at December 31, 2017 and March 31, 2017:

	December 31,	March 31,
	2017	2017
AV-101 materials and services	\$770,500	\$352,800
Insurance	72,300	85,800
Professional services	48,000	-
Public offering expenses	25,900	11,600
All other	23,700	6,400
	\$940,400	\$456,600



Table of Contents

## Note 5. Accrued Expenses

Accrued expenses are composed of the following at December 31, 2017 and March 31, 2017:

	December 31,	March 31,
	2017	2017
Accrued AV-101 development and related expenses	\$565,700	\$402,400
Accrued professional services	97,100	37,000
Accrued compensation	105,000	-
All other	3,100	3,600
	\$770,900	\$443,000

## Note 6. Notes Payable

The following table summarizes our unsecured promissory notes at December 31, 2017 and March 31, 2017.

	December 31, 2017			March 31, 2017		
	Principal	Accrued		Principal	Accrued	
	Balance	Interest	Total	Balance	Interest	Total
7.95% and 8.25% Notes payable to insurance						
premium financing company (current)	\$43,700	\$-	\$43,700	\$54,800	\$-	\$54,800
Total notes payable to unrelated parties	\$43,700	\$-	\$43,700	\$54,800	\$-	\$54,800
less: current portion	(43,700)	-	(43,700)	(54,800)	-	(54,800)
Net non-current portion	\$-	\$-	\$-	\$-	\$-	\$-

In May 2017, we executed a 7.95% promissory note in the principal amount of \$142,400 in connection with insurance policy premiums. The note is payable in monthly installments of \$14,800, including principal and interest, through

March 2018, and had a remaining outstanding balance of \$43,700 at December 31, 2017. In February 2017, we executed a promissory note in the principal amount of \$60,700 in connection with other insurance policy premiums. That note was payable in monthly installments of \$6,300, including principal and interest, and was paid in full at December 31, 2017.

#### Note 7. Capital Stock

At our Annual Meeting of Stockholders on September 15, 2017, as approved by and recommended to our stockholders by our Board of Directors, our stockholders approved an amendment to our Restated and Amended Articles of Incorporation to increase the authorized number of shares of common stock that we may issue from 30.0 million shares to 100.0 million shares. The amendment became effective on September 15, 2017, upon our filing of a certificate of amendment with the Nevada Secretary of State.

#### Common Stock and Warrants Issued in December 2017 Underwritten Public Offering

On December 13, 2017, we completed the December 2017 Public Offering, resulting in gross proceeds of \$15.0 million, pursuant to which we offered and sold shares of our common stock and warrants to purchase shares of our common stock at a combined public offering price of \$1.50 per shares and related warrant. We issued an aggregate of 10,000,000 shares of our common stock and warrants to purchase up to 10,000,000 shares of our common stock at an exercise price of \$1.50 per share (the December 2017 Offering Warrants). The common stock and the shares of common stock underlying the December 2017 Offering Warrants issued in the December 2017 Public Offering were offered, issued and sold pursuant to our Registration Statement on Form S-1 (Registration No. 333-221009) that was declared effective by the Securities and Exchange Commission (the Commission) on December 11, 2017. The December 2017 Offering Warrants are exercisable at any time through December 13, 2022, have no anti-dilution or other exercise price or share reset features, except as is customary with respect to a change in our capital structure in the event of a stock split or dividend, and do not contain any cashless exercise features as long as our Registration Statement on Form S-1 (Registration No. 333-221009) is effective. Accordingly, we have accounted for the December 2017 Offering Warrants as equity warrants. We received net proceeds of approximately \$13.6 million from the December 2017 Public Offering, after deducting underwriter's commission and other expenses related to the offering.



Table of Contents

## Common Stock and Warrants Issued in September 2017 Underwritten Public Offering

On September 6, 2017, we completed the September 2017 Public Offering, resulting in gross proceeds of approximately \$2.4 million, pursuant to which we offered and sold shares of our common stock and warrants to two of our existing institutional investors. We issued an aggregate of 1,371,430 shares of our common stock, Series A1 Warrants to purchase up to 1,388,931 shares of common stock and Series A2 Warrants to purchase up to 503,641 of common stock (collectively, the Warrants), each exercisable for \$1.82 per share in the September 2017 Public Offering. The Series A1 Warrants will be exercisable by the investors for a five-year period commencing on March 7, 2018, and the Series A2 Warrants were immediately exercisable at any time through September 6, 2022. The common stock and the shares of common stock underlying the Warrants issued in the September 2017 Public Offering were offered, issued and sold pursuant to our S-3 Registration Statement (Registration No. 333-215671) that had previously been declared effective by the Commission to cover this and potential future sales of our equity securities in one or more public offerings from time to time. We received net proceeds of approximately \$2.0 million from the September 2017 Public Offering, after deducting underwriter's commission and other expenses related to the offering.

The Series A1 Warrants to purchase an aggregate of 1,388,931 shares of our common stock issued in the September 2017 Public Offering have no anti-dilution or other exercise price or share reset features, except as is customary with respect to a change in our capital structure in the event of a stock split or dividend, and, accordingly, we have accounted for them as equity warrants. The Series A2 Warrants to purchase an aggregate of 503,641 shares of our common stock contained anti-dilution protection provisions that became effective upon the issuance of common stock in the December 2017 Public Offering at a price below their then-current \$1.82 per share exercise price. The anti-dilution protection provisions in the Series A2 Warrants constituted a down round feature subject to the guidance in ASU 2017-11. Since the Series A2 Warrants contained no other provisions which required their treatment as liability warrants rather than equity warrants, including exercise price or share reset features, except as is customary with respect to a change in our capital structure in the event of a stock split or dividend and which are also present in the Series A1 Warrants, we also accounted for the Series A2 Warrants as equity warrants.

Our sale of units consisting of common stock and warrants in the December 2017 Public Offering at an offering price of \$1.50 per unit triggered the anti-dilution provisions of the Series A2 Warrants. In accordance with the anti-dilution terms and formula contained in the Series A2 warrants, the exercise price of the Series A2 Warrants was reduced to \$0.001 per share. In December 2017, certain holders exercised the reset Series A2 warrants to purchase an aggregate of 188,865 shares of our common stock from which we received nominal cash proceeds. In accordance with the guidance in ASU 2017-11, we recognized the effect of triggering the down round feature as a dividend in our Condensed Consolidated Statement of Stockholders' Equity for the nine months ended December 31, 2017 and as an addition to net loss attributable to common stockholders and in our calculation of basic and fully diluted earnings per share in our Condensed Consolidated Statement of Operations for the three and nine months ended December 31, 2017.

We calculated the dividend from the trigger of the down round provision feature, \$199,200, using the Black Scholes Option Pricing Model and the assumptions indicated in the table below:

Assumption:	Pre-reset	Post-reset
Market price per share	\$1.17	\$1.17
Exercise price per share	\$1.82	\$0.001
Risk-free interest rate	2.09%	2.09%
Remaining contractual term in years	4.73	4.73



Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

Volatility	97.8%	97.8%
Dividend rate	0.0%	0.0%
Number of warrant shares	503,641	503,641
Fair value per share	\$0.77	\$1.17

Common Stock and Warrants Issued in Private Placements

During the quarter ended June 30, 2017, in self-placed private placement transactions, we accepted subscription agreements from individual accredited investors, pursuant to which we sold to such investors units, at a weighted average purchase price of \$2.00 per unit, consisting of an aggregate of 437,751 unregistered shares of our common stock and warrants, exercisable through April 30, 2021, to purchase an aggregate of 218,875 unregistered shares of our common stock at a weighted average exercise price of \$3.99 per share. The purchasers of the units have no registration rights with respect to the shares of common stock, warrants or the shares of common stock issuable upon exercise of the warrants comprising the units sold. The warrants are not exercisable until six months and one day following the date of issuance. We received aggregate cash proceeds of \$873,300 in connection with these self-placed private placement transactions, and the entire amount of the proceeds was credited to stockholders' equity.



Table of Contents

During the quarter ended September 30, 2017, in a self-placed private placement transaction, we sold to an accredited investor units consisting of 28,572 shares of our unregistered common stock and warrants exercisable through April 30, 2021 to purchase 28,572 unregistered shares of our common stock at an exercise price of \$4.00 per share. The purchaser of the units has no registration rights with respect to the shares of common stock, warrants or the shares of common stock issuable upon exercise of the warrants comprising the units sold. The warrants are not exercisable until six months and one day following the date of issuance. We received cash proceeds of \$50,000 from this sale of our securities, and the entire amount of the proceeds was credited to stockholders' equity.

During the quarter ended December 31, 2017, in a self-placed private placement transaction, we sold to an accredited investor units consisting of 150,000 shares of our unregistered common stock and warrants exercisable through November 30, 2021 to purchase 150,000 unregistered shares of our common stock at an exercise price of \$2.00 per share. The purchaser of the units has no registration rights with respect to the shares of common stock, warrants or the shares of common stock issuable upon exercise of the warrants comprising the units sold. The warrants are not exercisable until six months and one day following the date of issuance. We received cash proceeds of \$150,000 from this sale of our securities, and the entire amount of the proceeds was credited to stockholders' equity.

Issuance of Common Stock to Professional Services Providers and in Settlement of Accounts Payable

During the quarter ended June 30, 2017, we issued 25,000 shares of our unregistered common stock having a fair value on the date of issuance of \$49,800 as partial compensation to an investor relations service provider.

During the quarter ended September 30, 2017, we issued an aggregate of 927,500 unregistered shares of our common stock, of which 477,500 shares were issued from our 2016 Plan, for various professional services, including contract research, legal, investor relations and financial advisory services. The common stock issued had an aggregate fair value of \$1,503,600 on the dates issued, of which all but \$139,300 has been recognized as noncash expense through December 31, 2017. The un-expensed portion at December 31, 2017 is being recognized in expense ratably through July 2019 in accordance with the terms of work orders for certain contract research services to be provided through that period.

During the quarter ended December 31, 2017, we issued an aggregate of 70,000 unregistered shares of our common stock, all of which were issued from our 2016 Plan for additional investor relations and financial advisory services. The common stock issued had an aggregate fair value of \$140,800 on the dates issued.

During the quarter ended December 31, 2017, we also issued 500,000 unregistered shares of our common stock having a fair value at the time of issuance of \$585,000 and a cash payment of \$76,500 to our contract manufacturing organization (CMO) in exchange for and settlement of \$526,500 of open accounts payable for services provided by the CMO relating to production of AV-101 drug substance. We recognized a corresponding loss on settlement of accounts payable in the amount of \$135,000 for the quarter ended December 31, 2017.

Modification of Warrants Issued in Private Placements

During the quarter ended September 30, 2017, our Board of Directors (Board) authorized the modification of outstanding warrants issued in private placement transactions between March 2017 and June 2017 to reduce the exercise prices and increase the number of shares issuable thereunder. We calculated the fair value of the warrant immediately before and after the modification using the Black Scholes Option Pricing Model and the weighted average assumptions indicated in the table below. We recognized the additional fair value, \$279,700, as warrant modification expense, included as a component of general and administrative expenses, in our Condensed Consolidated Statement of Operations and Comprehensive Loss for the quarter ended September 30, 2017.

Assumption:	Pre-modification	Post-modification
Market price per share	\$1.54	\$1.54
Exercise price per share	\$3.99	\$2.00
Risk-free interest rate	1.62%	1.62%
Remaining contractual term in years	3.62	3.62
Volatility	95.5%	95.5%
Dividend rate	0.0%	0.0%
Number of warrant shares	247,500	495,001
Weighted average fair value per share	\$0.71	\$0.92

During the quarter ended December 31, 2017, the Board authorized the modification of outstanding warrants issued in private placement transactions between August 2017 and November 2017 to reduce the exercise prices of the warrants. We calculated the fair value of the warrants immediately before and after the modification using the Black Scholes Option Pricing Model and the weighted average assumptions indicated in the table below. We recognized the additional fair value, \$13,000, as warrant modification expense, included as a component of general and administrative expenses, in our Condensed Consolidated Statement of Operations and Comprehensive Loss for the quarter ended December 31, 2017.



Table of Contents

Assumption:	Pre-modification	Post-modification
Market price per share	\$1.14	\$1.14
Exercise price per share	\$2.32	\$1.58
Risk-free interest rate	2.12%	2.12%
Remaining contractual term in years	3.85	3.85
Volatility	98.7%	98.7%
Dividend rate	0.0%	0.0%
Number of warrant shares	178,572	178,572
Weighted average fair value per share	\$0.64	\$0.71

## Warrants Outstanding

Following the warrant issuances in the December 2017 Public Offering, the September 2017 Public Offering, and in our self-placed private placement transactions and the warrant modifications and exercises described above, at December 31, 2017, we had outstanding warrants to purchase shares of our common stock at a weighted average exercise price of \$2.80 per share as follows:

Exercise Price per Share	Expiration Date	Warrants Outstanding at December 31, 2017
\$0.001	9/6/2022	314,776
\$1.50	11/30/2021 to 12/13/2022	10,150,000
\$1.82	9/6/2022 to 3/7/2023	1,388,931
\$2.00	4/30/2021	523,573
\$3.51	12/31/2021	50,000
\$4.50	9/26/2019	25,000
\$5.30	5/16/2021	2,705,883
\$6.00	9/26/2019 to 11/30/2019	97,750
\$7.00	12/11/2018 to 3/3/2023	1,346,931
\$8.00	3/25/2021	185,000
\$10.00	11/15/2017 to 1/11/2020	20,000
\$20.00	9/15/2019	110,448
		16,918,292

Of the warrants outstanding at December 31, 2017, 2,705,883 shares of common stock underlying the warrants exercisable at \$5.30 per share issued in our May 2016 public offering, 1,388,931 shares of common stock underlying the warrants exercisable at \$1.82 per share issued in our September 2017 Public Offering and 10,000,000 shares of common stock underlying the warrants exercisable at \$1.50 per share issued in our December 2017 Public Offering are registered for resale by the warrant holders. At December 31, 2017, warrants to purchase an aggregate of 314,776 registered shares of our common stock remain subject to down round anti-dilution protection features. The common

shares issuable upon exercise of our remaining outstanding warrants are unregistered. All of the outstanding warrants are exercisable by the holders only by payment in cash of the stated exercise price per share.

Note 8. Related Party Transactions

Cato Holding Company (CHC), doing business as Cato BioVentures (CBV), is the parent of Cato Research Ltd. (CRL). CRL is a contract research, development and regulatory services organization (CRO) recently engaged by us for a wide range of material aspects related to the nonclinical and clinical development and regulatory affairs associated with our efforts to develop and commercialize AV-101 for MDD and other potential CNS indications. CBV is among our largest institutional stockholders at December 31, 2017, holding approximately 4.2% of our outstanding common stock. In October 2012, we issued certain unsecured promissory notes in the aggregate principal amount of approximately \$1.3 million to CBV and CRL (the Cato Notes) as payment in full for all contract research and development services and regulatory advice previously rendered to us by CRL for nonclinical and Phase 1 development of AV-101. In June 2015, the Cato Notes and additional amounts payable to CRL for CRO services related to AV-101 were extinguished in exchange for our issuance of an aggregate of 328,571 shares of Series B Preferred stock to CBV, which shares of Series B Preferred stock were automatically converted in accordance with their terms into an equal number of registered shares of our common stock as a result of our May 2016 public offering.





Table of Contents

In July 2017, we entered into a Master Services Agreement (MSA) with CRL, which replaced a substantially similar May 2007 master services agreement, pursuant to which CRL may assist us in the evaluation, development, commercialization and marketing of our potential product candidates, including AV-101, and provide regulatory and strategic consulting services as requested from time to time. Specific projects or services are and will be delineated in individual work orders negotiated from time-to-time under the MSA. Under the terms of work orders issued pursuant to the July 2017 MSA and our May 2007 master services agreement with CRL, we incurred expenses of \$292,700 and \$101,900 during the quarters ended December 31, 2017 and 2016, respectively, and \$904,900 and \$180,100 in the nine-month periods ended December 31, 2017 and 2016, respectively. During the nine months ended December 31, 2017, we have issued an aggregate of 350,000 unregistered shares of our common stock to CRL under the terms of certain work orders for current and future CRO services relating to our development of AV-101 for MDD, the fair value of which represented approximately \$443,000 of the reported CRO expense for the nine months then ended. We anticipate periodic expenses for CRO services from CRL related to nonclinical and clinical development of, and regulatory affairs related to, AV-101 and other potential product candidates will increase in future periods. In December 2017, we executed a work order with CRL for CRO services to be performed in conducting the AV-101 MDD Phase 2 Adjunctive Treatment Study and pursuant to which we became immediately obligated for an initial payment of \$461,700, which amount is reflected in Accrued liabilities and Prepaid expenses in our Condensed Consolidated Balance Sheet at December 31, 2017.

Note 9. Subsequent Events

We have evaluated subsequent events through February 9, 2018 and have identified the following matters requiring disclosure:

Exercise of Warrants

In January 2018, the holders of Series A2 warrants to purchase an aggregate of 314,774 shares of our common stock exercised all of such warrants at the reset exercise price of \$0.001 per share, as described in Note 7, Capital Stock, from which we received nominal cash proceeds. Following these exercises, none of our outstanding warrants have down round anti-dilution protection features.

Grant of Options from 2016 Plan

On February 2, 2018, the Compensation Committee of the Board approved the grant of options to independent members of the Board, officers and employees and certain professional service providers to purchase an aggregate of 2,150,000 shares of our common stock at an exercise price of \$1.16 per share, the quoted closing price of our common stock on the Nasdaq Capital Markets on the date of the grant. The options are vested 25% upon grant with the remaining shares vesting ratably over the next twenty-four months.



Table of Contents

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 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 used 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 agencies, 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, Board and 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.

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 focused on developing new generation medicines for depression and other central nervous system (CNS) disorders. Unless the context otherwise requires, the words "VistaGen Therapeutics, Inc." "VistaGen," "we," "the Company," "us" and "our" refer to VistaGen Therapeutics, Inc., a Nevada corporation. All references to future quarters and years in this Report refer to calendar quarters and calendar years, unless reference is made otherwise.

AV-101 is our oral CNS product candidate in Phase 2 clinical development in the United States, initially as a new generation adjunctive treatment for Major Depressive Disorder (MDD) in patients with an inadequate response to standard antidepressants approved by the U.S. Food and Drug Administration (FDA). AV-101's mechanism of action

(MOA) involves both NMDA (N-methyl-D-aspartate) and AMPA (alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid) receptors in the brain responsible for fast excitatory synaptic activity throughout the CNS. AV-101's MOA is fundamentally different from all standard FDA-approved antidepressants, as well as all atypical antipsychotics, such as aripiprazole, often used adjunctively with standard antidepressants. We believe AV-101 also has potential to treat several additional CNS indications where modulation of the NMDA receptors, activation of AMPA pathways and/or key active metabolites of AV-101 may achieve therapeutic benefit, including, among others, as a non-opioid alternative for neuropathic pain and for Parkinson's disease levodopa -induced dyskinesia (PD LID).

Clinical studies conducted at the U.S. National Institute of Mental Health (NIMH), part of the U.S. National Institutes of Health (NIH), by Dr. Carlos Zarate, Jr., Chief of the NIMH's Experimental Therapeutics & Pathophysiology Branch and its Section on Neurobiology and Treatment of Mood and Anxiety Disorders, have focused on the antidepressant effects of ketamine hydrochloride injection (ketamine), an ion-channel blocking NMDA receptor antagonist approved by the FDA as an anesthetic, in MDD patients with inadequate responses to multiple standard antidepressants. These NIMH studies, as well as clinical research at Yale University and other academic institutions in the U.S., have demonstrated ketamine's robust antidepressant effects in treatment-resistant MDD patients within twenty-four hours of a single sub-anesthetic dose administered by intravenous (IV) injection.



## Table of Contents

We believe orally administered AV-101 may have potential to deliver ketamine-like antidepressant effects, without ketamine's psychological side effects and other safety concerns, and without the need for IV administration. As published in the October 2015 issue of the peer-reviewed, *Journal of Pharmacology and Experimental Therapeutics*, in an article titled, "The prodrug 4-chlorokynurenine causes ketamine-like antidepressant effects, but not side effects, by NMDA/glycineB-site inhibition, using well-established preclinical models of depression, AV-101 was shown to induce fast-acting, dose-dependent, persistent and statistically significant antidepressant-like responses following a single treatment. These responses were equivalent to those seen with a single sub-anesthetic control dose of ketamine. In addition, these studies confirmed that the fast-acting antidepressant effects of AV-101 were mediated through both inhibiting the glycine binding (GlyB) site of the NMDA receptor and activating the AMPA receptor pathway in the brain.

In October 2017, we received FDA authorization to launch our 180-patient Phase 2 multi-center, multi-dose, double blind, placebo-controlled efficacy and safety study of AV-101 as a new generation adjunctive treatment for MDD patients with an inadequate therapeutic response to standard, FDA-approved antidepressants (the AV-101 MDD Phase 2 Adjunctive Treatment Study), and in December 2017 the FDA granted Fast Track Designation to AV-101 for development as a potential adjunctive treatment for MDD. We intend to launch the AV-101 MDD Phase 2 Adjunctive Treatment Study in the first quarter of 2018 with Dr. Maurizio Fava, Professor of Psychiatry at Harvard Medical School and Director, Division of Clinical Research, Massachusetts General Hospital (MGH) Research Institute, as the Principal Investigator. Dr. Fava was the co-Principal Investigator with Dr. A. John Rush of the STAR\*D study, the largest clinical trial conducted in depression to date, whose findings were published in journals such as the *New England Journal of Medicine (NEJM)* and the *Journal of the American Medical Association (JAMA)*. We expect top line results of the AV-101 MDD Phase 2 Adjunctive Treatment Study to be available in the first half of 2019. In addition, pursuant to our Cooperative Research and Development Agreement (CRADA) with the NIMH, the NIMH is currently funding, and Dr. Zarate, as Principal Investigator, and his team are currently conducting, a small Phase 2 clinical study of AV-101 as a monotherapy in subjects with treatment-resistant MDD (the NIMH AV-101 MDD Phase 2 Monotherapy Study).

VistaStem Therapeutics (VistaStem) is our wholly owned subsidiary focused on applying human pluripotent stem cell (hPSC) technology to discover, rescue, develop and commercialize (i) proprietary new chemical entities (NCEs) for CNS and other diseases and (ii) regenerative medicine (RM) involving hPSC-derived blood, cartilage, heart and liver cells. Our internal drug rescue programs are designed to utilize CardioSafe 3D, our customized cardiac bioassay system, to develop small molecule NCEs for our pipeline. To advance potential RM applications of our cardiac stem cell technology, in December 2016, we exclusively sublicensed to BlueRock Therapeutics LP, a next generation RM company established by Bayer AG and Versant Ventures (BlueRock Therapeutics), rights to certain proprietary technologies relating to the production of cardiac stem cells for the treatment of heart disease (the BlueRock Agreement). In a manner similar to our exclusive sublicense agreement with BlueRock Therapeutics, we may pursue additional RM collaborations or out-licensing transactions involving blood, cartilage, and/or liver cells derived from hPSCs for (A) cell-based therapy, (B) cell repair therapy, and/or (C) tissue engineering.

## AV-101 and Major Depressive Disorder

### Background

The World Health Organization (WHO) estimates that 300 million people worldwide are affected by depression. According to the NIH, major depression is one of the most common mental disorders in the U.S. The NIMH reports that, in 2016, approximately 16 million adults in the U.S. had at least one major depressive episode in the past year. According to the U.S. Centers for Disease Control and Prevention (CDC) in an August 2017 report, one in eight Americans over the age of 12 reported taking a standard, FDA-approved antidepressant in the previous month.

Most standard antidepressants target chemical imbalances in the brain related to neurotransmitter reuptake inhibition – either serotonin (antidepressants known as SSRIs) or serotonin/norepinephrine (antidepressants known as SNRIs). Nearly two out of every three drug-treated depression patients do not obtain adequate therapeutic benefit from their initial treatment with a standard antidepressant. Even when effective, these standard antidepressants take many weeks to achieve adequate therapeutic effects. After multiple treatment attempts involving many different standard antidepressants, nearly one out of every three drug-treated depression patients still do not achieve adequate therapeutic benefits from their antidepressant medication. Such patients with an inadequate response to standard antidepressants often seek to augment their treatment regimen by adding an atypical antipsychotic drug (a drug such as aripiprazole), despite only modest potential therapeutic benefit and the significant risk of additional side effects from such adjunctive drugs.

All standard antidepressants have risks of side effects, including, among others, anxiety, metabolic syndrome, sleep disturbance and sexual dysfunction. Adjunctive use of atypical antipsychotics to augment inadequately performing standard antidepressants may increase the risk of significant side effects, including, tardive dyskinesia, substantial weight gain, diabetes and heart disease, while offering only a modest potential increase in therapeutic benefit.





Table of Contents

AV-101

AV-101 is our oral CNS product candidate in Phase 2 development in the United States, initially focused as a new generation antidepressant for the adjunctive treatment of MDD patients with an inadequate therapeutic response to standard, FDA-approved antidepressants. As published in the October 2015 issue of the peer-reviewed, Journal of Pharmacology and Experimental Therapeutics, in an article titled, “The prodrug 4-chlorokynurenine causes ketamine-like antidepressant effects, but not side effects, by NMDA/glycineB-site inhibition,” using well-established preclinical models of depression, AV-101 was shown to induce fast-acting, dose-dependent, persistent and statistically significant ketamine-like antidepressant effects following a single treatment, responses equivalent to those seen with a single sub-anesthetic control dose of ketamine, but without the negative side effects seen with ketamine. In addition, these studies confirmed that the antidepressant effects of AV-101 were mediated through both inhibition of the GlyB site of NMDA receptors and activation of the AMPA receptor pathway in the brain, a key final common pathway feature of certain new generation antidepressants such as ketamine and AV-101, each with a MOA that is fundamentally different from all standard antidepressants and atypical antipsychotics used adjunctively to augment them.

We have completed two NIH-funded, randomized, double blind, placebo-controlled AV-101 Phase 1 safety studies. Currently, pursuant to our CRADA with the NIMH and Dr. Carlos Zarate, Jr., the NIMH is currently funding, and Dr. Zarate, as Principal Investigator, and his team are currently conducting, the NIMH AV-101 MDD Phase 2 Monotherapy Study.

In October 2017, we received authorization from the FDA to proceed, under our Investigational New Drug (IND) application, with the AV-101 MDD Phase 2 Adjunctive Treatment Study, which will test the safety, efficacy and tolerability of AV-101 as an adjunctive treatment of MDD in adult patients with an inadequate therapeutic response to standard, FDA-approved antidepressants. We intend to launch the AV-101 MDD Phase 2 Adjunctive Treatment Study in the first quarter of 2018, and expect top line results to be available in the first half of 2019. In connection with our preparation for this study, as well as potential Phase 3 development and commercialization of AV-101, we, together with our CMO, developed a novel process for the production of AV-101 drug substance. We believe our new proprietary production process will significantly improve AV-101 manufacturing efficiency, thereby reducing the current and future cost of manufacturing AV-101 drug substance and improving the yield of AV-101 drug substance manufactured. Additionally, in December 2017 the FDA granted Fast Track Designation to AV-101 for development as a potential adjunctive treatment for MDD. The FDA’s Fast Track Designation is a process designed to facilitate the development and expedite the review of drugs to treat serious conditions and unmet medical needs. With Fast Track Designation, there is an increased possibility for a priority review of AV-101 by the FDA.

We believe preclinical studies and Phase 1 safety studies support our hypothesis that AV-101 also has potential as a non-opioid treatment alternative for neuropathic pain, as well as several additional CNS indications where modulation of the NMDA receptors, activation of AMPA pathways and/or key active metabolites of AV-101 may achieve therapeutic benefit, including PD LID, epilepsy, and Huntington’s disease. We are beginning to plan additional Phase 2 clinical studies to further evaluate the therapeutic potential of AV-101 beyond MDD, however we do not intend to initiate such studies in 2018.



Table of Contents

CardioSafe 3D™; NCE Drug Rescue and Regenerative Medicine

VistaStem Therapeutics is our wholly owned subsidiary focused on applying hPSC technology to discover, rescue, develop and commercialize proprietary small molecule NCEs for CNS and other diseases, as well as potential cellular therapies involving stem cell-derived blood, cartilage, heart and liver cells. CardioSafe 3D™ is our customized in vitro cardiac bioassay system capable of predicting potential human heart toxicity of small molecule NCEs in vitro, long before they are ever tested in animal and human studies. Potential commercial applications of our stem cell technology platform involve using CardioSafe 3D internally for NCE drug discovery and drug rescue to expand our proprietary drug candidate pipeline. Drug rescue involves leveraging substantial prior research and development investments by pharmaceutical companies and others related to public domain NCE programs terminated before FDA approval due to heart toxicity risks and RM and cellular therapies. To advance potential RM applications of our cardiac stem cell technology, in December 2016, we exclusively sublicensed to BlueRock Therapeutics LP, a next generation regenerative medicine company established by Bayer AG and Versant Ventures, rights to certain proprietary technologies relating to the production of cardiac stem cells for the treatment of heart disease. In a manner similar to the BlueRock Agreement, we may also pursue additional potential RM applications using blood, cartilage, and/or liver cells derived from hPSCs for (A) cell-based therapy (injection of stem cell-derived mature organ-specific cells obtained through directed differentiation), (B) cell repair therapy (induction of regeneration by biologically active molecules administered alone or produced by infused genetically engineered cells), or (C) tissue engineering (transplantation of in vitro grown complex tissues) using hPSC-derived blood, bone, cartilage, and/or liver cells.

Financial Operations Overview and Results of Operations

Our critical accounting policies and estimates and recent accounting pronouncements are disclosed in our Annual Report on Form 10-K for the fiscal year ended March 31, 2017, as filed with the SEC on June 29, 2017, and in Note 3 to the accompanying unaudited Condensed Consolidated Financial Statements included in Part 1, Item 1 of this Report.

Summary

Net Loss

We generated \$1.25 million of sublicense revenue from the BlueRock Agreement in December 2016. However, we have not yet achieved recurring revenue-generating status from any of our product candidates or technologies. Since our inception in May 1998, we have devoted substantially all of our time and efforts to developing our lead CNS product candidate, AV-101, from early nonclinical studies to our ongoing Phase 2 clinical development program in MDD, as well as stem cell technology research and development, bioassay development, small molecule drug development, and creating, protecting and patenting intellectual property related to our product candidates and technologies, with the corollary initiatives of recruiting and retaining personnel and raising working capital. As of December 31, 2017, we had an accumulated deficit of approximately \$152.5 million. Our net loss for the nine months ended December 31, 2017 and 2016 was approximately \$10.3 million and \$7.7 million, respectively. We expect losses to continue for the foreseeable future, primarily related to our further development of AV-101 for the adjunctive treatment of MDD and other CNS indications.

Summary of the Nine Months Ended December 31, 2017

During the nine months ended December 31, 2017, we have continued to (i) advance nonclinical, including manufacturing, and clinical development of AV-101 as a potential new generation antidepressant and as a potential new therapeutic alternative for several other CNS indications with significant unmet medical need, (ii) expand the

regulatory and intellectual property foundation to support broad clinical development and, ultimately, commercialization of AV-101 in the U.S. and foreign markets, and (iii) on a limited basis, advance the predictive toxicology capabilities of CardioSafe 3D for small molecule new chemical entity drug rescue and development applications and collaborative regenerative medicine opportunities related to our cardiac stem cell technology platform.

Pursuant to our CRADA with the NIH, the NIH continues to fund, and Dr. Carlos Zarate Jr. of the NIMH continues to conduct, the NIMH AV-101 MDD Phase 2 Monotherapy Study at no cost to us other than supplying clinical trial material.

We continue to prepare for the launch of our AV-101 MDD Phase 2 Adjunctive Treatment Study with initiatives that have significantly improved the efficiency of our AV-101 manufacturing processes and are making available sufficient quantities of AV-101 to enable a comprehensive initiation of the study. We currently anticipate the launch of the AV-101 MDD Phase 2 Adjunctive Treatment Study, with Dr. Maurizio Fava of Harvard Medical School serving as Principal Investigator, in the first quarter of 2018.



Table of Contents

Additionally, we are pursuing initiatives to secure a broad spectrum of intellectual property protection for AV-101 covering multiple CNS indications. We have filed and are pursuing several patent applications in Europe, the U.S. and other selected regions. Several of these patent applications have already been granted or allowed, on both (i) certain novel therapeutic methods of use of AV-101, including depression, and (ii) certain novel methods of producing AV-101. In Europe, the European Patent Office (EPO) recently granted our patent related to methods of treating depression with AV-101 and certain other neurological indications. In the U.S. and other selected regional markets, we are currently pursuing a counterpart AV-101 patent application similar to the patent granted by the EPO. Although the U.S. Patent and Trademark Office (USPTO) has not yet allowed the counterpart application filed in the U.S., we believe that our counterpart patent applications under review by the USPTO and other countries ultimately will be granted.

In the U.S., Europe and other selected regional markets, we are also prosecuting patent applications related to novel methods of producing AV-101. The USPTO recently granted a patent covering our manufacturing process and the Chinese counterpart has also been granted. We have submitted a counterpart application to the EPO, which has not yet been approved. However, given that the USPTO has granted a patent in the U.S., we believe our counterpart patent application at the EPO ultimately will be granted.

The USPTO has also recently issued a patent related to methods for producing, from human pluripotent stem cells (hPSCs), hematopoietic precursor stem cells, which are stem cells that give rise to all of the blood cells and most of the bone marrow cells in the body. VistaGen holds an exclusive license to this patent from the University Health Network (UHN). The technology covered by the patent has the potential to impact both direct and supportive therapy for autoimmune disorders and cancer, with CAR-T cell applications, and foundational technology which may provide approaches for producing bone marrow stem cells for bone marrow transfusions.

In December 2017, we completed an underwritten public offering, resulting in gross proceeds of \$15.0 million, during which we offered and sold shares of our common stock and warrants to purchase shares of our common stock at a combined public offering price of \$1.50 per share and related warrant (the December 2017 Public Offering). We issued an aggregate of 10,000,000 shares of our common stock and warrants to purchase up to 10,000,000 shares of our common stock at an exercise price of \$1.50 per share (the December 2017 Offering Warrants). The December 2017 Offering Warrants are exercisable at any time through December 13, 2022, and do not contain any cashless exercise features as long as our Registration Statement on Form S-1 (Registration No. 333-221009) (the S-1) is effective. We received net proceeds of approximately \$13.6 million from the December 2017 Public Offering, after deducting underwriter's commission and other expenses related to the offering. The common stock and the shares of common stock underlying the December 2017 Offering Warrants issued in the December 2017 Public Offering were offered, issued and sold pursuant to the S-1.

In September 2017, we completed an underwritten public offering, pursuant to which we sold 1,371,430 shares of our common stock and Series A1 Warrants to purchase up to 1,388,931 shares of common stock and Series A2 Warrants to purchase up to 503,641 shares of common stock (collectively, the Warrants), each initially exercisable for \$1.82 per share to two of our existing institutional investors, resulting in net proceeds of approximately \$2.0 million (the September 2017 Public Offering). The Series A1 Warrants will be exercisable for a five-year period commencing on March 7, 2018, and the Series A2 Warrants are exercisable at any time and expire on September 6, 2022. The common stock and the shares of common stock underlying the Warrants issued in the September 2017 Public Offering were sold pursuant to our effective Registration Statement on Form S-3 (Registration No. 333-215671) to cover this and potential future sales of our equity securities in one or more public offerings from time to time. Consistent with the anti-dilution protection provisions of the Series A2 Warrants, the exercise price of such warrants was reduced upon the closing of the December 2017 Public Offering. At the date of this Report, all of the Series A2 Warrants have been exercised at the reset exercise price as a result of the December 2017 Public Offering. Following these exercises, none

of our outstanding warrants have down round anti-dilution protection features.

During the nine months ended December 31, 2017, we entered into self-placed private placement transactions with individual accredited investors, pursuant to which we sold units consisting of an aggregate of 616,323 shares of our unregistered common stock and, after adjustments, warrants which are not exercisable until six months and one day following issuance and expire between April 30, 2021 and November 30, 2022, to purchase an aggregate of 616,323 unregistered shares of our common stock at a weighted average fixed exercise price of approximately \$2.00 per share. We received aggregate cash proceeds of approximately \$1.1 million in these self-placed private placement transactions.

In July 2017, we appointed Mark Wallace, M.D., Distinguished Professor of Clinical Anesthesiology at the University of California, San Diego, to our Clinical and Regulatory Advisory Board to assist us in advancing development of AV-101 as a potential non-opioid treatment alternative for neuropathic pain. Dr. Wallace is an internationally recognized leader in the field of multi-modal pain management, with over 30 years of professional experience, board certifications, licensures, honors/awards, grants, articles and abstracts.





Table of Contents

As a matter of course, we continue to minimize, to the greatest extent possible, cash commitments and expenditures for both internal and external research and development and general and administrative services. To further advance the nonclinical and clinical development of AV-101 and our stem cell technology platform, as well as support our operating activities, we continue to carefully manage our routine operating costs, including our internal employee related expenses, as well as external costs relating to regulatory consulting, contract research and development, investor relations and corporate development, legal, acquisition and protection of intellectual property, public company compliance and other professional services and internal costs.

## Results of Operations

## Comparison of Three Months Ended December 31, 2017 and 2016

The following table summarizes the results of our operations, including both cash and noncash components, for the three months ended December 31, 2017 and 2016 (amounts in thousands).

	Three Months Ended December 31,	
	2017	2016
Sublicense revenue	\$-	\$1,250
Operating expenses:		
Research and development	1,602	1,611
General and administrative	1,266	2,276
Total operating expenses	2,868	3,887
Loss from operations	(2,868)	(2,637)
Interest expense, net	(2)	(1)
Loss on extinguishment of accounts payable	(135)	-
Loss before income taxes	(3,005)	(2,638)
Income taxes	-	-
Net loss	(3,005)	(2,638)
Accrued dividend on Series B Preferred Stock	(263)	(238)
Deemed dividend from trigger of down round provision feature	(199)	-
Net loss attributable to common stockholders	\$(3,467)	\$(2,876)

## Revenue

We recognized \$1.25 million in sublicense revenue pursuant to the BlueRock Therapeutics Agreement in the quarter ended December 31, 2016. While we may potentially receive additional payments and royalties under the BlueRock Therapeutics Agreement in the future, in the event certain performance-based milestones and commercial sales are achieved, we reported no revenue for the quarter ended December 31, 2017 and we presently have no recurring revenue generating arrangements with respect to AV-101 or other potential product candidates. There can be no assurance that the BlueRock Agreement will provide additional revenue to us in the near term or at all.



Table of Contents

## Research and Development Expense

Research and development expense, including both cash and noncash components, totaled \$1.6 million for each of the quarters ended December 31, 2017 and 2016. Noncash expenses, including stock compensation, depreciation and a portion of rent expense in both periods and a portion of AV-101 project expenses in the quarter ended December 31, 2017, totaled approximately \$385,000 and \$215,000 for the quarters ended December 31, 2017 and 2016, respectively. While total research and development expense remains essentially unchanged, we have continued our focus on nonclinical and clinical development of AV-101, particularly our preparations for the launch of the AV-101 MDD Phase 2 Adjunctive Treatment Study, which is currently anticipated in the first quarter of 2018. The following table indicates the primary components of research and development expense for each of the periods (amounts in thousands):

	Three Months Ended December 31,	
	2017	2016
Salaries and benefits	\$347	\$302
Stock-based compensation	299	114
Consulting and other professional services	7	(139)
Technology licenses and royalties, including UHN	149	293
Project-related research and supplies:		
AV-101	665	894
Stem cell and all other	15	50
	680	944
Rent	104	88
Depreciation	16	8
All other	-	1
Total Research and Development Expense	\$1,602	\$1,611

The increase in salaries and benefits expense reflects the impact of modest salary increases granted to our Chief Medical Officer (CMO) and Chief Scientific Officer (CSO) in July 2017 and to the non-officer members of our scientific staff in June 2017 and to bonus payments made to scientific staff members in December 2017, offset by the impact of a staff position terminated in April 2017.

Noncash stock-based compensation expense increased in the current period primarily from the routine amortization of option grants made to our CSO, CMO and scientific staff in September 2017, April 2017 and November 2016. Grants awarded after December 2016 account for approximately \$199,000 of 2017 expense. Expense attributable to these grants is generally being amortized over two-year to four-year vesting periods, based on the terms of the respective grants. Additionally, substantially all option grants made prior to September 2015 were fully-vested and fully-expensed prior to June 30, 2017.

Consulting services reflects fees paid or accrued for scientific, nonclinical and clinical development and regulatory advisory services rendered to us by third-parties, primarily by members of our scientific and CNS clinical and regulatory advisory boards. The reduction in expense in the current period primarily reflects the change in terms of consulting agreements with our stem cell-related scientific advisory board members. Consulting expense in 2016 reflected the impact of the rationalization of the agreements and accruals related to such advisory board members.

Technology license expense reflects both recurring annual license fees as well as legal counsel and other costs related to patent prosecution and protection pursuant to our stem cell technology license agreements or that we have elected to pursue for commercial purposes. We recognize these costs as they are invoiced to us by the licensors or counsel and they do not occur ratably throughout the year or between years. In both periods, this expense includes legal counsel and other costs we have incurred to advance pending patent applications in the U.S. and numerous foreign countries with respect to AV-101 and our stem cell technology platform. Technology license-related expense for 2016 also includes net expense of \$158,000 related to the sublicense consideration paid to UHN pursuant to the BlueRock Therapeutics Agreement plus additional fees and expenses related to two new stem cell technology related licenses acquired from UHN, net of amounts previously accrued in connection with our prior Sponsored Research Collaboration Agreement (SRCA) with UHN, and \$55,000 representing the fair value of a warrant granted to intellectual property counsel as partial compensation for services.



Table of Contents

AV-101 project expenses for the quarters ended December 31, 2017 and 2016 include continuing costs incurred to develop more efficient and cost-effective proprietary manufacturing methods for AV-101, and to produce clinical trial material for the AV-101 MDD Phase 2 Adjunctive Treatment Study, as well as costs incurred for certain other nonclinical studies to facilitate further clinical development of AV-101 in MDD and potentially for other indications, and to comply with applicable FDA regulations. We expect these expenses to increase materially over the next several quarters as we initiate and conduct the AV-101 MDD Phase 2 Adjunctive Treatment Study. AV-101 expenses in 2016 also included initial costs for preparation of the IND and trial protocol submission to the FDA to obtain approval for the AV-101 MDD Phase 2 Adjunctive Treatment Study. Stem cell and other project related expenses reflects costs associated with our in-house stem cell technology-related initiatives in both years, and, in 2016, our participation in the FDA's Comprehensive In Vitro Proarrhythmia Assay (CiPA) project.

The increase in rent expense for the quarter ended December 31, 2017 reflects higher commercial property rents prevalent in the South San Francisco real estate market and recognized in our November 2016 lease amendment extending the lease of our headquarters facilities in South San Francisco by five years from July 31, 2017 to July 31, 2022 and the related accounting for the extension amendment.

## General and Administrative Expense

General and administrative expense, including both cash and noncash components, decreased by 44% to approximately \$1.3 million from \$2.3 million for the quarters ended December 31, 2017 and 2016, respectively. Noncash expense accounted for approximately \$485,000 and \$1,486,000 for the quarters ended December 31, 2017 and 2016, respectively, including, in both periods, stock compensation expense, a portion of investor relations and investment banking expenses, warrant modification expense, and a portion of rent expense. The overall decrease in general and administrative expenses resulted primarily from decreased professional services expenses, notably attributable to a decrease in noncash expense attributable to grants of common stock for services, a decrease in noncash warrant modification expense, partially offset by increased salary and benefits and noncash stock compensation expenses. The following table indicates the primary components of general and administrative expenses, including the cash and noncash components, for each of the periods (amounts in thousands):

	Three Months Ended December 31,	
	2017	2016
Salaries and benefits	\$339	\$257
Stock-based compensation	390	153
Board fees	39	36
Legal, accounting and other professional fees	44	1,017
Investor relations	232	241
Insurance	60	38
Travel expenses	33	54
Rent and utilities	69	63

Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

Warrant modification expense	13	370
All other expenses	47	47
	\$1,266	\$2,276

The increase in salaries and benefits primarily reflects the impact of modest salary increases granted in July 2017 to our Chief Executive Officer (CEO) and Chief Financial Officer (CFO), and in January 2017 and July 2017 to our Vice President-Corporate Development (VP-Corporate Development) and, in June 2017, to a non-officer member of our administrative staff as well as bonus payments in December 2017 to our VP-Corporate Development and an administrative staff member.

Stock based compensation expense increased in the current period primarily as a result of the routine amortization of option grants to independent members of our Board and our CEO, CFO, VP Corporate Development and administrative staff in September 2017, April 2017 and November 2016, plus the new-hire grant made to our VP-Corporate Development in September 2016. Grants awarded after December 2016 account for approximately \$274,000 of 2017 expense. Expense attributable to these grants is generally being amortized over a two-year to four-year vesting period, based on the terms of the respective grants. Additionally, substantially all option grants made prior to September 2015 were fully-vested and fully-expensed prior to June 30, 2017.

Board fees includes fees recognized for the services of independent members of our Board. The Board modified committee assignments effective in April 2017, resulting in the slight increase in current year expense.





## Table of Contents

Legal, accounting and other professional fees for the quarters ended December 31, 2017 and 2016 includes cash expense related to routine legal services as well as accounting expense related to the review of the financial statements for the third quarter of each fiscal year. Other professional fees for the quarter ended December 31, 2016 additionally included noncash expense related to grants of an aggregate of 220,000 unregistered shares of our common stock valued on the respective grant dates at an aggregate of \$862,800 plus aggregate cash payments of \$80,000 to investment professionals for financial advisory and corporate development services.

Investor relations expense includes the fees of our various external service providers for a broad spectrum of investor relations, market awareness and strategic advisory and support functions, as well as initiatives that included numerous meetings in multiple U.S. markets and other communication activities focused on expanding market awareness of the Company, including among registered investment professionals and investment advisors, and individual and institutional investors. In the quarters ended December 31, 2017 and 2016, in addition to cash fees and expenses we incurred, we granted an aggregate of 70,000 and 35,000 unregistered shares of our common stock, respectively, to certain investor relations, market awareness and strategic business advisory service providers for their services and recognized noncash expense of \$84,000 and \$137,800, respectively, representing the fair value of the stock at the time of issuance.

In both periods, travel expense reflects costs associated with management presentations to and meetings in multiple U.S. markets with existing and potential individual and institutional investors, investment professionals and advisors, media, and securities analysts, as well as various investor relations, market awareness and corporate development and partnering initiatives. Travel expenses for the quarter ended December 31, 2017 were primarily related to advancing the consummation of the December 2017 Public Offering.

The increase in rent expense for the quarter ended December 31, 2017 reflects higher commercial property rents prevalent in the South San Francisco real estate market and recognized in our November 2016 lease amendment extending the lease of our headquarters facilities by five years from July 31, 2017 to July 31, 2022 and the related accounting for the extension amendment.

During the quarter ended December 31, 2017, we modified outstanding warrants issued in private placement transactions between August 2017 and November 2017 to purchase an aggregate of 178,572 shares of our common stock to reduce the exercise prices from a weighted average of \$2.32 per share to a weighted average of \$1.58 per share. We recognized the calculated increase in the fair value of the warrants, \$13,000, as noncash warrant modification expense. During the quarter ended December 31, 2016, we entered into warrant exchange agreements with certain warrant holders pursuant to which the warrant holders exchanged outstanding warrants to purchase an aggregate of 163,044 shares of our common stock for an aggregate of 110,008 shares of our unregistered common stock. We accounted for these transactions as warrant modifications, resulting in our recognition of \$293,300 in noncash expense in the quarter ended December 31, 2016. During that quarter we also modified an outstanding warrant to reduce the exercise price from \$8.00 per share to \$3.51 per share and increase the number of shares exercisable under the warrant from 25,000 shares to 50,000 shares, recognizing \$76,900 in noncash expense as the incremental fair value attributable to the modification.

### Interest and Other Expenses

Interest expense totaled \$2,000 for the quarter ended December 31, 2017 compared to \$900 reported for the quarter ended December 31, 2016. Interest expense in both periods relates to interest paid on insurance premium financing and on a capital lease of office equipment.

During the quarter ended December 31, 2017, we issued 500,000 unregistered shares of our common stock having a fair value at the time of issuance of \$585,000 and a cash payment of \$76,500 to a contract manufacturing organization in settlement of \$526,500 of open accounts payable. We recognized a corresponding loss on settlement of accounts payable in the amount of \$135,000 for the quarter.

We recognized \$263,000 and \$237,700 for the quarters ended December 31, 2017 and 2016, respectively, representing the 10% cumulative dividend payable on our Series B Preferred as an additional deduction in arriving at net loss attributable to common stockholders in the accompanying Condensed Consolidated Statement of Operations and Comprehensive Loss included in Part I of this Report. There have been no conversions of outstanding shares of our Series B Preferred stock into shares of our common stock since August 2016.

Our sale of units consisting of common stock and warrants in the December 2017 Public Offering at an offering price of \$1.50 per unit triggered the anti-dilution provisions of the Series A2 Warrants to purchase an aggregate of 503,641 shares of our common stock issued in the September 2017 Public Offering. In accordance with the anti-dilution terms and formula contained in the Series A2 warrants, the exercise price of the Series A2 Warrants was reduced from the initial exercise price of \$1.82 per share to \$0.001 per share. We recognized the effect of triggering the down round feature, \$199,200, as a further addition to net loss attributable to common stockholders and in our calculation of basic and fully diluted earnings per share in our accompanying Condensed Consolidated Statement of Operations and Comprehensive Loss and as a dividend in our Condensed Consolidated Statement of Stockholders' Equity included in Part I of this Report.



Table of Contents

## Comparison of Nine Months Ended December 31, 2017 and 2016

The following table summarizes the results of our operations, including both cash and noncash components, for the nine months ended December 31, 2017 and 2016 (amounts in thousands).

	Nine Months Ended December 31,	
	2017	2016
Sublicense revenue	\$-	\$1,250
Operating expenses:		
Research and development	5,125	4,043
General and administrative	4,997	4,908
Total operating expenses	10,122	8,951
Loss from operations	(10,122)	(7,701)
Interest expense (net)	(8)	(4)
Loss on extinguishment of accounts payable	(135)	-
Loss before income taxes	(10,265)	(7,705)
Income taxes	(2)	(2)
Net loss	(10,267)	(7,707)
Accrued dividend on Series B Preferred Stock	(767)	(1,018)
Deemed dividend from trigger of down round		
provision feature	(199)	-
Deemed dividend on Series B Preferred Stock	-	(111)
Net loss attributable to common stockholders	\$(11,233)	\$(8,836)

## Revenue

We recognized \$1.25 million in sublicense revenue pursuant to the BlueRock Therapeutics Agreement in the nine months ended December 31, 2016. While we may potentially receive additional payments and royalties under the BlueRock Therapeutics Agreement in the future, in the event certain performance-based milestones and commercial sales are achieved, we reported no revenue for the nine months ended December 31, 2017 and we presently have no recurring revenue generating arrangements with respect to AV-101 or other potential product candidates. There can be no assurance that the BlueRock Agreement will provide additional revenue to us in the near term or at all.





Table of Contents

## Research and Development Expense

Research and development expense, including both cash and noncash components, totaled \$5.1 million for the nine months ended December 31, 2017, an increase of approximately 27% compared to the \$4.0 million reported for the nine months ended December 31, 2016. Noncash expenses totaled approximately \$1,228,000 and \$346,000 in the nine months ended December 31, 2017 and 2016, respectively, including stock compensation, depreciation and a portion of rent expense in both periods, and a portion of AV-101 project expenses in the nine months ended December 31, 2017. The increase in research and development expense in 2017 reflects our continued focus on nonclinical and clinical development of AV-101, particularly our preparations for the launch of the AV-101 MDD Phase 2 Adjunctive Treatment Study, which is currently anticipated in the first quarter of 2018. The following table indicates the primary cash and noncash components of research and development expense for each of the periods (amounts in thousands):

	Nine Months Ended December 31,	
	2017	2016
Salaries and benefits	\$1,231	\$1,013
Stock-based compensation	627	240
Consulting and other professional services	23	(81)
Technology licenses and royalties	309	547
Project-related research and supplies:		
AV-101	2,465	1,963
Stem cell and all other	105	129
	2,570	2,092
Rent	308	206
Depreciation	54	25
All other	3	1
Total Research and Development Expense	\$5,125	\$4,043

The increase in salaries and benefits reflects the hiring of our Chief Medical Officer (CMO) in June 2016, and a salary increase granted to our CMO in July 2017, as well as salary increases granted to our Chief Scientific Officer (CSO) and to the non-officer members of our scientific staff in June 2016 and June 2017, offset by the impact of a staff position terminated in April 2017. Additionally, our then-newly-hired CMO did not receive a bonus in July 2016; however, both our CMO and CSO were granted a bonus in September 2017.

Stock based compensation expense increased in the current period primarily as a result of the routine amortization of option grants made to our CSO, CMO and scientific staff in September 2017, April 2017 and November 2016, plus the new-hire grant made to our CMO in June 2016. Grants awarded after December 2016 account for approximately \$279,000 of 2017 expense. The expense attributable to these grants is generally being amortized over a two-year to four-year vesting period, based on the terms of the respective grants. Substantially all option grants made prior to



September 2015 were fully-vested and fully-expensed prior to June 30, 2017.

Consulting services reflects fees paid or accrued for scientific, nonclinical and clinical development and regulatory advisory services rendered to us by third-parties, primarily by members of our scientific and CNS clinical and regulatory advisory boards. The reduction in expense in 2017 primarily reflects the change in terms of consulting agreements with our stem cell-related scientific advisory board members. Consulting expense in 2016 reflected the impact of the rationalization of the agreements and accruals related to such advisory board members.

Technology license expense in both periods reflects both recurring annual license fees as well as legal counsel and other costs related to patent prosecution and protection pursuant to our stem cell technology license agreements or that we have elected to pursue for commercial purposes. We recognize these costs as they are invoiced to us by the licensors or counsel and they do not occur ratably throughout the year or between years. In both periods, this expense also includes legal counsel and other costs we have incurred to advance numerous pending or now-granted patent applications in the U.S. and various foreign countries with respect to AV-101 and our stem cell technology platform. Technology license-related expense for 2016 also includes net expense of \$158,000 related to the sublicense consideration paid to UHN pursuant to the BlueRock Therapeutics Agreement plus additional fees and expenses related to two new stem cell technology related licenses acquired from UHN, net of amounts previously accrued in connection with our prior SRCA with UHN, and \$55,000 representing the fair value of a warrant granted to intellectual property counsel as partial compensation for services.



Table of Contents

AV-101 project expense for both periods includes costs incurred to develop more efficient and cost-effective proprietary manufacturing methods for AV-101, and to produce clinical trial material enabling the AV-101 MDD Phase 2 Adjunctive Treatment Study, and, primarily in 2017, costs incurred for certain other nonclinical studies to facilitate further clinical development of AV-101 in MDD and potentially for other indications and to comply with applicable FDA regulations. We expect these expenses to increase materially over the next several quarters as we initiate and conduct the AV-101 MDD Phase 2 Adjunctive Treatment Study. Stem cell and other project related expenses reflects costs associated with our in-house stem cell technology-related initiatives, and, to a greater extent in 2016, our participation in the FDA's CiPA project.

The increase in rent expense for 2017 reflects higher commercial property rents prevalent in the South San Francisco real estate market and recognized in our November 2016 lease amendment extending the lease of our headquarters facilities in South San Francisco by five years, from July 31, 2017 to July 31, 2022, and the related accounting for the extension amendment.

## General and Administrative Expense

General and administrative expense, including both cash and noncash components, increased approximately 2% to \$5.0 million for the nine months ended December 31, 2017 from \$4.9 million for the nine months ended December 31, 2016. Noncash expense accounted for approximately \$2.2 million and \$2.5 million for the nine months ended December 31, 2017 and 2016, respectively, including, in both periods, stock compensation expense, a portion of investor relations and professional services expenses, warrant modification expense, and a portion of rent expense. The overall increase in general and administrative expenses was primarily attributable to increased salary and benefits expense and noncash stock compensation and investor relations expenses, offset by reductions in professional services and noncash warrant modification expenses. The following table indicates the primary components of general and administrative expenses, including noncash components, for each of the periods (amounts in thousands):

	Nine Months Ended December 31,	
	2017	2016
Salaries and benefits	\$1,260	\$932
Stock-based compensation	760	334
Board fees	117	105
Legal, accounting and other professional fees	739	1,766
Investor relations	1,229	820
Insurance	181	116
Travel expenses	95	126
Rent and utilities	209	148
Warrant modification expense	293	427
All other expenses	114	134
	\$4,997	\$4,908

The increase in salaries and benefits reflects the impact of the hiring of our VP-Corporate Development in September 2016 and salary increases granted in June 2016 and July 2017 to our CEO and CFO, and in June 2016 and June 2017 to a non-officer member of our administrative staff. Additionally, each of our officers was granted a bonus in September 2017, but our VP-Corporate Development had not yet joined the Company in July 2016, when our CEO and CFO received a bonus payment.

Stock based compensation expense increased in 2017 primarily as a result of the routine amortization of option grants to independent members of our Board of Directors and our CEO, CFO, VP-Corporate Development and administrative staff in September 2017, April 2017 and November 2016, plus the new-hire grant made to our VP-Corporate Development in September 2016. Grants awarded after December 2016 account for approximately \$383,000 of 2017 expense. The expense attributable to these grants is generally being amortized over a two-year to four-year vesting period based on the terms of the respective grants. Substantially all option grants made prior to September 2015 were fully-vested and fully-expensed prior to June 30, 2017.



Table of Contents

Board fees includes fees recognized for the services of independent members of our Board. The Board modified committee assignments effective in April 2017, resulting in the modest increase in expense.

Legal, accounting and other professional fees for the nine months ended December 31, 2017 and 2016 includes expense related to routine legal services as well as the accounting expense related to the annual audit of the prior year's financial statements, tax return preparation and the review of the financial statements for the first three quarters of the current fiscal year. In addition to cash fees incurred, during the nine months ended December 31, 2017, we granted an aggregate of 20,000 unregistered shares of our common stock having an aggregate fair value of \$30,800 to legal services providers as partial compensation for services and an aggregate of 150,000 unregistered shares of our common stock having an aggregate fair value of \$234,000 to two investment banking firms pursuant to financial advisory agreements. Noncash expense for the nine months ended December 31, 2016 included (i) \$337,500 recognized in the quarter ended June 30, 2016 pursuant to the June 30, 2015 grant of an aggregate of 90,000 shares of our Series B 10% convertible preferred stock having an aggregate fair value of \$1,350,000 as compensation for financial advisory and corporate development service contracts with two independent providers for services to be performed through June 30, 2016; (ii) \$108,500 recognized in the quarter ended September 30, 2016 representing the fair value of 25,000 unregistered shares of our common stock granted to a legal services provider as compensation for services; and (iii) \$862,800 recognized in the quarter ended December 31, 2016 representing the fair value of 220,000 unregistered shares of our common stock granted as compensation for financial advisory, investment banking and business development services.

Investor relations expense includes the fees of our various external service providers for a broad spectrum of investor relations, market awareness and strategic advisory and support functions, as well as initiatives that included numerous meetings in multiple U.S. markets and other communication activities focused on expanding market awareness of the Company, including among registered investment professionals and investment advisors, and individual and institutional investors. In the nine months ended December 31, 2017, in addition to cash fees and expenses we incurred, we granted an aggregate of 552,000 shares of our unregistered common stock to various corporate development, investor relations, market awareness and business advisory service providers as full or partial compensation for their services and recognized noncash expense totaling \$847,300, representing the fair value of the stock at the time of issuance. In the nine months ended December 31, 2016, in addition to cash fees and expenses we incurred, we granted an aggregate of 60,000 unregistered shares of our common stock to three investor relations and investor awareness service providers as partial compensation for their services and recognized noncash expense of \$246,300, representing the fair value of the stock at the time of issuance. During the same period in 2016, we also granted three-year, immediately exercisable warrants to purchase an aggregate of 75,000 shares of our unregistered common stock at exercise prices ranging from \$4.50 per share to \$6.00 per share to three investor relations service providers and recognized non-cash expense of \$172,300 representing the fair value of the warrants at the time of issuance.

In both periods, travel expense reflects costs associated with management presentations to and meetings in multiple U.S. markets with existing and potential individual and institutional investors, investment professionals and advisors, media, and securities analysts, as well as various investor relations, market awareness and corporate development initiatives.

The increase in rent expense for 2017 reflects higher commercial property rents prevalent in the South San Francisco real estate market and recognized in our November 2016 lease amendment extending the lease of our headquarters facilities in South San Francisco by five years, from July 31, 2017 to July 31, 2022, and the related accounting for the extension amendment.

In September 2017, we reduced the exercise price of 247,500 warrants issued in the Spring 2017 Private Placement from a weighted average exercise price of \$3.99 per share to \$2.00 per share. We also issued to each of the Spring 2017 Private Placement investors additional warrants to purchase an aggregate total of 247,501 shares of common stock, with an exercise price of \$2.00 per share. We recognized noncash expense of \$279,700 in the quarter ended September 30, 2017, representing the increase in fair value of the warrants granted initially before and after the modification and the fair value of the additional warrants granted. In December 2017, we modified outstanding warrants issued in private placement transactions between August 2017 and November 2017 to purchase an aggregate of 178,572 shares of our common stock to reduce the exercise prices from a weighted average of \$2.32 per share to a weighted average of \$1.58 per share. We recognized the increase in the fair value of the warrants, \$13,000, as noncash warrant modification expense in the quarter ended December 31, 2017. Between April 2016 and December 2016, we entered into warrant exchange agreements with certain warrant holders pursuant to which the warrant holders exchanged outstanding warrants to purchase an aggregate of 224,513 shares of our common stock for an aggregate of 156,246 shares of our unregistered common stock. We accounted for these transactions as warrant modifications, resulting in our recognition of an aggregate of \$350,700 in noncash expense attributable to the increase in fair value related to the warrant exchanges during the nine-month period ended December 31, 2016. Further, in December 2016, we modified an outstanding warrant to reduce the exercise price from \$8.00 per share to \$3.51 per share and increase the number of shares exercisable under the warrant from 25,000 shares to 50,000 shares, recognizing \$76,900 in expense in the quarter then ended as the incremental fair value attributable to the modification.





## Table of Contents

### Interest and Other Expenses

Interest expense totaled \$7,700 for the nine months ended December 31, 2017 compared to \$3,700 for the nine months ended December 31, 2017. Interest expense in both periods relates to interest paid on insurance premium financing and on a capital lease of office equipment.

During the quarter ended December 31, 2017, we issued 500,000 unregistered shares of our common stock having a fair value at the time of issuance of \$585,000 and a cash payment of \$76,500 to a contract manufacturing organization in settlement of \$526,500 of open accounts payable. We recognized a corresponding loss on settlement of accounts payable in the amount of \$135,000 for the quarter.

We recognized \$766,600 and \$1,018,500 for the nine months ended December 31, 2017 and 2016, respectively, representing the 10% cumulative noncash dividend payable on our Series B Preferred as an additional deduction in arriving at net loss attributable to common stockholders in the accompanying Condensed Consolidated Statement of Operations and Comprehensive Loss included in Part I of this Report. The reduction in the dividend accrual results from the automatic conversion of an aggregate of 2,403,051 shares of Series B Preferred into an equal number of shares of our common stock upon our completion of our May 2016 public offering of shares of our common stock and warrants, and a subsequent voluntary conversion of 87,500 shares of our Series B Preferred in August 2016. There have been no conversions of outstanding shares of Series B Preferred into common shares since August 2016.

Our sale of units consisting of common stock and warrants in the December 2017 Public Offering at an offering price of \$1.50 per unit triggered the anti-dilution provisions of the Series A2 Warrants to purchase an aggregate of 503,641 shares of our common stock issued in the September 2017 Public Offering. In accordance with the anti-dilution terms and formula contained in the Series A2 warrants, the exercise price of the Series A2 Warrants was reduced from the initial exercise price of \$1.82 per share to \$0.001 per share. We recognized the effect of triggering the down round feature, \$199,200, as a further addition to net loss attributable to common stockholders and in our calculation of basic and fully diluted earnings per share in our accompanying Condensed Consolidated Statement of Operations and Comprehensive Loss and as a dividend in our Condensed Consolidated Statement of Stockholders' Equity included in Part I of this Report.

During the quarter ended June 30, 2016, we allocated the proceeds from our self-placed private placement sales of Series B Preferred Units to the Series B Preferred stock and the Series B Warrants based on their relative fair values on the dates of the sales. The difference between the relative fair value per share of the Series B Preferred, approximately \$4.20 per share, and its Conversion Price (or stated value) of \$7.00 per share represented a deemed dividend to the purchasers of the Series B Preferred Units. Accordingly, we recognized a deemed dividend in the aggregate amount of \$111,100 in arriving at net loss attributable to common stockholders for the nine months ended December 31, 2016 in the accompanying Condensed Consolidated Statement of Operations and Comprehensive Loss included in Part I of this Report.

### Liquidity and Capital Resources

From our inception in May 1998 through December 31, 2017, we have financed our operations and technology acquisitions primarily through the issuance and sale of our equity and debt securities, including convertible promissory notes and short-term promissory notes, for cash proceeds of approximately \$61.4 million, as well as from an aggregate of approximately \$17.6 million of government research grant awards, strategic collaboration payments, intellectual property sublicensing and other revenues. We have also issued equity securities with an approximate aggregate value at issuance of \$35.6 million in non-cash settlements of certain liabilities, including liabilities for professional services rendered to us or as compensation for such services. Additionally, pursuant to our CRADA with

the NIH, the NIMH continues to conduct Phase 2 clinical development activities relating to AV-101 as a potential new generation antidepressant. The NIMH AV-101 MDD Phase 2 Monotherapy Study is being sponsored in full, at no cost to us other than supplying clinical trial material, by the NIMH under the direction of Dr. Carlos Zarate Jr. as Principal Investigator.

In December 2017, we completed the December 2017 Public Offering, resulting in gross proceeds of \$15.0 million, during which we offered and sold shares of our common stock and warrants to purchase shares of our common stock at a combined public offering price of \$1.50 per share and related warrant. We issued an aggregate of 10,000,000 shares of our common stock and December 2017 Offering Warrants to purchase up to 10,000,000 shares of our common stock at an exercise price of \$1.50 per share. The December 2017 Offering Warrants are exercisable at any time through December 13, 2022, and do not contain any cashless exercise features as long as our Registration Statement on Form S-1 (Registration No. 333-221009) is effective. We received net proceeds of approximately \$13.6 million from the December 2017 Public Offering, after deducting underwriter's commission and other expenses related to the offering. The common stock and the shares of common stock underlying the December 2017 Offering Warrants issued in the December 2017 Public Offering were offered, issued and sold pursuant to the S-1.



Table of Contents

In September 2017, we completed the September 2017 Public Offering, pursuant to which we sold 1,371,430 shares of our common stock and Series A1 Warrants to purchase up to 1,388,931 shares of common stock and Series A2 Warrants to purchase up to 503,641 shares of common stock, each initially exercisable for \$1.82 per share to two of our existing institutional investors, resulting in net proceeds of approximately \$2.0 million. The Series A1 Warrants will be exercisable for a five-year period commencing on March 7, 2018, and the Series A2 Warrants are exercisable at any time and expire on September 6, 2022. The common stock and the shares of common stock underlying the Warrants issued in the September 2017 Public Offering were sold pursuant to our effective Registration Statement on Form S-3 (Registration No. 333-215671) to cover this and potential future sales of our equity securities in one or more public offerings from time to time. Consistent with the anti-dilution protection provisions of the Series A2 Warrants, the exercise price of such warrants was reduced upon the closing of the December 2017 Public Offering. At the date of this Report, all of the Series A2 Warrants have been exercised at the reset exercise price as a result of the December 2017 Public Offering. Following these exercises, none of our outstanding warrants have down round anti-dilution protection features.

During the nine months ended December 31, 2017, we entered into self-placed private placement transactions with individual accredited investors, pursuant to which we sold units consisting of an aggregate of 616,323 shares of our unregistered common stock and, after adjustments, warrants which are not exercisable until six months and one day following issuance and expire between April 30, 2021 and November 30, 2022, to purchase an aggregate of 616,323 unregistered shares of our common stock at a weighted average fixed exercise price of approximately \$2.00 per share. We received aggregate cash proceeds of approximately \$1.1 million in these self-placed private placement transactions.

At December 31, 2017, we had a cash and cash equivalents balance of \$13.0 million. We believe this amount is sufficient to enable us to fund our planned operations for the next 12 months. We expect to seek additional capital to finalize and release the results of the AV-101 MDD Phase 2 Adjunctive Treatment Study, produce additional AV-101 study material, conduct Phase 3-enabling studies, conduct Phase 3 studies in MDD, conduct AV-101 Phase 2 studies in CNS indications other than MDD and to fund our internal operations in 2019 and beyond.

We expect, as we have numerous times in the past, to raise additional capital as and when necessary and advisable, potentially including through an offering under a Registration Statement on Form S-1, through one or more offerings under our effective S-3 Registration Statement or through other capital raising activity, to sustain our operations and achieve our key corporate objectives beyond the next twelve months, including finalizing and releasing the results of the AV-101 MDD Phase 2 Adjunctive Treatment Study. There can, however, be no assurance that future financing will be available in sufficient amounts, in a timely manner, or on terms acceptable to us, if at all.

We may also seek additional research and development collaborations that could generate revenue, funding for development of AV-101 and additional product candidates, and/or additional government grant awards and agreements similar to our current CRADA with the NIMH, under which the NIMH is fully funding and conducting the NIMH AV-101 MDD Phase 2 Monotherapy Study. Such strategic collaborations may provide non-dilutive resources to advance our strategic initiatives while reducing a portion of our future cash outlays and working capital requirements. In a manner similar to the BlueRock Agreement, we may also pursue similar arrangements with third-parties covering other of our intellectual property. Although we may seek additional collaborations that could generate revenue and/or non-dilutive funding for development of AV-101 and other product candidates, as well as new government grant awards and/or agreements similar to our CRADA with NIMH, no assurance can be provided that any such collaborations, awards or agreements will occur in the future.

Our future working capital requirements will depend on many factors, including, without limitation, the scope and nature of opportunities related to our success and the success of certain other companies in clinical trials, including

our development and commercialization of AV-101 as an adjunctive treatment for MDD and other potential CNS conditions, and various applications of our stem cell technology platform, the availability of, and our ability to obtain, government grant awards and agreements, and our ability to enter into collaborations on terms acceptable to us. To further advance the clinical development of AV-101 and our stem cell technology platform, as well as support our operating activities, we plan to continue to carefully manage our routine operating costs, including our employee headcount and related expenses, as well as the timing of and projected costs relating to key research and development projects, including our expenses associated with the AV-101 MDD Phase 2 Adjunctive Treatment Study, regulatory consulting, CRO and CMO services, investor relations and corporate development, legal, acquisition and protection of intellectual property, public company compliance and other professional services and working capital costs.

Notwithstanding the foregoing, substantial additional financing may not be available to us on a timely basis, on acceptable terms, or at all. If we are unable to obtain substantial additional financing on a timely basis as and when needed in 2018 or 2019 and beyond, our business, financial condition, and results of operations may be harmed, the price of our stock may decline, we may be required to reduce, defer, or discontinue certain of our research and development activities and we may not be able to continue as a going concern.



Table of Contents

## Cash and Cash Equivalents

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

	Nine Months Ended December 31,	
	2017	2016
Net cash used in operating activities	\$(6,454)	\$(5,968)
Net cash used in investing activities	(2)	(10)
Net cash provided by financing activities	16,567	9,921
Net increase in cash and cash equivalents	10,111	3,943
Cash and cash equivalents at beginning of period	2,921	429
Cash and cash equivalents at end of period	\$13,032	\$4,372

## 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

In our Annual Report on Form 10-K for our fiscal year ended March 31, 2017 filed with the Securities and Exchange Commission on June 29, 2017, we identified two material weaknesses in our internal control over financial reporting relating to (i) segregation of duties and (ii) the functionality of our accounting software. Management has determined that current resources would be more appropriately applied elsewhere and when resources permit, they will alleviate such material weaknesses through various steps, which may include the addition of qualified financial personnel and/or the acquisition and implementation of alternative accounting software. Accordingly, there was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) of the Exchange Act) that occurred during the fiscal quarter 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

Investing in our securities involves a high degree of risk. You should consider carefully the risks and uncertainties described below, together with all of the other information in this Quarterly Report on Form 10-Q (Report) and in our Annual Report on Form 10-K filed with the Securities and Exchange Commission for the fiscal year ended March 31, 2017 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.





Table of Contents

Risks Related to Product Development, Regulatory Approval and Commercialization

We depend heavily on the success of AV-101. We cannot be certain that we will be able to obtain regulatory approval for, or successfully commercialize AV-101, or any product candidate.

We currently have no drug products for sale and may never be able to develop and commercialize marketable drug products. Our business depends heavily on the successful development, regulatory approval and commercialization of AV-101 for depression, including for MDD, and, potentially, various other diseases and disorders involving the CNS, as well as, but to a more limited extent, our ability to produce, develop and commercialize NCEs from our drug rescue programs. AV-101 will require substantial additional nonclinical and clinical testing and regulatory approval before it may be commercialized. It is unlikely to achieve regulatory approval, if at all, until at least 2021. Each drug rescue NCE will require substantial nonclinical development, all phases of clinical development, and regulatory approval before it may be commercialized. 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 United States and in other countries where we 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. Drug development is a long, expensive and uncertain process, and delay or failure can occur at any stage of any of our nonclinical or clinical studies. This process takes many years and may also include post-marketing studies and surveillance obligations, which would require the expenditure of substantial resources beyond the proceeds we have raised to date. Of the large number of drugs in development in the United States, only a small percentage will successfully complete the FDA regulatory approval process and will be commercialized. Accordingly, we cannot assure you that AV-101, any drug rescue NCE, or any other future product candidate will be successfully developed or commercialized.

We are not permitted to market our product candidates in the United States until we receive approval of a New Drug Application (NDA) from the FDA, or in any foreign countries until we receive the requisite approval from such countries. We expect the FDA to require us to complete the planned AV-101 MDD Phase 2 Adjunctive Treatment Study and at least two pivotal Phase 3 clinical trials in order to submit an NDA for AV-101 as an adjunctive treatment for MDD patients with an inadequate response to standard, FDA-approved antidepressants. Also, we anticipate that the FDA will require that we conduct additional toxicology studies, additional nonclinical and certain small clinical studies before submitting an NDA for AV-101. The results of all of these studies are not known until after the studies are concluded.

Obtaining FDA approval of an NDA is a complex, lengthy, expensive and uncertain process, and the FDA may delay, limit or deny approval of AV-101 or any other product candidate we may seek to develop for many reasons, including, among others:

if we submit an NDA and it is reviewed by an 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 non-clinical or clinical studies, limitations on approved labeling or distribution and use restrictions;

the FDA may require development of a Risk Evaluation and Mitigation Strategy (REMS) as a condition of approval or post-approval;

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 and successfully commercialize AV-101 or any other product candidate we may develop, including drug rescue NCEs. Any such setback in our pursuit of regulatory approval for any product candidate would have a material adverse effect on our business and prospects.

We have applied for, and have been granted Fast Track designation from the FDA for AV-101 for the treatment of MDD. However, this designation may not actually lead to a faster development or regulatory review or approval process for AV-101. Further, there is no guarantee the FDA will grant Fast Track designation for AV-101 as a treatment option for other CNS indications or for 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 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 approval or expedited approval of any application for the product.



Table of Contents

In October 2017 we applied for FDA Fast Track designation for AV-101, and in December 2017 the FDA granted Fast Track designation for AV-101 for the treatment of MDD. However, this designation may not lead to a faster development or regulatory review or approval process for AV-101 and the FDA may withdraw Fast Track designation of AV-101 if it believes that the designation is no longer supported by data from our clinical development programs.

In addition, we may apply for Fast Track designation for AV-101 as a treatment option for other CNS indications, as well as for other product candidates. The FDA has broad discretion whether or not to grant a Fast Track designation, and even if we believe AV-101 and other product candidates are eligible for this designation, we cannot be sure that the review or approval will compare to conventional FDA procedures.

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 AV-101 and/or other product candidates, including positive results, may not be predictive of the results of later-stage clinical trials. AV-101 or other product candidates in later stages of clinical trials may fail to show the desired safety and efficacy results despite having progressed through preclinical studies and initial clinical trials. Many companies in the biopharmaceutical industry have suffered significant setbacks in advanced 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, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that believed their product candidates performed satisfactorily in preclinical studies and clinical trials nonetheless failed to obtain FDA approval. We have not yet completed a Phase 2 clinical trial for AV-101, and if the NIMH AV-101 MDD Phase 2 Monotherapy Study and/or our AV-101 MDD Phase 2 Adjunctive Treatment Study fail(s) to produce positive results, the development timeline and regulatory approval and commercialization prospects for AV-101 and, correspondingly, our business and financial prospects, could be materially adversely affected.

This drug candidate development risk is heightened by any changes in planned timing or nature of clinical trials compared to completed clinical trials. As product candidates are developed through preclinical to early and late stage clinical trials towards 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 results of planned clinical trials may be adversely affected if we or our collaborator 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.

If serious adverse events or other undesirable side effects or safety concerns are identified during the use of AV-101 in investigator-sponsored clinical trials or in our clinical trials of AV-101, it may adversely affect or delay our clinical development of AV-101 for MDD and other CNS indications.

AV-101 as a monotherapy is currently being tested by the NIMH in the NIMH AV-101 MDD Phase 2 Monotherapy Study and may be subjected to testing in the future for other CNS indications in additional investigator sponsored

clinical trials. If serious adverse events or other undesirable side effects or safety concerns, or unexpected characteristics of AV-101 are observed in investigator-sponsored clinical trials of AV-101 or in our clinical trials of AV-101, it may adversely affect or delay our clinical development of AV-101, and the occurrence of these events would have a material adverse effect on our business and financial prospects.



Table of Contents

Failures or delays in the commencement or completion of our planned clinical trials and nonclinical studies of AV-101 or other 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.

Under our CRADA with the NIMH, the NIMH is conducting and funding the NIMH AV-101 MDD Phase 2 Monotherapy Study. We will need to complete the planned AV-101 MDD Phase 2 Adjunctive Treatment Study, at least two additional large Phase 3 pivotal clinical trials, additional toxicology and other nonclinical studies and certain smaller clinical studies prior to the submission of an NDA for AV-101 as a new generation adjunctive treatment for MDD. Successful completion of our nonclinical and clinical trials is a prerequisite to submitting an NDA to the FDA and, consequently, the ultimate approval required before commercial marketing of AV-101 for MDD and any other product candidates we may develop. Except as disclosed herein, we do not know whether the NIMH AV-101 MDD Phase 2 Monotherapy Study, our AV-101 MDD Phase 2 Adjunctive Treatment Study or any of our future-planned nonclinical and clinical trials 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 FDA may deny permission to proceed with our 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 of additional INDs that may be required;

negative results from our ongoing nonclinical 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, AV-101 or other product candidates necessary to conduct nonclinical or clinical trials, including delays in the manufacturing of sufficient supply or finished drug product resulting from our new manufacturing process for AV-101;

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 drug-related side effects experienced by patients in a clinical trial;

delays in validating any endpoints utilized in a clinical trial;

the FDA 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.



Table of Contents

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 FDA, 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 FDA or other regulatory authorities 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 our ongoing 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, FDA guidance or unanticipated events during our nonclinical studies and clinical trials of AV-101 or other 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, FDA guidance or unanticipated events during our nonclinical studies and clinical trials of AV-101 or other product candidates may force us to amend nonclinical studies and clinical trial protocols or the FDA may impose additional nonclinical studies and clinical trial requirements. Amendments or changes to our clinical trial protocols would require resubmission to the FDA 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 non-clinical 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 AV-101 or other 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 nonclinical and clinical trials of AV-101 and any other product candidates. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, completion of nonclinical and clinical trials and development of AV-101 and other product candidates may be delayed and we may not be able to obtain regulatory approval for or commercialize AV-101 or other product candidates and our business could be substantially harmed.

We do not have the internal staff resources to independently conduct nonclinical and clinical trials completely on our own. We rely on our network of strategic relationships with various medical institutions, nonclinical and clinical

investigators, contract laboratories and other third parties, such as contract research and development organizations (CROs), to conduct 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 execution of nonclinical and clinical trials for our product candidates and 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 staff. Communicating with outside parties can also be challenging, potentially leading to mistakes as well as difficulties in coordinating activities. Outside parties may:

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.



Table of Contents

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 in accordance with the applicable protocol, legal, regulatory and scientific requirements and standards, and our reliance on CROs or the NIH does not relieve us of our regulatory responsibilities. We and our CROs, the NIMH and any investigator in an investigator-sponsored study are required to comply with regulations and guidelines, including current 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 or any of our CROs fail to comply with applicable cGCPs, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. 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 regulations and will require a large number of test patients. Our failure or the failure of our CROs 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, we plan to have CROs, and in the case of the NIMH AV-101 MDD Phase 2 Monotherapy Study, the NIMH, conduct the AV-101 Phase 2 and Phase 3 clinical trials. As a result, many important aspects of our drug development programs are outside of our direct control. In addition, the CROs or the NIMH, as the case may be, may not perform all of their obligations under arrangements with us or in compliance with regulatory requirements, but we remain responsible and are 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 our clinical trials. If the NIMH or CROs do not perform clinical trials in a satisfactory manner, breach their obligations to us or fail to comply with regulatory requirements, the development and commercialization of AV-101 and other product candidates may be delayed or our development program materially and irreversibly harmed. We cannot control the amount and timing of resources these CROs or the NIMH devote to our program or our clinical products. If we are unable to rely on nonclinical and clinical data collected by our CROs or the NIMH, 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 any of our relationships with these third-party CROs or the NIMH terminate, we may not be able to enter into arrangements with alternative CROs or collaborators. If CROs or the NIMH do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements or for other reasons, any clinical trials that such CROs or the NIMH 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.



Table of Contents

We rely completely on third-parties to manufacture and prepare supplies of AV-101 for all nonclinical and clinical studies of AV-101, and we intend to continue to rely on third parties to produce all nonclinical, clinical and commercial supplies of AV-101 in the future.

We do not currently have, nor do we plan to acquire or develop, the necessary infrastructure internal resources or technical capabilities to manufacture and prepare supplies of AV-101, or any future product candidates, for use in nonclinical and clinical studies, and we lack the internal resources and the capability to manufacture any product candidate on a clinical or commercial scale. As a result, we rely completely on third party contract manufacturing organizations (CMOs) to manufacture AV-101 active pharmaceutical ingredient (API) and prepare AV-101 final drug product. The facilities used by our CMOs to manufacture AV-101 API and final drug product are subject to a pre-approval inspection by the FDA to assess compliance with applicable 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 either the supply or quality of materials used in the manufacturing and preparation of AV-101 or the AV-101 manufacturing process, and we are completely dependent on our CMOs to comply with all cGMPs for manufacture of both AV-101 API and AV-101 finished drug product. If our CMOs cannot secure adequate supplies of suitable raw materials or successfully manufacture AV-101 API that conforms to our specifications and the strict regulatory requirements of the FDA or applicable foreign regulatory agencies, production of sufficient supplies of AV-101 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 AV-101 for required or planned nonclinical and/or clinical studies of AV-101. 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 AV-101. 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 AV-101 supply agreements in place with our CMOs and each batch of AV-101 is 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, development and, if approved, commercial quantities of AV-101 and any other product candidates we may seek to develop in the future. Although we believe our current scale of manufacturing for AV-101 and current and projected supply of AV-101 API and finished drug product will be adequate to support our planned nonclinical and clinical studies of AV-101, no assurance can be given that unanticipated AV-101 supply shortages, CMO-related delays in manufacture and production of AV-101 API and finished drug product will not occur in the future.

Even if we receive marketing approval for AV-101 or any other product candidate in the United States, we may never receive regulatory approval to market AV-101 or any other product candidate outside of the United States.

We have not yet selected any markets outside of the United States where we intend to seek regulatory approval to market our product candidates. In order to market any product outside of the United States, however, 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 United States as well as other risks. In particular, in many countries outside of the United States, 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.



Table of Contents

If any of our 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, the United States Drug Enforcement Administration (DEA) may need to determine the controlled substance schedule, taking into account the recommendation of the FDA. 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. While we currently do not know whether any of our product candidates will be considered to be controlled substances, certain of our product candidates, including AV-101, may be regulated as controlled substances.

If any of our product candidates are regulated as controlled substances, depending on the controlled substance schedule in which the product candidates are placed, we, our contract manufacturers, and any future distributors, 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. 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 contract manufacturers are not able to obtain or maintain any necessary DEA 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 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 sales and marketing capabilities or enter into agreements with third parties to market and sell our product candidates, we may not be able to generate any revenue.

We do not currently have an infrastructure for the sale, marketing and distribution of pharmaceutical products, nor do we intend to create such capabilities in the foreseeable future. Therefore, in order to market our product candidates, if approved by the FDA or any other regulatory body, we must make contractual arrangements with third parties to perform services related to sales, marketing, managerial and other non-technical capabilities relating to the commercialization of our product candidates. If we are unable to establish adequate contractual arrangements for such sales, marketing and distribution capabilities, or if we are unable to do so on commercially reasonable terms, our business, results of operations, financial condition and prospects will be materially adversely affected.



Table of Contents

Even if we receive marketing approval for our 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 product candidates, if approved by the FDA or other applicable regulatory authorities, will depend upon the awareness and acceptance of our product candidates among the medical community, including physicians, patients and healthcare payors. 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 product candidates are approved but do not achieve an adequate level of acceptance by patients, physicians and payors, we may not generate sufficient revenue from our product candidates to become or remain profitable. Before granting reimbursement approval, healthcare payors 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 payors about the benefits of our product candidates may require significant resources and may never be successful.

-39-



Table of Contents

Our 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.

Undesirable safety concerns and side effects caused by our product candidates could cause us or regulatory authorities to 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 the FDA or other 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 product candidates, we may still face future development and regulatory difficulties.

Even if we receive marketing approval for our 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 has 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 also has the authority to require, as part of an NDA or post-approval, the submission of a REMS. Any REMS required by the FDA 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.



Table of Contents

Manufacturers of drug 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 product candidates.

The pharmaceuticals 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 our product candidates or address similar markets. It is probable that the number of companies seeking to develop product candidates similar to our product candidates will increase.

Currently, management is unaware of any FDA-approved oral adjunctive therapy for MDD patients with an inadequate response to standard antidepressants having the same mechanism of action and safety profile as our oral AV-101. However, new antidepressant products with other mechanisms of action or products approved for other indications, including the FDA-approved anesthetic ketamine hydrochloride, are being or may be used off-label for treatment of MDD, as well as other CNS indications for which AV-101 may have therapeutic potential. Additionally, other non-pharmaceutical treatment options, such as psychotherapy and electroconvulsive therapy (ECT) are sometimes used before or instead of standard antidepressant medications to treat patients with MDD.

In the field of new generation, orally available, adjunctive treatments of adult MDD patients with an inadequate response to standard FDA-approved antidepressants, we believe our principal competitor is Alkermes' oral opiate modulator drug candidate, ALKS-5461, which adjunctive treatment product candidate is the subject of a New Drug Application recently submitted to the FDA by Alkermes.

Many of our potential competitors, alone or with their strategic partners, have substantially greater financial, technical and human resources than we do and significantly greater experience in the discovery and development of product candidates, obtaining FDA and other regulatory approvals of treatments and the commercialization of those treatments. We believe that a range of pharmaceutical and biotechnology companies have programs to develop small molecule drug candidates for the treatment of depression, including MDD, Parkinson's disease levodopa induced dyskinesia, neuropathic pain, epilepsy, and other neurological conditions and diseases, including, but not limited to, Abbott Laboratories, Acadia, Allergan, Alkermes, AstraZeneca, Eli Lilly, GlaxoSmithKline, IntraCellular, Johnson & Johnson/Janssen, Lundbeck, Merck, Novartis, Ono, Otsuka, Pfizer, Roche, Sage, Sumitomo Dainippon, and Takeda, 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.



Table of Contents

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 product candidates will require substantial additional cash to fund expenses. For some of our product candidates, we may decide to collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of those product candidates.

We face significant competition in seeking appropriate collaborators. Whether we reach a definitive agreement for collaboration 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 clinical trials, the likelihood of approval by the FDA or similar regulatory authorities outside the United States, 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 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 may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we 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 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 product candidates with commercial and therapeutic potential. Although AV-101 is in Phase 2 clinical development for treatment of MDD, we may fail to pursue additional CNS-related Phase 2 development opportunities for AV-101, or identify additional product candidates for clinical development 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.

Because we currently have limited financial and management resources, we necessarily focus on a limited number of research and development programs and product candidates and are currently focused primarily on development of AV-101, with additional limited focus on NCE drug rescue and RM. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other potential CNS-related indications for AV-101 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.





Table of Contents

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 products, 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 payors 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 payors, including private insurers, and some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance.

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

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, including anticipated activities to be conducted by our sales team, 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 is found not to be in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.



Table of Contents

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, such as AV-101, 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 AV-101 as an adjunctive treatment of MDD, physicians may nevertheless prescribe AV-101 to their patients in a manner that is inconsistent with the FDA-approved label. 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 promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed. If we cannot successfully manage the promotion of our product candidates, if approved, we could become subject to significant liability, which would materially adversely affect our business and financial condition.

Even if approved, reimbursement policies could limit our ability to sell our 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 payors, 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 U.S. healthcare industry and elsewhere. Government authorities and these third-party payors 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 product candidates, including AV-101. Even if we have obtained FDA Orphan Drug designation for AV-101 or other product candidates, 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 product candidates, including AV-101. Even if we obtain Orphan Drug designation from the FDA for AV-101 or any other product candidates, there are limitations to the exclusivity afforded by such designation. In the United States, 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 United States 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.



Table of Contents

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. 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 in some foreign countries;

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.

We are a development stage biopharmaceutical company with no current revenues or approved products, and limited experience developing new drug, biological and/or regenerative medicine candidates, including conducting clinical

trials and other areas required for the successful development and commercialization of therapeutic products, which makes it difficult to assess our future viability.

We are a development stage biopharmaceutical company. Although our lead drug candidate is in Phase 2 development, we currently have no approved products and currently generate no revenues, 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 the following fundamental objectives, either on our own or with strategic collaborators:

produce product candidates;

develop and obtain required regulatory approvals for commercialization of product candidates we produce;

maintain, leverage and expand our intellectual property portfolio;

establish and maintain sales, distribution and marketing capabilities, and/or enter into strategic partnering arrangements to access such capabilities;

gain market acceptance for our products; and

obtain adequate capital resources and manage our spending as costs and expenses increase due to research, production, development, regulatory approval and commercialization of product candidates.





Table of Contents

Our future success is highly dependent upon our ability to successfully develop and commercialize AV-101, acquire or license additional product candidates, or discover, as well as produce, develop and commercialize proprietary drug rescue NCEs using our stem cell technology, and we cannot provide any assurance that we will successfully develop and commercialize AV-101, acquire or license additional product candidates or discover and develop drug rescue NCEs, or that, if produced, AV-101 or any other product candidate will be successfully commercialized.

Business development and research and development programs designed to identify, acquire or license additional product candidates, or, as the case may be, produce drug rescue NCEs require substantial technical, financial and human resources, whether or not any additional product candidate is acquired or licensed or NCEs are ultimately identified and produced. In particular, our drug rescue programs may initially show promise in identifying potential NCEs, yet fail to yield a lead NCE suitable for preclinical, clinical development or commercialization for many reasons, including the following:

our drug rescue research and development methodology may not be successful in identifying and developing potential drug rescue NCEs;

competitors may develop alternatives that render our drug rescue NCEs obsolete;

a drug rescue NCE may, on further study, be shown to have harmful side effects or other characteristics that indicate it is unlikely to be effective or otherwise does not meet applicable regulatory criteria;

a drug rescue NCE may not be capable of being produced in commercial quantities at an acceptable cost, or at all; or

a drug rescue NCE may not be accepted as safe and effective by regulatory authorities, patients, the medical community or third-party payors.

In addition, we do not have a sales or marketing infrastructure, and we, including our executive officers, do not have any significant pharmaceutical sales, marketing or distribution experience. We may seek to collaborate with others to develop and commercialize AV-101, drug rescue NCEs and/or other 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 in entering into arrangements with third parties to sell, market and distribute AV-101, any drug rescue NCEs or other 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, in collaboration with third parties, we will not be successful in commercializing our product candidates.

We have limited operating history with respect to drug development, including our anticipated focus on the identification and acquisition of additional product candidates or the assessment of potential drug rescue NCEs and no operating history with respect to the production of drug rescue NCEs, and we may never be able to produce a drug rescue NCE.

If we are unable to develop and commercialize AV-101, acquire or license additional product candidates, or produce suitable drug rescue NCEs, we may not be able to generate sufficient revenues to execute our business plan, which likely would result in significant harm to our financial position and results of operations, which could adversely impact our stock price.

With respect to drug rescue, there are a number of factors, in addition to the utility of CardioSafe 3D, that may impact our ability to identify and produce, develop or out-license and commercialize drug rescue NCEs, independently or with strategic partners, including:

our ability to identify potential drug rescue candidates in the public domain, obtain sufficient quantities of them, and assess them using our bioassay systems;

if we seek to rescue drug rescue candidates that are not available to us in the public domain, the extent to which third parties may be willing to out-license or sell certain drug rescue candidates to us on commercially reasonable terms;

our medicinal chemistry collaborator's ability to design and produce proprietary drug rescue NCEs based on the novel biology and structure-function insight we provide using CardioSafe 3D; and

financial resources available to us to develop and commercialize lead drug rescue NCEs internally, or, if we out-license them to strategic partners, the resources such partners choose to dedicate to development and commercialization of any drug rescue NCEs they license from us.



Table of Contents

Even if we do acquire additional product candidates or produce proprietary drug rescue NCEs, we can give no assurance that we will be able to develop and commercialize them as marketable drugs, on our own or in collaboration with others. Before we generate any revenues from AV-101, additional acquired or licensed products candidates or any drug rescue NCEs we or our potential collaborators must complete preclinical and clinical developments, submit clinical and manufacturing data to the FDA, qualify a third party CMO, receive regulatory approval in one or more jurisdictions, satisfy the FDA that our contract manufacturer is capable of manufacturing the product in compliance with cGMP, build a commercial organization, make substantial investments and undertake significant marketing efforts ourselves or in partnership with others. We are not permitted to market or promote any of our product candidates before we receive regulatory approval from the FDA or comparable foreign regulatory authorities, and we may never receive such regulatory approval for any of our product candidates.

If CardioSafe 3D fails to predict accurately and efficiently the cardiac effects, both toxic and nontoxic, of drug rescue candidates and drug rescue NCEs, then our drug rescue programs will be adversely affected.

Our success is partly dependent on our ability to use CardioSafe 3D to identify and predict, accurately and efficiently, the potential toxic and nontoxic cardiac effects of drug rescue candidates and drug rescue NCEs. If CardioSafe 3D is not capable of providing physiologically relevant and clinically predictive information regarding human cardiac biology, our drug rescue business will be adversely affected.

CardioSafe 3D may not be meaningfully more predictive of the behavior of human cells than existing methods.

The success of our drug rescue programs is highly dependent upon CardioSafe 3D being more accurate, efficient and clinically predictive than long-established surrogate safety models, including animal cells and live animals, and immortalized, primary and transformed cells, currently used by pharmaceutical companies and others. We cannot give assurance that CardioSafe 3D will be more efficient or accurate at predicting the heart safety of new drug candidates than the testing models currently used. If CardioSafe 3D fails to provide a meaningful difference compared to existing or new models in predicting the behavior of human heart, respectively, their utility for drug rescue will be limited and our drug rescue business will be adversely affected.

We may invest in producing drug rescue NCEs for which there proves to be no demand.

To generate revenue from our drug rescue activities, we must produce proprietary drug rescue NCEs for which there proves to be demand within the healthcare marketplace, and, if we intend to out-license a particular drug rescue NCE for development and commercialization prior to market approval, then also among pharmaceutical companies and other potential collaborators. However, we may produce drug rescue NCEs for which there proves to be no or limited demand in the healthcare market and/or among pharmaceutical companies and others. If we misinterpret market conditions, underestimate development costs and/or seek to rescue the wrong drug rescue candidates, we may fail to generate sufficient revenue or other value, on our own or in collaboration with others, to justify our investments, and our drug rescue business may be adversely affected.

We may experience difficulty in producing human cells and our future stem cell technology research and development efforts may not be successful within the timeline anticipated, if at all.

Our human pluripotent stem cell technology is technically complex, and the time and resources necessary to develop various human cell types and customized bioassay systems are difficult to predict in advance. We might decide to devote significant personnel and financial resources to research and development activities designed to expand, in the case of drug rescue, and explore, in the case of drug discovery and regenerative medicine, potential applications of our stem cell technology platform. In particular, we may conduct exploratory nonclinical RM programs involving blood,

bone, cartilage, and/or liver cells. Although we and our collaborators have developed proprietary protocols for the production of multiple differentiated cell types, we could encounter difficulties in differentiating and producing sufficient quantities of particular cell types, even when following these proprietary protocols. These difficulties could result in delays in production of certain cells, assessment of certain drug rescue candidates and drug rescue NCEs, design and development of certain human cellular assays and performance of certain exploratory non-clinical regenerative medicine studies. In the past, our stem cell research and development projects have been significantly delayed when we encountered unanticipated difficulties in differentiating human pluripotent stem cells into heart and liver cells. Although we have overcome such difficulties in the past, we may have similar delays in the future, and we may not be able to overcome them or obtain any benefits from our future stem cell technology research and development activities. Any delay or failure by us, for example, to produce functional, mature blood, bone, cartilage, and liver cells could have a substantial and material adverse effect on our potential drug discovery, drug rescue and regenerative medicine business opportunities and results of operations.



Table of Contents

Restrictions on research and development involving human embryonic stem cells and religious and political pressure regarding such stem cell research and development could impair our ability to conduct or sponsor certain potential collaborative research and development programs and adversely affect our prospects, the market price of our common stock and our business model.

Some of our research and development programs may involve the use of human cells derived from our controlled differentiation of human embryonic stem cells (hESCs). Some believe the use of hESCs gives rise to ethical and social issues regarding the appropriate use of these cells. Our research related to differentiation of hESCs may become the subject of adverse commentary or publicity, which could significantly harm the market price of our common stock. Although now substantially less than in years past, certain political and religious groups in the United States and elsewhere voice opposition to hESC technology and practices. We may use hESCs derived from excess fertilized eggs that have been created for clinical use in in vitro fertilization (IVF) procedures and have been donated for research purposes with the informed consent of the donors after a successful IVF procedure because they are no longer desired or suitable for IVF. Certain academic research institutions have adopted policies regarding the ethical use of human embryonic tissue. These policies may have the effect of limiting the scope of future collaborative research opportunities with such institutions, thereby potentially impairing our ability to conduct certain research and development in this field that we believe is necessary to expand the drug rescue capabilities of our technology, which would have a material adverse effect on our business.

The use of embryonic or fetal tissue in research (including the derivation of hESCs) in other countries is regulated by the government, and varies widely from country to country. Government-imposed restrictions with respect to use of hESCs in research and development could have a material adverse effect on us by harming our ability to establish critical collaborations, delaying or preventing progress in our research and development, and causing a decrease in the market interest in our stock.

The foregoing potential ethical concerns do not apply to our use of induced pluripotent stem cells (iPSCs) because their derivation does not involve the use of embryonic tissues.

We have assumed that the biological capabilities of iPSCs and hESCs are likely to be comparable. If it is discovered that this assumption is incorrect, our exploratory research and development activities focused on potential regenerative medicine applications of our stem cell technology platform could be harmed.

We may use both hESCs and iPSCs to produce human cells for our customized in vitro assays for drug discovery and drug rescue purposes. However, we anticipate that our future exploratory research and development, if any, focused on potential regenerative medicine applications of our stem cell technology platform primarily will involve iPSCs. With respect to iPSCs, we believe scientists are still somewhat uncertain about the clinical utility, life span, and safety of such cells, and whether such cells differ in any clinically significant ways from hESCs. If we discover that iPSCs will not be useful for whatever reason for potential regenerative medicine programs, this would negatively affect our ability to explore expansion of our platform in that manner, including, in particular, where it would be preferable to use iPSCs to reproduce rather than approximate the effects of certain specific genetic variations.

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



Table of Contents

To the extent our research and development activities involve using iPSCs, we will be subject to complex and evolving laws and regulations regarding privacy and informed consent. Many of these laws and regulations are subject to change and uncertain interpretation, and could result in claims, changes to our research and development programs and objectives, increased cost of operations or otherwise harm the Company.

To the extent that we pursue research and development activities involving iPSCs, we will be subject to a variety of laws and regulations in the United States and abroad that involve matters central to such research and development activities, including obligations to seek informed consent from donors for the use of their blood and other tissue to produce, or have produced for us, iPSCs, as well as state and federal laws that protect the privacy of such donors. United States federal and state and foreign laws and regulations are constantly evolving and can be subject to significant change. If we engage in iPSC-related research and development activities in countries other than the United States, we may become subject to foreign laws and regulations relating to human subjects research and other laws and regulations that are often more restrictive than those in the United States. In addition, both the application and interpretation of these laws and regulations are often uncertain, particularly in the rapidly evolving stem cell technology sector in which we operate. These laws and regulations can be costly to comply with and can delay or impede our research and development activities, result in negative publicity, increase our operating costs, require significant management time and attention and subject us to claims or other remedies, including fines or demands that we modify or cease existing business practices.

Legal, social and ethical concerns surrounding the use of iPSCs, biological materials and genetic information could impair our operations.

To the extent that our future stem cell research and development activities involve the use of iPSCs and the manipulation of human tissue and genetic information, the information we derive from such iPSC-related research and development activities could be used in a variety of applications, which may have underlying legal, social and ethical concerns, including the genetic engineering or modification of human cells, testing for genetic predisposition for certain medical conditions and stem cell banking. Governmental authorities could, for safety, social or other purposes, call for limits on or impose regulations on the use of iPSCs and genetic testing or the manufacture or use of certain biological materials involved in our iPSC-related research and development programs. Such concerns or governmental restrictions could limit our future research and development activities, which could have a material adverse effect on our business, financial condition and results of operations.

Our human cellular bioassay systems and human cells we derive from human pluripotent stem cells, although not currently subject to regulation by the FDA or other regulatory agencies as biological products or drugs, could become subject to regulation in the future.

The human cells we produce from hPSCs and our customized bioassay systems using such cells, including CardioSafe 3D, are not currently sold, for research purposes or any other purpose, to biotechnology or pharmaceutical companies, government research institutions, academic and nonprofit research institutions, medical research organizations or stem cell banks, and they are not therapeutic procedures. As a result, they are not subject to regulation as biological products or drugs by the FDA or comparable agencies in other countries. However, if, in the future, we seek to include human cells we derive from hPSCs in therapeutic applications or product candidates, such applications and/or product candidates would be subject to the FDA's pre- and post-market regulations. For example, if we seek to develop and market human cells we produce for use in performing regenerative medicine applications, such as tissue engineering or organ replacement, we would first need to obtain FDA pre-market clearance or approval. Obtaining such clearance or approval from the FDA is expensive, time-consuming and uncertain, generally requiring many years to obtain, and requiring detailed and comprehensive scientific and clinical data. Notwithstanding the time and expense, these efforts may not result in FDA approval or clearance. Even if we were to obtain regulatory approval

or clearance, it may not be for the uses that we believe are important or commercially attractive.



Table of Contents

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 \$10.3 million and \$47.2 million, which includes \$26.7 million of non-cash expense related to the extinguishment of essentially all of our outstanding promissory notes and certain other indebtedness, during the fiscal years ended March 31, 2017 and 2016, respectively. We incurred a net loss of approximately \$10.3 million in the nine months ended December 31, 2017 and, as of that date, we had an accumulated deficit of approximately \$152.5 million. 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 (deficit) and working capital. We expect our research and development expenses to significantly increase in connection with non-clinical studies and clinical trials of our product candidates. In addition, if we obtain marketing approval for our product candidates, we may incur significant sales, marketing and outsourced-manufacturing expenses should we elect not to collaborate with one or more third parties for such services and capabilities. 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 revenues. To date, we have generated approximately \$17.7 million in revenues, including receipt of non-dilutive cash payments from collaborators, sublicense revenue, and research and development grant awards from the NIH, not including the fair market value of the ongoing NIMH AV-101 MDD Phase 2 Monotherapy Study fully-sponsored by the NIMH under our NIMH CRADA. 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, AV-101, or we enter into one or more development and commercialization agreements with respect to AV-101 or one or more other product candidates. Our ability to generate revenue depends on a number of factors, including, but not limited to, our ability to:

initiate and successfully complete non-clinical 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 product candidates;

commercialize our product candidates, if approved, by developing a sales force or entering into collaborations with third parties; and

achieve market acceptance of our product candidates in the medical community and with third-party payors.

Unless we enter into a development and commercialization collaboration or partnership agreement, we expect to incur significant sales and marketing costs as we prepare to commercialize AV-101 or other product candidates. Even if we initiate and successfully complete pivotal clinical trials of AV-101 or other product candidates, and AV-101 or other product candidates are approved for commercial sale, and despite expending these costs, AV-101 or other product candidates may not be commercially successful. We may not achieve profitability soon after generating product sales, if ever. If we are unable to generate product revenue, we will not become profitable and may be unable to continue operations without continued funding.

We require additional financing to execute our business plan and continue to operate as a going concern.

Our audited consolidated financial statements for the year ended March 31, 2017 as well as the unaudited condensed consolidated financial statements for the period ended December 31, 2017 included elsewhere in this Report have been prepared assuming we will continue to operate as a going concern, although we and our auditors have indicated that our continuing losses and negative cash flows from operations raise substantial doubt about our ability to continue as such. Because we continue to experience net operating losses, our ability to continue as a going concern is subject to our ability to obtain necessary funding from outside sources, including obtaining additional funding from the sale of our securities or obtaining loans and grant awards from financial institutions and/or government agencies where possible. Our continued net operating losses increase the difficulty in completing such sales or securing alternative sources of funding, and there can be no assurances that we will be able to obtain such funding on favorable terms or at all. If we are unable to obtain sufficient financing from the sale of our securities or from alternative sources, we may be required to reduce, defer, or discontinue certain or all of our research and development activities or we may not be able to continue as a going concern.





Table of Contents

Since our inception, most of our resources have been dedicated to research and development of AV-101 and the drug rescue capabilities of our stem cell technology platform. In particular, we have expended substantial resources advancing AV-101 through preclinical development and Phase 1 clinical safety studies, and developing CardioSafe 3D and our cardiac stem cell technology for drug rescue and potential regenerative medicine applications, and we will continue to expend substantial resources for the foreseeable future developing and commercializing AV-101 for multiple CNS indications, and, potentially, developing drug rescue NCEs and RM therapies, on our own or in collaborations similar to the BlueRock Agreement. 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, as well as commercializing any products approved for sale.

At December 31, 2017, we had a cash and cash equivalents balance of \$13.0 million. We believe this amount is sufficient to enable us to fund our planned operations for at least the twelve months following the issuance of the financial statements included in this Report. We expect to seek additional capital to finalize the results from the AV-101 MDD Phase 2 Adjunctive Treatment Study, produce additional AV-101 study material, conduct Phase 3-enabling studies, conduct Phase 3 studies in MDD, conduct AV-101 Phase 2 studies in CNS indications other than MDD and to fund our internal operations in 2019 and beyond.

Further, we have no current source of revenue to sustain our present activities, and we do not expect to generate revenue until, and unless, we (i) out-license or sell AV-101, a drug rescue NCE, and/or another drug candidate unrelated to AV-101 to third-parties, (ii) enter into license arrangements involving our stem cell technology, or (iii) obtain approval from the FDA or other regulatory authorities and successfully commercialize, on our own or through a future collaboration, one or more of our compounds.

As the outcome of our AV-101 and NCE drug rescue activities and future anticipated clinical trials is highly uncertain, we cannot reasonably estimate the actual amounts necessary to successfully complete the development and commercialization of our product candidates, on our own or in collaboration with others. In addition, other unanticipated costs may arise. As a result of these and other factors, we will need to seek additional capital in the near term to meet our future operating requirements, including capital necessary to develop, obtain regulatory approval for, and to commercialize our 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. We are considering a range of potential sources of funding, 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 may complete additional financing arrangements in 2017 and beyond. Raising funds in the current economic environment may present additional challenges. Even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital if market conditions are favorable or if we have specific strategic considerations.



Table of Contents

Our future capital requirements depend on many factors, including:

the number and characteristics of the product candidates we pursue, including AV-101 and drug rescue NCEs;

the scope, progress, results and costs of researching and developing 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 commercialization activities if any of our product candidates are approved for sale, including marketing, sales and distribution costs;

the cost of manufacturing our product candidates and any products we successfully commercialize;

our ability to establish and maintain strategic partnerships, licensing or other arrangements and the financial terms of such agreements;

market acceptance of our products;

the effect of competing technological and market developments;

our ability to obtain government funding for our programs;

the costs involved in obtaining 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 acquire or invest in businesses, products and technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

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 and commercialize our product candidates. In addition, 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, and the terms of any 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 or exchange 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 could also be required to seek funds through arrangements with collaborative partners or otherwise at an earlier stage than otherwise would be desirable and we may be required to relinquish rights to some of our technologies or product candidate or otherwise agree to terms unfavorable to us, any of which may have a material adverse effect on our business, operating results and prospects.

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 the commercialization of any product candidate 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.

We have identified material weaknesses in our internal control over financial reporting, and our business and stock price may be adversely affected if we do not adequately address those weaknesses or if we have other material weaknesses or significant deficiencies in our internal control over financial reporting.

We have identified material weaknesses in our internal control over financial reporting. In particular, we concluded that (i) the size and capabilities of the Company's staff does not permit appropriate segregation of duties to prevent one individual from overriding the internal control system by initiating, authorizing and completing all transactions, and (ii) the Company utilizes accounting software that does not prevent erroneous or unauthorized changes to previous reporting periods and/or can be adjusted so as to not provide an adequate auditing trail of entries made in the accounting software.



Table of Contents

The existence of one or more material weaknesses or significant deficiencies could result in errors in our financial statements, and substantial costs and resources may be required to rectify any internal control deficiencies. If we cannot produce reliable financial reports, investors could lose confidence in our reported financial information, we may be unable to obtain additional financing to operate and expand our business and our business and financial condition could be harmed.

Raising additional capital will 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 intend to pursue private and public equity offerings, debt financings, strategic collaborations and licensing arrangements during 2017 and beyond. 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, we convert or exchange certain of our outstanding securities into 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 rights of our stockholders. Debt financing, if available, would increase our fixed payment obligations and may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. If we raise additional funds through collaboration, strategic 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.

Some of our programs have been partially supported by government grant awards, which may not be available to us in the future.

Since inception, we have received substantial funds under grant award programs funded by state and federal governmental agencies, such as the NIH, the NIH's National Institute of Neurological Disease and Stroke (NINDS) and the NIMH, and the California Institute for Regenerative Medicine (CIRM). To fund a portion of our future research and development programs, we may apply for additional grant funding from such or similar governmental organizations. However, funding by these governmental organizations may be significantly reduced or eliminated in the future for a number of reasons. For example, some programs are subject to a yearly appropriations process in Congress. In addition, we may not receive funds under future grants because of budgeting constraints of the agency administering the program. Therefore, we cannot assure you that we will receive any future grant funding from any government organization or otherwise. A restriction on the government funding available to us could reduce the resources that we would be able to devote to future research and development efforts. Such a reduction could delay the introduction of new products and hurt our competitive position.

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

As of March 31, 2017, we had federal and state net operating loss carryforwards of \$77.1 million and \$67.6 million, respectively, which begin to expire in fiscal 2018. 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 future offerings, prior private placements, sales of our common stock by our existing stockholders or additional sales of our common stock by us in the future, could have a material adverse effect on our results of operations in future years. We have not 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 attract and retain senior management and key scientific personnel, we may be unable to successfully produce, develop and commercialize AV-101, drug rescue NCEs, other potential product candidates and other commercial applications of our stem cell technology.

Our success depends in part on our continued ability to attract, retain and motivate highly qualified management and scientific and technical personnel. We are highly dependent upon our Chief Executive Officer, President and Chief Scientific Officer, Chief Medical Officer and Chief Financial Officer, as well as other employees, consultants and scientific collaborators. As of the date of this Report, we have nine 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 AV-101, drug rescue NCEs, other product candidates, and other applications of our stem cell technology, including our production and assessment of potential drug rescue NCEs or disrupt our administrative functions.





Table of Contents

Although we have not historically experienced unique difficulties attracting and retaining qualified employees, we could experience such problems in the future. For example, competition for qualified personnel in the biotechnology and pharmaceuticals field is intense. We will need to hire additional personnel as we expand our research and development and administrative activities. We may not be able to attract and retain quality personnel on acceptable terms.

In addition, we rely on a diverse range of strategic consultants and advisors, including manufacturing, scientific and clinical development, and regulatory advisors, to assist us in designing and implementing our research and development and regulatory strategies and plans, including our AV-101 development and drug rescue strategies and plans. 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 AV-101 for MDD and other CNS-related conditions, as well as stem cell technology-related drug rescue and RM programs, we will need to expand our research and development capabilities and/or contract 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 and commercialize 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 and development efforts effectively and hire, train and integrate additional management, administrative and technical 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.

If we develop AV-101, drug rescue NCEs, other product candidates, or regenerative medicine 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 AV-101, any drug rescue NCE, other product candidate, or regenerative medicine product candidate we 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 products 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 maintain 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.



Table of Contents

As a public company, we incur significant administrative workload and expenses to comply with U.S. regulations and requirements imposed by the NASDAQ Stock Market concerning corporate governance and public disclosure.

As a public company with common stock listed on the NASDAQ Capital Market, we must comply with various laws, regulations and requirements, including certain provisions of the Sarbanes-Oxley Act of 2002, as well as rules implemented by the SEC and the NASDAQ Stock Market. Complying with these statutes, regulations and requirements, including our public company reporting requirements, continues to occupy a significant amount of the time of management and involves significant accounting, legal and other expenses. Furthermore, these laws, regulations and requirements require us to observe greater corporate governance practices than we have employed in the past, including, but not limited to maintaining a sufficient number of independent directors, increased frequency of board meetings, and holding annual stockholder meetings. Our efforts to comply with these regulations are likely to result in increased general and administrative expenses and management time and attention directed to compliance activities.

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 recent global financial crisis, 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 internal computer systems, or those of our third-party CROs or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product candidates' development programs.

Despite the implementation of security measures, our internal computer systems and those of our third-party CROs and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. 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 AV-101 or other product candidates could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach results in a loss of or

damage to our data or applications or 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.

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

We may acquire additional businesses or products, 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 products resulting from a strategic alliance 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, we will achieve the expected synergies to justify the transaction.



Table of Contents

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 products and compositions, their methods of use 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, should they issue, 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 patent applications related to AV-101 and we own and have licensed patents and patent applications related to human pluripotent stem cell technology.

Although we have an issued patent relating to AV-101 in the U.S. and the European Union, we cannot yet provide any assurances that any of our other numerous pending U.S. and additional foreign patent applications relating to AV-101 will mature into issued patents and, if they do, that such patents will include claims with a scope sufficient to protect AV-101 or otherwise provide any competitive advantage. Moreover, other parties may have developed technologies that may be related or competitive to our approach, and may have filed or may file patent applications and may have received or may receive patents that may overlap or conflict with our patent applications, 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 patent protection.

The patent positions of biotechnology and pharmaceutical companies, including our patent position, involve complex legal and factual questions, and, therefore, the issuance, scope, validity and enforceability of any additional patent claims that we may obtain cannot be predicted with certainty. Patents, if issued, may be challenged, deemed unenforceable, invalidated, or circumvented. U.S. patents and patent applications may also be subject to interference proceedings, ex parte reexamination, or inter partes review proceedings, supplemental examination and challenges in district court. Patents may be subjected to opposition, post-grant review, or comparable proceedings lodged in various foreign, both national and regional, patent offices. These proceedings could result in either 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 application. In addition, such proceedings may be costly. Thus, any patents that we may own or exclusively license may not provide any 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.

Furthermore, though a patent is presumed valid and enforceable, its issuance is not conclusive as to its validity or its enforceability and it may not provide us with adequate proprietary protection or competitive advantages against competitors with similar products. Even if a patent issues and is held to be valid and enforceable, competitors may be able to design around our patents, such as using pre-existing or newly developed technology. Other parties may develop and obtain patent protection for more effective technologies, designs or methods. We may not be able to prevent the unauthorized disclosure or use of our technical knowledge or trade secrets by consultants, vendors, former employees and 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 depends on our ability to detect infringement. It is difficult to detect infringers who do not advertise the components that are used in their products. Moreover, it may be difficult or impossible to obtain evidence of infringement in 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 that we initiate and the damages or other remedies awarded if we were to prevail 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 would 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 would also be materially and adversely impacted.





Table of Contents

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

any of our AV-101 or other pending patent applications, if issued, will include claims having a scope sufficient to protect AV-101 or any other products or product candidates, particularly considering that the compound patent to AV-101 has 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 be found to ultimately be valid and enforceable;

any patents issued to us 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

that our commercial activities or products will not infringe upon the patents or proprietary rights of others.

We also 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 and consultants who are parties to these agreements breach or violate the terms of these agreements, we may not 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.

We may infringe the intellectual property rights of others, which may prevent or delay our product development efforts and stop us from commercializing or increase the costs of commercializing our product candidates, if approved.

Our success will depend in part on our ability to operate without infringing the intellectual property and proprietary rights of third parties. We cannot assure you that our business, products and methods do not or will not infringe the patents or other intellectual property rights of third parties.

The pharmaceutical 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 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 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 may later result in issued patents that our product candidates may infringe, or which such third parties claim are infringed by our technologies. 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 resources to bring these actions to a successful conclusion.



Table of Contents

Patent and other types of intellectual property litigation can involve complex factual and legal questions, and their outcome is 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 be willfully infringing another 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 was successfully asserted against us and we could not obtain such a license, we may be forced to stop or delay developing, manufacturing, selling or otherwise commercializing our product candidates.

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. Patent litigation is costly and time-consuming. We may not have sufficient resources to bring these actions to a successful conclusion. 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 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 all such 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.

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 U.S. Patent and Trademark Office (USPTO), European Patent Office (EPO) 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 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.

Third parties may initiate legal proceedings against us alleging that we infringe their intellectual property rights or we may initiate legal proceedings against third parties to challenge the validity or scope of intellectual property rights controlled by third parties, the outcome of which would be uncertain and could have a material adverse effect on the success of our business. Any lawsuit we are engaged in to protect or enforce our patents or the patents of our licensors could be expensive, time-consuming and unsuccessful.

Even if the patent applications we own or license are issued, competitors may infringe these patents. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid, is unenforceable and/or is not infringed, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.



Table of Contents

Further, 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 or we or our licensors or collaborators may initiate legal proceedings against third parties to challenge the validity or scope of intellectual property rights controlled by third parties, including in oppositions, interferences, reexaminations, inter partes reviews or derivation proceedings before the United States or other jurisdictions. These proceedings can be expensive and time-consuming and many of our or our licensors' or collaborators' adversaries in these proceedings may have the ability to dedicate substantially greater resources to prosecuting these legal actions than we or our licensors or collaborators can. Our defense of litigation or interference 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, 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 European Union.

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.

Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court.

If we or one of our licensing partners initiated legal proceedings against a third party to enforce a patent, if and when issued, 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 or non-enablement. Grounds for unenforceability assertions include allegations that someone connected with prosecution of the patent withheld relevant information from the USPTO or EPO, 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. Such mechanisms include re-examination, post grant review and equivalent proceedings in foreign jurisdictions, e.g., opposition proceedings. Such proceedings could result in revocation or amendment of our patents in such a way that they no longer cover our product candidates or competitive products. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to validity, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. 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.



We will 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 United States could be less extensive than those in the United States, assuming that rights are obtained in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. The statutory deadlines for pursuing patent protection in individual foreign jurisdictions are based on the priority date of each of our patent applications. For the patent applications relating to AV-101, as well as for many of the patent families that we own or license, the relevant statutory deadlines have not yet expired. Thus, for each of the patent families that we believe provide coverage for our lead product candidates or technologies, we will need to decide whether and where to pursue protection outside the United States.



Table of Contents

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 United States. 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 United States. 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. 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. 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 around the world 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.

We are a party to a number of license agreements under which we are granted rights to intellectual property that are or could become important to our business, and we expect that we may need to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that 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 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.



Table of Contents

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 to support 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 which 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 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 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. In addition, 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 also 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.





Table of Contents

In the event 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.

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 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.

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 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 United States has recently 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.

In addition to increasing uncertainty with regard to 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.



Table of Contents

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 other 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 in defending 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, 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.

If, instead of identifying drug rescue candidates based on information available to us in the public domain, we seek to in-license drug rescue candidates from biotechnology, medicinal chemistry and pharmaceutical companies, academic, governmental and nonprofit research institutions, including the NIH, or other third parties, there can be no assurances that we will obtain material ownership or economic participation rights over intellectual property we may derive from such licenses or similar rights to the drug rescue NCEs we may produce and develop. If we are unable to obtain ownership or substantial economic participation rights over intellectual property related to drug rescue NCEs we produce and develop, our business may be adversely affected.

#### Risks Related to our Securities

The limited public market for our securities may adversely affect an investor's ability to liquidate an investment in the Company.

Our common stock is currently quoted on the NASDAQ Capital Market, however, there is presently limited trading activity. We can give no assurance that an active market will develop, or if developed, that it will be sustained. If an investor acquires shares of our common stock, the investor may not be able to liquidate the shares should there be a need or desire to do so.



Table of Contents

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

The market price for our common stock, similar to other biopharmaceutical companies, is likely to be 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:

plans for, progress of or results from nonclinical and clinical development activities related to our product candidates;

the failure of the FDA 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 United States and other countries;

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 of large blocks of our common stock, including sales by our executive officers, directors and significant stockholders;

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, 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 recent situations in which the market price of a stock has been volatile, holders of that stock have instituted securities class action litigation against such 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.





Table of Contents

A significant portion of our total outstanding shares are restricted from immediate resale but may be sold into the market in the near future. Future sales of shares by existing stockholders could cause our stock price to decline, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market could occur at any time. These sales, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. Historically, there has been a limited public market for shares of our common stock. Future sales and issuances of a substantial number of shares of our common stock in the public market, including shares issued upon the conversion of our Series A Preferred, Series B Preferred or Series C Preferred, and the exercise of outstanding options and warrants for common stock which are issuable upon exercise, in the public market, or the perception that these sales and issuances are occurring or might occur, could significantly reduce the market price for our common stock and impair our ability to raise adequate capital through the sale of equity securities.

Our principal institutional stockholders may continue to have substantial control over us and could limit your ability to influence the outcome of key transactions, including changes in control.

Certain of our current institutional stockholders own a substantial portion of our outstanding capital stock, including our common stock, Series A Preferred, Series B Preferred, and Series C Preferred, all of which preferred stock is convertible into a substantial number of shares of common stock. Accordingly, institutional stockholders may exert significant influence over us and over the outcome of any corporate actions requiring approval of holders of our common stock, including the election of directors and amendments to our organizational documents, such as increases in our authorized shares of common stock, any merger, consolidation or sale of all or substantially all of our assets or any other significant corporate transactions. These stockholders may also delay or prevent a change of control of us, even if such a change of control would benefit our other stockholders. The significant concentration of stock ownership may adversely affect the trading price of our common stock due to investors' perception that conflicts of interest may exist or arise. Furthermore, the interests of our principal institutional stockholders may not always coincide with your interests or the interests of other stockholders may act in a manner that advances its best interests and not necessarily those of other stockholders, including seeking a premium value for its common stock, which might affect the prevailing market price for our common stock.

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 (the Articles) permit us to issue up to 10.0 million shares of preferred stock. Our Board has authorized the issuance of (i) 500,000 shares of Series A Preferred, all of which shares are issued and outstanding at December 31, 2017; (ii) 4.0 million shares of Series B 10% Convertible Preferred stock, of which approximately 1.2 million shares remain issued and outstanding at December 31, 2017; and (iii) 3.0 million shares of Series C Convertible Preferred Stock, of which approximately 2.3 million shares are issued and outstanding at December 31, 2017. Our Board could authorize the issuance of additional series of preferred stock in the future 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.



## Table of Contents

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

Since becoming a public company by means of a reverse merger in 2011, we have been 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 a significant amount of money 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 expenses 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

In November 2017, in a self-placed private placement transaction, we sold to an accredited investor units consisting of (i) 150,000 shares of our unregistered common stock and (ii) warrants exercisable through November 30, 2021 to purchase 150,000 unregistered shares of our common stock at an exercise price of \$1.50 per share. The warrants are not exercisable until six months and one day following the date of issuance. We received cash proceeds of \$150,000 from this sale of our securities.

In December 2017, we issued 50,000 shares of our unregistered common stock for services provided by our contract research organization under the terms of a negotiated work order.

## Edgar Filing: VistaGen Therapeutics, Inc. - Form 10-Q

In December 2017, we issued 500,000 shares of our unregistered common stock having a fair value at the time of issuance of \$585,000 and a cash payment of \$76,500 to a contract manufacturing organization in settlement of \$526,500 of open accounts payable.

Proceeds from each of the offerings were used for general corporate purposes. All of the above sales were made in reliance on Section 4(a)(2) of the Securities Act as transactions by and issuer not involving any public offering, Regulation D of the Securities Act, and/or Section 3(a)(9) under the Securities Act. In all such transactions, certain inquiries were made by the Company to establish that such sales qualified for such exemption from the registration requirements. In particular, the Company confirmed that, with respect to the exemption claimed under Section 4(a)(2) of the Securities Act, that (i) all offers of sales and sales were made by personal contact from officers and directors of the Company or other persons closely associated with the Company, (ii) each investor made representations that he, she or it was an accredited investor as defined in Rule 501 of Regulation D under the Securities Act (and the Company had no reason to believe that such representations were incorrect), (iii) each purchaser gave assurance of investment intent, and (iv) offers and sales within any offering were made only to a limited number of persons.

### Item 3. Defaults Upon Senior Securities

None.

-66-



Table of Contents

Item 6. EXHIBITS

Exhibit Number	Description
<u>31.1</u>	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
<u>31.2</u>	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
<u>32</u>	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	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation Linkbase
101.DEF	XBRL Taxonomy Extension Definition Linkbase
101.LAB	XBRL Taxonomy Extension Label Linkbase
101.PRE	XBRL Taxonomy Extension Presentation Linkbase





Table of Contents

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.

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

/s/ Jerrold D.  
Dotson  
Jerrold D. Dotson  
Chief Financial  
Officer (Principal  
Financial and  
Accounting Officer)

Dated: February 12, 2018