MIRAGEN THERAPEUTICS, INC.
Form 10-Q
May 09, 2018
UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 31, 2018

or

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

For the transition period from to

Commission File No. 001-36483

MIRAGEN THERAPEUTICS, INC.
(Exact name of registrant as specified in its charter)

Delaware	47-1187261
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

6200 Lookout Road, Boulder, CO 80301
(Address, including zip code, of registrant's principal executive offices)

(720) 643-5200
(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 x No o

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 x No o

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

1

Large accelerated filer o	Accelerated filer x
Non-accelerated filer o (do not check if a smaller reporting company)	Smaller reporting company o
Emerging growth company x	

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. o

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

As of May 1, 2018, there were 30,192,373 shares of the registrant's Common Stock outstanding.

MIRAGEN THERAPEUTICS, INC.
INDEX

PART I. FINANCIAL INFORMATION
Item 1. Financial Statements
Condensed Consolidated Balance Sheets as of March 31, 2018 and December 31, 2017 (Unaudited) 4
Condensed Consolidated Statements of Operations for the three months ended March 31, 2018 and 2017 (Unaudited) 5
Condensed Consolidated Statements of Changes in Stockholders' Equity for the three months ended March 31, 2018 (Unaudited) 6
Condensed Consolidated Statements of Cash Flows for the three months ended March 31, 2018 and 2017 (Unaudited) 7
Notes to Condensed Consolidated Financial Statements (Unaudited) 8
Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations 28
Item 3. Quantitative and Qualitative Disclosures about Market Risk 34
Item 4. Controls and Procedures 34

PART II. OTHER INFORMATION
Item 1. Legal Proceedings 36
Item 1A. Risk Factors 36
Item 2. Unregistered Sales of Equity Securities and Use of Proceeds 68
Item 3. Defaults Upon Senior Securities 68
Item 4. Mine Safety Disclosures 68
Item 5. Other Information 68
Item 6. Exhibits 68

Table of Contents

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

MIRAGEN THERAPEUTICS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share data)
(unaudited)

	March 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$78,099	$ 47,441
Accounts receivable	4,809	1,456
Prepaid expenses and other current assets	3,445	2,971
Total current assets	86,353	51,868
Property and equipment, net	589	563
Other assets	50	50
Total assets	$86,992	$ 52,481
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$760	$ 906
Accrued liabilities	3,377	2,991
Total current liabilities	4,137	3,897
Notes payable	10,018	9,922
Other liabilities	131	152
Total liabilities	14,286	13,971
Commitments and contingencies		
Stockholders' equity:		
Common stock, $0.01 par value; 100,000,000 shares authorized; 30,186,540 and 22,568,006 shares issued and outstanding at March 31, 2018 and December 31, 2017, respectively	302	226
Additional paid-in capital	170,658	131,877
Accumulated deficit	(98,254)	(93,593)
Total stockholders' equity	72,706	38,510
Total liabilities and stockholders' equity	$86,992	$ 52,481

See accompanying notes to these condensed consolidated financial statements.

Table of Contents

MIRAGEN THERAPEUTICS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except share and per share data)
(unaudited)

	Three Months Ended March 31,	
	2018	2017
Revenue:		
Collaboration revenue	$4,756	$ 10
Grant revenue	28	452
Total revenue	4,784	462
Operating expenses:		
Research and development	6,413	4,120
General and administrative	2,990	3,281
Total operating expenses	9,403	7,401
Loss from operations	(4,619)	(6,939)
Other income (expense):		
Interest and other income	167	30
Interest and other expense	(209)	(71)
Net loss	(4,661)	(6,980)
Accretion of redeemable convertible preferred stock to redemption value	—	(5)
Net loss available to common stockholders	$(4,661)	$ (6,985)
Net loss per share, basic and diluted	$(0.18)	$ (0.60)
Weighted-average shares used to compute basic and diluted net loss per share	26,483,112	11,555,286

See accompanying notes to these condensed consolidated financial statements.

Table of Contents

MIRAGEN THERAPEUTICS, INC
CONDENSED CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(in thousands, except share data)
(unaudited)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount			
Balance at December 31, 2017	22,568,006	$ 226	$ 131,877	$ (93,593)	$ 38,510
Issuance of common stock in public offering, net of issuance cost	7,414,996	74	37,771	—	37,845
Shares issued for cash upon the exercise of stock options	179,598	2	110	—	112
Issuance of common stock for cash under employee stock purchase plan	23,940	—	110	—	110
Share-based compensation expense	—	—	790	—	790
Net loss	—	—	—	(4,661)	(4,661)
Balance at March 31, 2018	30,186,540	$ 302	$ 170,658	$ (98,254)	$ 72,706

See accompanying notes to these condensed consolidated financial statements.

Table of Contents

MIRAGEN THERAPEUTICS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)
(unaudited)

	Three Months Ended March 31,	
	2018	2017
Cash flows from operating activities:		
Net loss	$(4,661)	$(6,980)
Adjustments to reconcile net loss to net cash used in operating activities:		
Share-based compensation expense	790	419
Depreciation and amortization	69	73
Non-cash interest expense	96	32
Changes in operating assets and liabilities:		
Accounts receivable	(3,353)	(257)
Prepaid expenses and other assets	(521)	(534)
Accounts payable	(146)	118
Accrued and other liabilities	365	(1,054)
Net cash used in operating activities	(7,361)	(8,183)
Cash flows from investing activities:		
Purchases of property and equipment	(95)	(44)
Cash acquired in reverse merger	—	1,280
Net cash provided by (used in) investing activities	(95)	1,236
Cash flows from financing activities:		
Proceeds from the sale of common stock - public offering	40,782	—
Payment of issuance costs associated with the sale of common stock - public offering	(2,890)	—
Proceeds from the exercise of stock options	112	89
Proceeds from stock purchases under employee stock purchase plan	110	—
Proceeds from the sale of common stock - private financing	—	40,703
Payment of issuance costs associated with the sale of common stock - private financing	—	(1,176)
Payments of principal on notes payable	—	(500)
Net cash provided by financing activities	38,114	39,116
Net increase in cash and cash equivalents	30,658	32,169
Cash and cash equivalents at beginning of period	47,441	22,104
Cash and cash equivalents at end of period	$78,099	$54,273
Supplemental disclosure of cash flow information		
Cash paid for interest	$112	$38
Supplemental disclosure of non-cash investing and financing activities		
Amortization of public offering costs	$47	$—
Conversion of preferred stock to common stock	$—	$76,981
Liabilities assumed, net of non-cash assets received in reverse merger	$—	$1,076
Transfer of common stock issuance costs from prepaid expenses and other current assets to equity (private financing and at the market sales)	$—	$331
Unpaid financing costs included in prepaid expenses and other current assets and accrued liabilities	$—	$224
Reclassification of preferred stock warrant (accrued liability) to common stock warrant (equity)	$—	$51
Accretion of redeemable convertible preferred stock to redemption value	$—	$5

See accompanying notes to these condensed consolidated financial statements.

Table of Contents

MIRAGEN THERAPEUTICS, INC.
NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(unaudited)

1. DESCRIPTION OF BUSINESS

Miragen Therapeutics, Inc., a Delaware corporation (the "Company" or "Miragen"), is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapies with a specific focus on microRNAs and their role in certain diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression and play vital roles in influencing the pathways responsible for many disease processes. A leader in microRNA therapeutics discovery and development, the Company has advanced three product candidates, cobomarsen, also known as MRG-106, MRG-201, and MRG-110 into clinical development. The Company is developing MRG-110 under a license and collaboration agreement (the "Servier Collaboration Agreement") with Les Laboratoires Servier and Institut de Recherches Servier (collectively, "Servier").

Liquidity

The Company has incurred annual net operating losses since its inception. As of March 31, 2018, the Company had an accumulated deficit of $98.3 million and a net loss of $4.7 million for the three months ended March 31, 2018.

In February 2018, the Company entered into an underwriting agreement (the "Underwriting Agreement") with Jefferies LLC, Evercore Group L.L.C., and Deutsche Bank Securities Inc., as representatives of several underwriters (the "Underwriters"), pursuant to which the Company sold 7,414,996 shares of Common Stock in an underwritten public offering at a price to the public of $5.50 per share, which resulted in net proceeds of approximately $37.9 million after deducting underwriting commissions and discounts and other offering expenses payable by the Company.

The Company's management believes that the $78.1 million of cash and cash equivalents on hand at March 31, 2018 will be sufficient to fund its operations in the normal course of business and allow the Company to meet its liquidity needs into early 2020.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The accompanying condensed consolidated financial statements include the accounts of the Company and its wholly-owned subsidiary, Miragen Therapeutics Europe Limited ("Miragen Europe"), which was formed in January 2011 for the sole purpose of submitting regulatory filings in Europe. Miragen Europe has no employees or operations.

The financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("U.S. GAAP") and follow the requirements of the Securities and Exchange Commission (the "SEC") for interim reporting. As permitted under those rules, certain footnotes or other financial information that are normally required by U.S. GAAP can be condensed or omitted. These financial statements have been prepared on the same basis as the Company's annual financial statements and, in the opinion of management, reflect all adjustments, consisting only of normal recurring adjustments, which are necessary for a fair statement of the Company's financial information. These interim results are not necessarily indicative of the results to be expected for the year ending December 31, 2018, or for any other interim period, or for any other future year. The balance sheet as of December 31, 2017 has been derived from audited consolidated financial statements at that date but does not include all the information required by U.S. GAAP for complete financial statements. All intercompany balances and transactions have been eliminated in consolidation.

The accompanying unaudited condensed consolidated financial statements and related financial information should be read in conjunction with the audited consolidated financial statements of the Company and the notes thereto contained in the Company's Form 10-K for the year ended December 31, 2017, filed with the SEC on March 15, 2018. The Company's management performed an evaluation of its activities through the date of filing of these financial statements and concluded that there are no subsequent events requiring disclosure, other than as disclosed.

Use of Estimates

The Company's condensed consolidated financial statements are prepared in accordance with U.S. GAAP, which requires it to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and

Table of Contents

contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Although these estimates are based on the Company's knowledge of current events and actions it may take in the future, actual results may ultimately differ from these estimates and assumptions.

Revenue Recognition

The Company recognizes revenue principally from its strategic alliance and collaboration agreement. Revenue is recognized from upfront payments for licenses and milestone payments that are generated from defined research or development events, as well as from the reimbursement of amounts for research and development services under its strategic alliance and collaboration agreement. The Company recognizes revenue when all four of the following criteria are met: (1) persuasive evidence of an arrangement exists; (2) products have been delivered or services rendered; (3) the selling price is fixed or determinable; and (4) collectability is reasonably assured.

Multiple-element arrangements are examined to determine whether the deliverables can be separated or must be accounted for as a single unit of accounting. The Servier Collaboration Agreement, for example, includes a combination of upfront license fees, payments for research and development activities, and milestone payments that are evaluated to determine whether each deliverable under the agreement has value to the customer on a stand-alone basis and whether reliable evidence of fair value for the deliverable exists. Deliverables in an arrangement that do not meet this separation criteria are treated as a single unit of accounting, generally applying applicable revenue recognition guidance for the final deliverable to the combined unit of accounting.

The Company recognizes revenue from non-refundable upfront license fees over the term of performance under the Servier Collaboration Agreement. When the performance period is not specified, the Company estimates the performance period based upon provisions contained within the agreement, such as the duration of the research or development term, the existence, or likelihood, of achievement of development commitments, and any other significant commitments. These advance payments are deferred and recorded as deferred revenue upon receipt, pending recognition, and are classified as a short-term or long-term liability in the accompanying condensed consolidated balance sheets. Expected performance periods are reviewed periodically and, if applicable, the amortization period is adjusted, which may accelerate or decelerate revenue recognition. The timing of revenue recognition, specifically as it relates to the amortization of upfront license fees, is significantly influenced by the Company's estimates.

The Company applies the milestone method of accounting to recognize revenue from milestone payments when earned, as evidenced by persuasive evidence that the milestone has been achieved and the payment is non-refundable, provided that the milestone event is substantive. A milestone event is defined as an event (1) that can only be achieved based in whole or in part on either the Company's performance or on the occurrence of a specific outcome resulting from the Company's performance; (2) for which there is substantive uncertainty at the inception of the arrangement that the event will be achieved; and (3) that would result in additional payments being due to the Company. Events for which the occurrence is either contingent solely upon the passage of time or the result of a counterparty's performance are not considered to be milestone events. A milestone event is substantive if all of the following conditions are met: (i) the consideration is commensurate with either the Company's performance to achieve the milestone or the enhancement of the value to the delivered item(s) as a result of a specific outcome resulting from the Company's performance to achieve the milestone; (ii) the consideration relates solely to past performance; and (iii) the consideration is reasonable relative to all the deliverables and payment terms (including other potential milestone consideration) within the arrangement. The Company assesses whether a milestone is substantive at the inception of each arrangement. If a milestone is deemed non-substantive, the Company accounts for the milestone payment using a method consistent with the related units of accounting for the arrangement over the estimated performance period.

Share-Based Compensation

The Company accounts for share-based compensation expense related to stock options granted to employees and members of its board of directors under its 2008 Equity Incentive Plan (the “2008 Plan”) and under its 2016 Equity Incentive Plan (the “2016 Plan”) by estimating the fair value of each stock option or award on the date of grant using the Black-Scholes option pricing model. The Company recognizes share-based compensation expense on a straight-line basis over the vesting term.

The Company accounts for stock options issued to non-employees by valuing the award using an option pricing model and remeasuring such awards to the current fair value until the awards are vested or a performance commitment has otherwise been reached.

Table of Contents

Research and Development

Research and development costs are expensed as incurred in performing research and development activities. The costs include employee-related expense including salaries, benefits, share-based compensation, fees for acquiring and maintaining licenses under third-party license agreements, consulting fees, costs of research and development activities conducted by third parties on the Company's behalf, laboratory supplies, depreciation, and facilities and overhead costs. The Company defers and capitalizes non-refundable advance payments for research and development activities until the related goods are received or services performed. In circumstances where amounts have been paid in excess of costs incurred, the Company records a prepaid expense.

The Company records upfront and milestone payments to acquire contractual rights to licensed technology as research and development expenses when incurred if there is uncertainty in the Company receiving future economic benefit from the acquired contractual rights. The Company considers future economic benefits from acquired contractual rights to licensed technology to be uncertain until such a drug candidate is approved by the U.S. Food and Drug Administration or when other significant risk factors are abated.

Clinical Trial and Preclinical Study Accruals

The Company makes estimates of accrued expenses as of each balance sheet date in its condensed consolidated financial statements based on certain facts and circumstances at that time. The Company's accrued expenses for clinical trials and preclinical studies are based on estimates of costs incurred for services provided by clinical research organizations, manufacturing organizations, and other providers. Payments under the Company's agreements with external service providers depend on a number of factors, such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, the Company obtains information from various sources and estimates the level of effort or expense allocated to each period. Adjustments to the Company's research and development expenses may be necessary in future periods as its estimates change.

Cash and Cash Equivalents

All highly-liquid investments that have maturities of 90 days or less at the date of purchase are classified as cash equivalents. Cash equivalents are reported at cost, which approximates fair value due to the short maturities of these instruments.

Fair Value of Financial Instruments

The following tables present information about the Company's financial assets and liabilities that have been measured at fair value and indicate the fair value of the hierarchy of the valuation inputs utilized to determine such fair value. In general, fair values determined by Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities. Fair value determined by Level 2 inputs utilize observable inputs other than Level 1 prices, such as quoted prices, for similar assets or liabilities, quoted market prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the related assets or liabilities. Fair values determined by Level 3 inputs are unobservable data points for the asset or liability, and include situations where there is little, if any, market activity for the asset or liability.

	March 31, 2018		December 31, 2017	
	Level 1	Level 3	Level 1	Level 3
	(in thousands)			
Assets:				

Money market funds (included in cash and cash equivalents) (1)	$78,919	$ —	$47,653	$ —
Liabilities:				
Preferred and common stock warrants (included in accrued and other liabilities)	$—	$ 82	$—	$ 82

(1) Amounts presented for each period above differ from cash and cash equivalents reported in the condensed consolidated balance sheets due to outstanding disbursements and deposits.

Table of Contents

Certain of the Company's financial instruments are not measured at fair value on a recurring basis but are recorded at amounts that approximate their fair value due to the short-term nature of their maturities, such as cash and cash equivalents, accounts receivable, accounts payable, and accrued expenses. The carrying amount of the Company's note payable approximates its fair value (a Level 2 fair value measurement), reflecting interest rates currently available to the Company.

The Company accounts for warrants to purchase its stock pursuant to ASC Topic 470, Debt, and ASC Topic 480, Distinguishing Liabilities from Equity, and classifies warrants for common stock as liabilities or equity. The warrants classified as liabilities are reported at their estimated fair value and any changes in fair value are reflected in interest expense and other related expenses. The warrants classified as equity are reported at their estimated fair value with no subsequent remeasurement.

Concentrations of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash equivalents, which include short-term investments that have maturities of less than three months. The Company maintains deposits in federally insured financial institutions in excess of federally insured limits. The Company has not experienced any losses in such accounts. The Company invests its excess cash primarily in deposits and money market funds held with one financial institution.

Property and Equipment

The Company carries its property and equipment at cost, less accumulated depreciation and amortization. Depreciation is computed using the straight-line method over the estimated useful lives of the assets, generally three to five years. Leasehold improvements are amortized over the shorter of the life of the lease (including any renewal periods that are deemed to be reasonably assured) or the estimated useful life of the assets. Construction in progress is not depreciated until placed in service. Repairs and maintenance costs are expensed as incurred and expenditures for major improvements are capitalized.

Impairment of Long-Lived Assets

The Company assesses the carrying amount of its property and equipment whenever events or changes in circumstances indicate the carrying amount of such assets may not be recoverable. No impairment charges were recorded during the three months ended March 31, 2018 and 2017.

Net Loss per Share

Basic net loss per share is calculated by dividing the net loss applicable to common stockholders by the weighted average number of shares of Common Stock outstanding during the period without consideration of Common Stock equivalents. Since the Company was in a loss position for all periods presented, diluted net loss per share is the same as basic net loss per share for all periods, as the inclusion of all potential common shares outstanding is anti-dilutive.

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and/or circumstances from non-owner sources. If the Company had comprehensive gains (losses), they would be reflected in the statement of operations and comprehensive loss and as a separate component in the statement of stockholders' equity. There were no elements of comprehensive loss during the three months ended March 31, 2018 and 2017.

Income Taxes

The Company accounts for income taxes by using an asset and liability method of accounting for deferred income taxes. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. A valuation allowance is recorded to the extent it is more likely than not that a deferred tax asset will not be realized. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in operations in the period that includes the enactment date.

The Company’s significant deferred tax assets are for net operating loss carryforwards, tax credits, accruals and reserves, and capitalized start-up costs. The Company has provided a valuation allowance for its entire net deferred tax assets since inception

Table of Contents

as, due to its history of operating losses, the Company has concluded that it is more likely than not that its deferred tax assets will not be realized.

The Company has no unrecognized tax benefits. The Company classifies interest and penalties arising from the underpayment of income taxes in the condensed consolidated statements of operations as general and administrative expenses. No such expenses have been recognized during the three months ended March 31, 2018 and 2017.

The Tax Cuts and Jobs Act ("Tax Act") was signed into law on December 22, 2017. The Tax Act includes significant changes to the U.S. corporate income tax system, including: (i) a federal corporate rate reduction from 35% to 21%; (ii) limitations on the deductibility of interest expense and executive compensation; (iii) elimination of the corporate alternative minimum tax ("AMT") and a change in how existing AMT credits can be realized; (iv) change in the rules related to uses and limitations of net operating loss carryforwards created in tax years beginning after December 31, 2017; (v) reduction of the orphan drug credit from 50% to 25%; and (vi) transition of U.S. international taxation from a worldwide tax system to a territorial tax system. The Company does not anticipate the Tax Act to have a material impact on the condensed consolidated financial statements primarily due to the valuation allowance recorded against our net deferred tax assets.

Segment Information

The Company operates in one operating segment and, accordingly, no segment disclosures have been presented herein. All equipment, leasehold improvements, and other fixed assets are physically located within the United States and all agreements with the Company's partners are denominated in U.S. dollars, except where noted.

Recent Accounting Pronouncements – Not Yet Adopted

Revenue Recognition

In May 2014, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2014-09, Revenue from Contracts with Customers (Accounting Standards Codification Topic 606), and has issued a number of clarifying ASUs subsequently, all of which outline a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and supersedes most current revenue recognition guidance, including industry-specific guidance. The core principle of the revenue model is that "an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services." The standard provides enhancements to the quality and consistency of how revenue is reported by companies, while also improving comparability in the financial statements of companies reporting using International Financial Reporting Standards or U.S. GAAP. The new standard also will require enhanced revenue disclosures, provide guidance for transactions that were not previously addressed comprehensively, and improve guidance for multiple-element arrangements. This accounting standard becomes effective for the Company for reporting periods beginning after December 15, 2018, and interim reporting periods thereafter. Early adoption is permitted for annual reporting periods (including interim periods) beginning after December 15, 2016. This new standard permits the use of either the retrospective or cumulative effect transition method.

The Company plans to adopt ASC 606 in the first quarter of 2019. As of March 31, 2018, there were limited contracts that will be in effect (actively) as of the transition date. The Company has not yet determined the effect of the standard on its condensed consolidated financial statements. The Company's selected implementation transition method will be dependent upon contracts that are in place closer to the transition date.

Leases

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842), which supersedes FASB ASC Topic 840, Leases (Topic 840), and provides principles for the recognition, measurement, presentation and disclosure of leases for both lessees and lessors. In September 2017, the FASB issued ASU 2017-13, Revenue Recognition (Topic 605), Revenue from Contracts with Customers (Topic 606), Leases (Topic 840), and Leases (Topic 842): Amendments to SEC Paragraphs Pursuant to the Staff Announcement at the July 20, 2017 EITF Meeting and Rescission of Prior SEC Staff Announcements and Observer Comments, which provides additional implementation guidance on the previously issued ASU 2016-02 Leases (Topic 842). ASU 2016-02 requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than twelve months regardless of classification. Leases with a term of twelve months or less will be accounted for similar to existing guidance for

Table of Contents

operating leases. The standard is effective for the Company for fiscal years beginning after December 15, 2019, and interim periods thereafter, with early adoption permitted. At adoption, this update will be applied using a modified retrospective approach, with an option to use certain transition relief. The Company is currently evaluating the impact of this standard on its condensed consolidated financial statements.

Other new pronouncements issued but not effective as of March 31, 2018 are not expected to have a material impact on the Company's condensed consolidated financial statements.

3. STRATEGIC ALLIANCE AND COLLABORATION WITH SERVIER

In October 2011, the Company entered into the Servier Collaboration Agreement with Servier for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease. Under the Servier Collaboration Agreement, the Company granted Servier an exclusive license to research, develop, manufacture, and commercialize RNA-targeting therapeutics for certain microRNA targets in the cardiovascular field. In 2017, the Company and Servier agreed to amend the Servier Collaboration Agreement to remove all existing targets, add one new target (microRNA-92), and grant Servier the right to add one additional target through September 2019.

In April 2018, the Company and Servier entered into a seventh amendment to the Servier Collaboration Agreement (the "Servier Amendment"). The Servier Amendment, among other things, (i) updated the development plan for MRG-110 and cost-sharing provisions; (ii) provided for specified development cost reimbursement by Servier to the Company following a determination by a joint committee established by the parties under the Servier Collaboration Agreement that the outcome of a specified portion of a Phase 1 clinical trial has met its primary end point; and (iii) provided for additional development plan cost reimbursement by Servier to the Company following a determination by a joint committee established by the parties under the Servier Agreement that a product candidate targeting microRNA-92 will proceed into a Phase 2 clinical trial.

Servier's rights to each named target are limited to therapeutics in the field of cardiovascular disease, as defined, and in their territory, which is worldwide except for the United States and Japan. The Company retains all other rights including commercialization of therapeutics developed under the Servier Collaboration Agreement in the field of cardiovascular disease in the United States and Japan.

The Company is eligible to receive non-refundable development milestone payments of €5.8 million to €13.8 million ($7.1 million to $17.0 million as of March 31, 2018) and regulatory milestone payments of €10.0 million to €40.0 million ($12.3 million to $49.3 million as of March 31, 2018) for each target. Additionally, the Company may receive up to €175.0 million ($215.6 million as of March 31, 2018) in commercialization milestones, as well as quarterly royalty payments expressed in percentages ranging from the low-double digits to the mid-teens (subject to reductions for patent expiration, generic competition, third-party royalty, and costs of goods) on the net sales of any licensed product commercialized by Servier. Servier is obligated to make royalty payments for a period specified under the Servier Collaboration Agreement.

The Company applies the milestone method of accounting to recognize revenue from milestone payments when earned, as evidenced by persuasive evidence that the milestone has been achieved and the payment is non-refundable, provided that the milestone event is substantive. In March 2018, the Company and Servier initiated a Phase 1 clinical trial of MRG-110. Under the terms of the Servier Collaboration Agreement, the Company earned its first development milestone payment of €3.0 million ($3.7 million as of March 31, 2018). This amount is included as revenue in the accompanying condensed consolidated statement of operations during the three months ended March 31, 2018 and accounts receivable in the condensed consolidated balance sheet as of March 31, 2018.

As part of the Servier Collaboration Agreement, the Company established a multiple-year research collaboration, under which it jointly performs agreed upon research activities directed to the identification and characterization of named targets and oligonucleotides in the cardiovascular field, which is referred to as the Research Collaboration. The current amended term of the Research Collaboration extends through September 2019. Servier is responsible for funding certain costs of the Research Collaboration, as defined under the Servier Collaboration Agreement. During the three months ended March 31, 2018 and 2017, the Company recognized as revenue amounts reimbursable under the Servier Collaboration Agreement of $1.1 million and $10 thousand, respectively.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities under the development plan through the completion of one or more Phase 2 clinical trials and will reimburse the Company for a specified portion of such costs it

Table of Contents

incurs. The costs of Phase 3 clinical trials for each product candidate will be allocated between the parties at a specified percentage of costs. The applicable percentage for each product candidate will be based upon whether certain events under the Servier Collaboration Agreement occur, including if the Company enters into a third-party agreement for the development and/or commercialization of a product in the United States at least 180 days before the initiation of the first Phase 3 clinical trial, or if the Company subsequently enters into a U.S. partner agreement, or if it does not enter into a U.S. partner agreement but files for approval in the United States using data from the Phase 3 clinical trial.

Under the Servier Collaboration Agreement, the Company also granted Servier a royalty-free, non-exclusive license to develop a companion diagnostic in its territory for any therapeutic product that may be developed by Servier under the Servier Collaboration Agreement. The Company also granted Servier an exclusive, royalty-free license to commercialize such a companion diagnostic in its territory for use in connection with the development and commercialization of such therapeutic product in its territory.

The Servier Collaboration Agreement will expire as to each underlying product candidate when Servier's royalty obligations as to such product candidate have expired. Servier may also terminate the Servier Collaboration Agreement for: (i) convenience upon a specified number of days' prior notice to the Company or (ii) upon determination of a safety issue relating to development under the agreement upon a specified number of days' prior notice to the Company. Either party may terminate the Servier Collaboration Agreement upon a material breach by the other party that is not cured within a specified number of days. The Company may also terminate the agreement if Servier challenges any of the patents licensed by the Company to Servier.

The Company determined that the elements within the Servier Collaboration Agreement should be treated as a single unit of accounting because the delivered elements, the licenses, did not have stand-alone value to Servier at the time the license was granted. As such, the Company recognized license fees earned under the Servier Collaboration Agreement as revenue on a proportional performance basis over the estimated period to complete the activities under the Research Collaboration. The total period of performance is equal to the estimated term of the Research Collaboration. The Company measured its progress under the proportional performance method based on actual and estimated full-time equivalents. The Company received a total of $12.4 million (€9.0 million) in non-refundable license fees under the Servier Collaboration Agreement. Based on earlier estimates of the term of the Research Collaboration, these license fees had been fully recognized as revenue during the period from October 2011 through December 2016. Accordingly, no amounts were recognized as license revenue during the three months ended March 31, 2018 and 2017, respectively.

In total, for the three months ended March 31, 2018 and 2017, the Company recognized $4.8 million and $10 thousand, respectively, as revenue under the Servier Collaboration Agreement. Amounts incurred but not billed to Servier for research and related intellectual property activities totaled $1.0 million and $1.1 million as of March 31, 2018 and December 31, 2017, respectively. These amounts are included in prepaid expenses and other current assets in the Company's condensed consolidated balance sheets. As of March 31, 2018, accounts receivable for Servier research and related intellectual property activities totaled $4.8 million, which included the development milestone of $3.7 million. At December 31, 2017, accounts receivable for Servier research and related intellectual property activities totaled $1.4 million.

4. REVERSE MERGER

In February 2017, the Company, then known as Signal Genetics, Inc. ("Signal"), completed its merger with Miragen Therapeutics, Inc., a then privately-held Delaware corporation ("Private Miragen"). Pursuant to the Agreement and Plan of Merger and Reorganization (the "Merger Agreement") by and among the Company, Private Miragen, and Signal Merger Sub, Inc., a wholly-owned subsidiary of the Company ("Merger Sub"), Merger Sub merged with and into

Private Miragen, with Private Miragen surviving as a wholly-owned subsidiary of the Company (the "Merger"). Immediately, following the Merger, Private Miragen merged with and into the Company, with the Company as the surviving corporation (the "Short-Form Merger" and, together with the Merger, the "Mergers"). In connection with the Short-Form Merger, the Company changed its corporate name to "Miragen Therapeutics, Inc."

For accounting purposes, Private Miragen is considered to have acquired Signal in the Merger. Private Miragen was determined to be the accounting acquirer based upon the terms of the Merger and other factors including: (i) the Private Miragen security holders owned approximately 95.2% of the combined company's outstanding common stock immediately following the closing of the Mergers; (ii) former Private Miragen directors held all of the board seats in the combined company immediately following the closing of the Mergers; and (iii) Private Miragen management held key management positions of the combined company. The Merger has been accounted for as an asset acquisition rather than business combination because the assets acquired and liabilities assumed by Private Miragen do not meet the definition of a business as defined by U.S. GAAP. The net

Table of Contents

assets acquired in connection with this transaction were recorded at their estimated acquisition date fair values in February 2017 as of the date the Mergers were completed.

Immediately prior to the effective date of the Merger, all shares of preferred stock of Private Miragen converted into shares of common stock of Private Miragen on a one-for-one basis.

At the effective date of the Merger, the Company issued shares of its common stock outstanding at a par value of $0.01 per share (the "Common Stock") to Private Miragen stockholders, at an exchange rate of approximately 0.7031 shares of Common Stock in exchange for each share of Private Miragen common stock outstanding immediately prior to the Merger. The exchange rate was calculated by a formula that was determined through arms-length negotiations between the Company and Private Miragen. The combined company assumed all the outstanding options, whether or not vested, under the 2008 Plan with such options representing the right to purchase a number of shares of Common Stock equal to approximately 0.7031 multiplied by the number of shares of Private Miragen common stock previously represented by such options.

Immediately after the Merger, there were 21,309,440 shares of Common Stock outstanding. In addition, immediately after the Merger, Private Miragen stockholders, warrant holders, and option holders owned approximately 95.9% of the aggregate number of shares of Common Stock, and the stockholders of the Company immediately prior to the Merger owned approximately 4.1% of the aggregate number of shares of Common Stock (each on a fully diluted basis). The accompanying unaudited condensed consolidated financial statements and notes to the unaudited condensed consolidated financial statements give retroactive effect to the exchange ratio and change in par value for all periods presented.

On February 13, 2017, prior to the effectiveness of the Merger, Signal had 1,024,960 shares of Common Stock outstanding and a market capitalization of $12.6 million. The estimated fair value of the net assets of Signal on February 13, 2017, prior to the Merger, was $0.2 million. The fair value of Common Stock on the Merger closing date, prior to the Merger, was above the fair value of the Company's net assets. As the Company's net assets were predominantly comprised of cash offset by current liabilities, the fair value of the Company's net assets as of February 13, 2017, prior to the Merger, is considered to be the best indicator of the fair value and, therefore, the purchase consideration.

The following table summarizes the net assets acquired based on their estimated fair values immediately prior to the Merger (in thousands):

Cash and cash equivalents	$1,280
Prepaid and other assets	248
Accrued liabilities	(1,324)
Net acquired tangible assets	$204

5. PROPERTY AND EQUIPMENT

Property and equipment, net, consisted of the following:

	March 31, 2018	December 31, 2017
	(in thousands)	
Lab equipment	$2,235	$ 2,229
Leasehold improvements	741	737
Computer hardware and software	372	355
Furniture and fixtures	119	77
Property and equipment, gross	3,467	3,398

Less: accumulated depreciation and amortization	(2,878)	(2,835)
Property and equipment, net	$589	$ 563

During the three months ended March 31, 2018 and 2017, depreciation and amortization expense was $0.1 million. Depreciation and amortization expense is recorded primarily in research and development expense on the condensed consolidated statements of operations.

Table of Contents

6. ACCRUED LIABILITIES

Accrued liabilities consisted of the following:

	March 31, 2018	December 31, 2017
	(in thousands)	
Accrued license fees	$803	$ —
Accrued outsourced clinical and preclinical studies	791	581
Accrued employee compensation and related taxes	607	1,538
Accrued legal fees and expenses	474	185
Accrued other professional service fees	236	232
Accrued equipment and lab materials	197	197
Value of liability-classified stock purchase warrants	82	82
Deferred and accrued facility lease obligations	77	74
Other accrued liabilities	110	102
Total accrued liabilities	$3,377	$ 2,991

7. NOTES PAYABLE

2017 Silicon Valley Bank Loan Agreement

In November 2017, the Company entered into a loan and security agreement with Silicon Valley Bank (the "2017 SVB Loan Agreement"), which amended and restated the loan and security agreement Private Miragen entered into with Silicon Valley Bank in April 2015 (the "2015 SVB Loan Agreement"). Upon entry into the 2017 SVB Loan Agreement, the Company borrowed $10.0 million with a 30-month payment period following an 18-month interest-only payment period ending in November 2021. Under certain circumstances, the interest-only period can be extended by an additional six months. Amounts outstanding bear interest at the prime rate (4.75% at March 31, 2018), with a final payment fee equal to $0.9 million due upon maturity. As of March 31, 2018, no additional amounts are available under the 2017 SVB Loan Agreement.

The Company may elect to prepay prior to maturity all or any portion of the outstanding principal amounts under the 2017 SVB Loan Agreement, subject to a prepayment charge, depending on the date of prepayment or upon the occurrence of an event of default in which the Company's obligations to repay the outstanding principal is accelerated. The Company's obligations under the 2017 SVB Loan Agreement are secured by a first-priority security interest, right, and title in all business assets, excluding the Company's intellectual property, which is subject to a negative pledge.

The 2017 SVB Loan Agreement includes customary representations, warranties, and covenants (affirmative and negative), including restrictive covenants that limit the Company's ability to: encumber or dispose of the collateral securing the loan; change the business of the Company; transfer a material portion of the Company's assets; acquire other businesses; and merge or consolidate with or into any other business organization; incur additional indebtedness; declare or pay any cash dividend or make a cash distribution on any class of stock or other equity interest; enter into specified material transactions with Company affiliates; make non-ordinary course payments or enter into any amendment regarding subordinated debt of the Company; or become an "investment company" under the Investment Company Act of 1940, as amended; in each case subject to specified exceptions.

The 2017 SVB Loan Agreement also includes standard events of default, including payment defaults; breaches of covenants following any applicable cure period; material breaches of representations or warranties; the occurrence of a material adverse change (as defined in the 2017 SVB Loan Agreement); events relating to bankruptcy or insolvency; breaches of material third-party agreements; the occurrence of an unsatisfied material judgment against the Company;

and specified governmental actions against the Company, including specified actions by the U.S. Food and Drug Administration. Upon the occurrence of an event of default, Silicon Valley Bank may declare all outstanding obligations immediately due and payable, including a prepayment charge, and take such other actions as are set forth in the 2017 SVB Loan Agreement. Upon the occurrence of an event of default, at the Silicon Valley Bank's discretion, interest on the 2017 SVB Loan Agreement will accrue at 5.0% above the rate that is otherwise applicable thereto until the earlier of the repayment of the Company's obligations under the 2017 SVB Loan Agreement or the cure of such event of default.

Table of Contents

2015 Silicon Valley Bank Loan Agreement

In April 2015, Private Miragen entered into the 2015 SVB Loan Agreement and $5.0 million was funded in May 2015, which had a 30-month payment period following an 18-month interest-only payment period that ended in November 2016. Interest accrued on amounts outstanding at the prime rate minus 0.25%, with a final payment fee equal to 5.50% of amounts borrowed. Upon the execution of the 2017 SVB Loan Agreement, the 2015 SVB Loan agreement was terminated in its entirety. As a result, the Company paid the remaining principal and final interest payment with proceeds from the 2017 SVB Loan Agreement. The Company accounted for the termination of the 2015 SVB Loan Agreement as an extinguishment and incurred a loss on debt extinguishment of $0.1 million, which was recorded within interest expense.

In connection with the 2015 SVB Loan Agreement entered into in April 2015, Private Miragen issued detachable warrants to purchase up to 11,718 shares of Private Miragen preferred stock at an adjusted exercise price of $8.53 per share. At issuance, the warrants were classified as a liability subject to remeasurement at each balance sheet date. Immediately prior to the Merger, these warrants became exercisable for Private Miragen common stock, which was immediately exchanged for the right to purchase the Company's Common Stock. The Company determined that although the warrants were no longer exercisable for redeemable preferred stock, the warrants continued to be classified as a liability after the Merger due to the right of the holder to require the Company to repurchase the warrants for $0.1 million under certain circumstances. As of March 31, 2018, the Company estimated the fair value of the warrants to be $0.1 million using a probability adjusted present value method with the following assumptions: term of two years, discount rate of 6.8%, and probability of 90.0%.

Amounts outstanding under the SVB loan agreements were as follows:

	March 31, 2018	December 31, 2017
	(in thousands)	
Principal amount outstanding	$10,000	$ 10,000
Unamortized debt discount	(104)	(119)
Accreted final payment fee	122	41
Total notes payable	$10,018	$ 9,922

Future annual minimum principal payments under the 2017 SVB Loan Agreement as of March 31, 2018 are as follows (in thousands):

2018	$—
2019	2,333
2020	4,000
2021	3,667
Total	$10,000

8. COMMITMENTS AND CONTINGENCIES

Indemnification Agreements

The Company has entered into indemnification agreements with each of its directors and officers whereby it has agreed to indemnify such persons for certain events or occurrences while the individual is, or was, serving as a director, officer, employee, or other agent of the Company. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited.

Employment Agreements

The Company has entered into agreements with its executives that provide for base salary, severance, eligibility for bonuses, and other generally available benefits. The agreements provide that the Company may terminate the employment of its executives at any time, with or without cause.

If an executive is terminated without cause, as defined in the employment agreements, or an executive resigns for good reason, as defined in the employment agreements, then the executive is entitled to receive, upon the execution of a release agreement, a severance package consisting of: (i) the equivalent of 12 months of the executive's base salary in effect immediately prior to

Table of Contents

date of termination; (ii) acceleration of vesting of the equivalent of 12 months of vesting of the executive's outstanding unvested stock options or other equity awards that were outstanding as of the effective date of the executive's employment agreement; and (iii) 12 months of continued health coverage.

If an executive is terminated without cause or resigns for good reason within one month prior to or 12 months following a change of control, as defined in the employment agreements, the executive is entitled to receive, upon the execution of a release agreement, a severance package consisting of: (i) the equivalent of 12 months of the executive's base salary in effect immediately prior to date of termination; (ii) the vesting in full of the executive's then-outstanding stock options or other equity awards subject to time-based vesting; and (iii) 12 months of continued health coverage. Solely in the case of the Company's Chief Executive Officer, if such termination occurs one month before or 12 months following a change of control, then, upon the execution of a release agreement, the executive is entitled to: (i) the equivalent of 24 months of the executive's base salary in effect immediately prior to the date of termination; (ii) the vesting in full of the executive's outstanding stock options or other equity awards subject to time-based vesting; and (iii) 12 months of continued health coverage.

License Agreements with the University of Texas

As of March 31, 2018, the Company had two exclusive patent license agreements (the "UT License Agreements") with the Board of Regents of The University of Texas System (the "University of Texas"). Under each of the UT License Agreements, the University of Texas granted the Company exclusive and nonexclusive licenses to certain patent and technology rights. The University of Texas is a minority stockholder of the Company.

In consideration of rights granted by the University of Texas, the Company is required to: (i) pay a nonrefundable upfront license documentation fee in the amount of $10 thousand per license; (ii) pay an annual license maintenance fee in the amount of $10 thousand per license starting one year from the date of each agreement; (iii) reimburse the University of Texas for actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date; and (iv) bear all future costs of and manage the filing, prosecution, enforcement, and maintenance of patent rights. During the three months ended March 31, 2018, the Company incurred immaterial upfront and maintenance fees, which were recorded as research and development expense. During the three months ended March 31, 2017, no upfront and maintenance fees were incurred. All costs related to the filing, prosecution, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the UT License Agreements, the Company may be obligated to make the following future milestone payments for each licensed product candidate: (i) up to approximately $0.6 million upon the initiation of defined clinical trials; (ii) $2.0 million upon regulatory approval in the United States; and (iii) $0.5 million per region upon regulatory approval in other specified regions. Additionally, if the Company or any of its sublicensees successfully commercializes any product candidate subject to the UT License Agreements, it is responsible for royalty payments in the low-single digits based upon net sales of such licensed products and payments at a percentage in the mid-teens of any sublicense income, subject to specified exceptions. The University of Texas's right to these royalty payments will expire as to each license agreement upon the expiration of the last patent claim subject to the applicable UT License Agreement.

The license term extends on a product-by-product and country-by-country basis until the expiration of the last to expire of the licensed patents that covers such product in such country. Upon expiration of the royalty payment obligation, the Company will have a fully-paid license in such country. The Company may also terminate each UT License Agreement for convenience upon a specified number of days' prior notice to the University of Texas. The University of Texas also has the right to earlier terminate the UT License Agreements after a defined date under specified circumstances where the Company has effectively abandoned its research and development efforts or has no

sales. The UT License Agreements will terminate under customary termination provisions including automatic termination upon the Company's bankruptcy or insolvency, upon notice of an uncured material breach, and upon mutual written consent. All charges incurred under the UT License Agreements have been expensed to date due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with Roche Innovation Center Copenhagen A/S (formerly Santaris Pharma A/S)

In June 2010, Private Miragen entered into a license agreement with the Santaris Pharma A/S, which was subsequently acquired by F. Hoffmann-La Roche Ltd ("Roche") in 2014, and subsequently changed its name to Roche Innovation Center Copenhagen A/S ("RICC"). The agreement was amended in October 2011 and amended and restated in December 2012 (the "RICC License Agreement").

Under the RICC License Agreement, the Company has received exclusive and nonexclusive licenses from RICC to use specified technology of RICC (the "RICC Technology") for specified uses, including research, development, and

Table of Contents

commercialization of pharmaceutical products using this technology worldwide. Under the RICC License Agreement, the Company has the right to develop and commercialize the RICC Technology directed to four specified targets and the option to obtain exclusive product licenses for up to six additional targets. The acquisition of Santaris Pharma A/S by Roche was considered a change of control under the RICC License Agreement, and as such, certain terms and conditions of the RICC License Agreement changed, as contemplated and in accordance with the RICC License Agreement. These changes primarily relate to milestone payments reflected in the disclosures below. As consideration for the grant of the license and option, Private Miragen previously paid RICC $2.3 million and issued RICC 856,806 shares of Private Miragen's Series A convertible preferred stock, which were subsequently transferred to Roche Finance Ltd, an affiliate of Roche, and, in 2017, were converted into 602,420 shares of Common Stock as a result of the Merger. If the Company exercises its option to obtain additional product licenses or to replace the target families, it will be required to make additional payments to RICC.

Under the terms of the RICC License Agreement, milestone payments were previously decreased by a specified percentage as a result of the change of control by RICC referenced above. The Company is obligated to make future milestone payments for each licensed product for up to $5.2 million, which is inclusive of a potential product license option fee. Certain of these milestones will be increased by a specified percentage if the Company undergoes a change of control during the term of the RICC License Agreement. If the Company grants a third party a sublicense to the RICC Technology, it is required to remit to Roche up to a specified percentage of the upfront and milestone and other specified payments it receives under its sublicense, and if such sublicense covers use of the RICC Technology in the United States or the entire European Union, the Company will not have any further obligation to pay the fixed milestone payments noted above. During the three months ended March 31, 2018, the Company incurred $0.7 million in expense related to a milestone reached, which is included in research and development expense in the Company's condensed consolidated statement of operations during the three months ended March 31, 2018 and accrued liabilities in the Company's condensed consolidated balance sheets as of March 31, 2018.

If the Company or its sublicensee successfully commercializes any product candidate subject to the RICC License Agreements, then RICC is entitled to royalty payments in the mid-single digits on the net sales of such product, provided that if such net sales are made by a sublicensee under the RICC License Agreement, RICC is entitled to royalty payments equal to the lesser of a percentage in the mid-single digits on the net sales of such product or a specified percentage of the royalties paid to the Company by such sublicensee, subject to specified restrictions. The Company is obligated to make any such royalty payments until the later of: (i) a specified anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid patent claim licensed by RICC under the RICC License Agreement underlying such product. Upon the occurrence of specified events, the royalty owed to RICC will be decreased by a specified percentage.

The RICC License Agreement will terminate upon the latest of the expiration of all of RICC's royalty rights, the termination of the last Miragen target, or the expiration of its right to obtain a product license for a new target under the RICC License Agreement. The Company may also terminate the RICC License Agreement for convenience upon a specified number of days' prior notice to RICC, subject to specified terms and conditions. Either party may terminate the RICC License Agreement upon an uncured material breach by the other party and RICC may terminate the RICC License Agreement upon the occurrence of other specified events immediately or after such event is not cured within a specified number of days, as applicable.

All charges incurred under the RICC License Agreement have been expensed to date due to the uncertainty as to future economic benefit from the acquired rights.

For the three months ended March 31, 2018 and 2017, the Company paid zero and $0.4 million, respectively, to RICC for raw materials to be used in its drug manufacturing process.

Subcontract Agreement with Yale University

In October 2014, Private Miragen and Yale University ("Yale") entered into a subcontract agreement and then into a subaward agreement in March 2015 (the "Yale Agreements"), which were subsequently amended. Under the Yale Agreements, the Company is providing specified services regarding the development of a proprietary compound that targets miR-29 in the indication of idiopathic pulmonary fibrosis. Yale entered into the Yale Agreements in connection with a grant that Yale received from the National Institutes of Health ("NIH") for the development of a miR-29 mimic as a potential therapy for pulmonary fibrosis.

In consideration of the Company's services under the Yale Agreements, Yale has agreed to reimburse the Company up to a certain amount over five years, subject to the availably of funds under the grant and continued eligibility. Under the terms of the Yale Agreements, the Company retains all rights to any and all intellectual property developed solely by the Company in connection with the Yale Agreements. Yale has also agreed to provide the Company with an exclusive option to negotiate in good faith for an exclusive, royalty-bearing license from Yale for any intellectual property developed by Yale or jointly by the

Table of Contents

parties under the Yale Agreements. Yale is responsible for filing, prosecuting, and maintaining foreign and domestic patent applications and patents on all inventions jointly developed by the parties under the Yale Agreements. Through March 31, 2018, the Company received $0.1 million under the Yale Agreements.

The Yale Agreements terminate automatically on the date that Yale delivers its final research report to the NIH under the terms of the grant underlying the Yale Agreements. Each party may also terminate the Yale Agreements upon a specified number of days' notice in the event that the NIH's grant funding is reduced or terminated or upon material breach by the other party.

License Agreements with the t2cure GmbH

In October 2010, Private Miragen entered into a license and collaboration agreement (the "t2cure Agreement") with t2cure GmbH ("t2cure"), which was subsequently amended. Under the t2cure Agreement, the Company received a worldwide, royalty-bearing, and exclusive license to specified patent and technology rights relating to miR-92.

In consideration of rights granted by t2cure, Private Miragen paid an upfront fee of $46 thousand and agreed to: (i) pay an annual license maintenance fee in the amount of €3 thousand ($4 thousand as of March 31, 2018); and (ii) reimburse t2cure for costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights.

Under the terms of the t2cure Agreement, the Company is obligated to make the following future milestone payments for each licensed product, as defined in the t2cure Agreement: (i) up to approximately $0.7 million upon the initiation of certain defined clinical trials; (ii) $2.5 million upon regulatory approval in the United States; and (iii) up to $1.5 million per region upon regulatory approval in the European Union or Japan. Additionally, if the Company or any of its sublicensees successfully commercialize any product candidate subject to the t2cure Agreement, it is responsible for royalty payments equal to percentages in the low-single digits upon net sales of licensed products, and under certain circumstances, sublicense fees equal to a percentage of sublicense income received by it. The Company is obligated to make any such royalty payment until the later of: (i) the tenth anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid claim to a patent licensed by t2cure under the t2cure Agreement covering such product. If such patent claims expire prior to the end of the ten-year term, then the royalty owed to t2cure will be decreased by a specified percentage. The Company also has the right to decrease its royalty payments by a specified percentage for royalties paid to third parties for licenses to certain third-party intellectual property.

The license term extends on a country-by-country basis until the later of: (i) the tenth anniversary of the first commercial sale of a licensed product in a country and (ii) the expiration of the last to expire valid claim that claims such licensed product in such country. Upon expiration of the royalty payment obligation, the Company will have a fully-paid license in such country. The Company has the right to terminate the t2cure Agreement at will, on a country-by-country basis, after 60 days' written notice. The t2cure Agreement will also automatically terminate upon the Company's bankruptcy or insolvency or upon notice of an uncured material breach.

The Company has expensed all charges incurred under the t2cure Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with The Brigham and Women's Hospital

In May 2016, Private Miragen and The Brigham and Women's Hospital ("BWH") entered into an exclusive patent license agreement (the "BWH License Agreement"). Under the BWH License Agreement, the Company has an exclusive, worldwide license, including a right to sublicense, to specified patent rights and a nonexclusive, worldwide

license, including a right to sublicense, to specified technology rights of BWH, each related to certain microRNAs believed to be involved in various neurodegenerative disorders. As consideration for these rights, the Company is obligated to pay a specified annual license fee. BWH is also entitled to milestone payments of up to approximately $2.6 million for each of the Company's product candidates developed based on the patent rights subject to the BWH License Agreement plus a one-time sales milestone payment of $0.3 million for all product candidates developed based on the patent rights subject to the BWH License Agreement. If the Company were to successfully commercialize any product candidate subject to the BWH License Agreement, then BWH is entitled to royalty payments in the low-single digits on the net sales of such product. BWH's right to these royalty payments will expire on a product-by-product and country-by-country basis upon the expiration of the last patent claim in such country that is subject to the BWH License Agreement and covers the product, and the Company's license to such product in such country will become fully paid at such time. BWH is also entitled to a percentage in the low-double digits of any sublicense income from such product, subject to specified exceptions. The Company is also responsible for all costs associated with the preparation, filing, prosecution, and maintenance of the patent rights subject to the BWH License Agreement. Additionally, the Company is

Table of Contents

obligated to use commercially-reasonable efforts to develop a product under the BWH License Agreement and to meet specified diligence milestones thereunder.

The BWH License Agreement will terminate upon the expiration of all issued patents and patent applications subject to the patent rights under the agreement. The Company may also terminate the BWH License Agreement for convenience upon a specified number of days' prior notice to BWH. BWH may terminate the BWH License Agreement upon a breach by the Company of its payment obligations and upon the occurrence of other specified events that are not cured within a specified number of days, provided that such termination is automatic upon the Company's bankruptcy or insolvency.

Facility Lease

In December 2010, Private Miragen entered into a multi-year lease agreement for its current office and lab space. The agreement was subsequently amended to extend the term through August 2020. This lease is noncancelable. Minimum base lease payments, including the impact of tenant improvement allowances, under the operating lease are recognized on a straight-line basis over the full term of the lease.

During both three months ended March 31, 2018 and 2017, rent expense was $0.1 million. The Company is also required to pay for operating expenses related to the leased space, which was $0.1 million for both three months ended March 31, 2018 and 2017.

Future annual minimum payments under the lease as of March 31, 2018 were as follows (in thousands):

2018	$294
2019	404
2020	277
Total	$975

9. CAPITAL STOCK

Common Stock

The Company is authorized to issue 105,000,000 shares of its stock, of which 100,000,000 shares have been designated as Common Stock and 5,000,000 shares have been designated as preferred stock with a par value of $0.01 per share. The number of authorized shares of Common Stock may be increased or decreased by the affirmative vote of the holders of a majority of the Company's stock who are entitled to vote. Each share of Common Stock is entitled to one vote. The holders of Common Stock are entitled to receive dividends when and as declared or paid by its board of directors. At the effective date of the Merger, each outstanding share of Private Miragen common stock was converted into the right to receive approximately 0.7031 shares of the Company's Common Stock.

Common Stock Sales Agreement

In March 2017, the Company entered into an at the market issuance Common Stock Sales Agreement (the "ATM Agreement") with Cowen and Company, LLC ("Cowen") under which the Company may offer and sell, from time to time at its sole discretion, shares of its Common Stock having an aggregate offering price of up to $50.0 million through Cowen as its sales agent.

Cowen may sell the Common Stock by any method permitted by law deemed to be an "at the market offering" as defined in Rule 415 of the Securities Act of 1933, as amended, including without limitation sales made by means of ordinary brokers' transactions on The Nasdaq Capital Market or otherwise at market prices prevailing at the time of

sale, in block transactions, or as otherwise directed by the Company. Cowen will use commercially-reasonable efforts to sell the Common Stock from time to time, based upon instructions from the Company (including any price, time, or size limits or other customary parameters or conditions the Company may impose). The Company will pay Cowen a commission equal to 3.0% of the gross sales proceeds of any Common Stock sold through Cowen under the ATM Agreement. The Company also has provided Cowen with customary indemnification rights.

The Company is not obligated to make any sales of Common Stock under the ATM Agreement. The offering of shares of Common Stock pursuant to the ATM Agreement will terminate upon the earlier of: (i) the sale of all Common Stock subject to the ATM Agreement or (ii) termination of the ATM Agreement in accordance with its terms.

Table of Contents

During the three months ended March 31, 2018, the Company had no sales under the ATM Agreement. Prior to 2018, the Company sold, pursuant to the terms of the ATM Agreement, 840,534 shares of Common Stock, at a weighted average price of $9.35 per share, for aggregate net proceeds of approximately $7.5 million, including initial expenses for executing the “at the market offering” and commissions to Cowen as sales agent.

Common Stock Public Offering

In February 2018, the Company entered into an Underwriting Agreement with Underwriters relating to a public offering of its Common Stock. Under the Underwriting Agreement, in February 2018, the Company sold 7,414,996 shares of Common Stock at a price of $5.50 per share, which resulted in net proceeds of approximately $37.9 million after deducting underwriting commissions and discounts and other offering expenses payable by the Company.

Private Miragen Common Stock Offering

In February 2017, immediately prior to the Merger and in accordance with subscription agreements entered into with certain investors in October 2016, Private Miragen issued and sold an aggregate of 9,045,126 shares of Private Miragen’s common stock at a price per share of $4.50, or 6,359,628 shares of Common Stock at a price per share of $6.40 as adjusted for the exchange ratio in the Merger, for aggregate consideration of $40.7 million, offset by associated financing fees of $1.5 million.

Series Preferred

As of March 31, 2018, the Company had no shares of preferred stock outstanding and had not designated the rights, preferences, or privileges of any class or series of preferred stock. Although the Company’s board of directors has the authority to issue preferred stock at its discretion in one or more classes or series and to fix the designations, powers, preferences and rights, and the qualifications, limitations, or restrictions thereof, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, and the number of shares constituting any class or series of preferred stock, without further vote or action by the stockholders.

10. WARRANTS

As of March 31, 2018, the Company had 49,349 Common Stock Warrants outstanding at a weighted average exercise price of $27.65. A summary of outstanding Common Stock purchase warrants as of March 31, 2018 is as follows:

Number of Underlying Shares	Exercise Price	Expiration Date
13,534	$80.70	2019 & 2020
11,718	$8.53	2025
24,097	$7.15	2024
49,349		

The Company had no stock purchase warrant activity during the three months ended March 31, 2018.

11. SHARE-BASED COMPENSATION

Equity Incentive Plans

As of March 31, 2018, there were 1,741,241 options outstanding and no remaining equity awards available for future issuances under the 2008 Plan. All awards granted under the 2008 Plan that, after February 13, 2017, expire or terminate for any reason prior to exercise or settlement, are forfeited, or are reacquired, withheld, or not issued to satisfy a tax withholding obligation or to satisfy the exercise price of a stock award, will become available for grant under the 2016 Plan in accordance with its terms.

The 2016 Plan provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, other stock awards, and performance awards that may be settled in cash, stock, or other property. All employees and non-employee directors are eligible to participate in the 2016 Plan and may receive all types of awards other than incentive stock options. Incentive stock options may be granted under the 2016 Plan only to employees (including officers) and employees of the Company’s affiliates.

Table of Contents

The aggregate number of shares of Common Stock that may be issued under the 2016 Plan will not exceed 4,182,404 shares, which number is the sum of: (i) 1,681,294 shares, plus (ii) the number of shares subject to outstanding stock awards that were granted under the 2008 Plan, that, from and after the closing date of the Merger, expire or terminate for any reason prior to exercise or settlement, are forfeited because of the failure to meet a contingency or condition required to vest such shares, or are reacquired, withheld, or not issued to satisfy a tax withholding obligation in connection with an award or to satisfy the purchase price or exercise price of a stock award, if any, as such shares become available from time to time, plus (iii) 902,720 shares from previous automatic increases to the share reserve (as described in more detail below), including the automatic increase of 902,720 shares effected on January 1, 2018. In addition, the share reserve will automatically increase on January 1 of each year, for a period of not more than ten years, commencing on January 1 of the year following the year in which the effective date of the 2016 Plan occurs, and ending on (and including) January 1, 2026, in an amount equal to 4% of the shares of Common Stock outstanding on December 31 of the preceding calendar year; however, the board of directors or compensation committee may act prior to January 1 of a given year to provide that there will be no January 1 increase in the share reserve for such year or that the increase in the share reserve for such year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the automatic increase. As of March 31, 2018, there were equity awards exercisable for 1,718,565 shares of Common Stock outstanding and 867,171 shares of Common Stock available for issuance pursuant to the terms under the 2016 Plan.

Options granted under the 2008 Plan and 2016 Plan have an exercise price equal to the market value of the Common Stock at the date of grant and expire ten years from the date of grant. Generally, options vest 25% on the first anniversary of the vesting commencement date and 75% ratably in equal monthly installments over the remaining 36 months. The Company has also granted options that vest in equal monthly or quarterly amounts over periods up to 48 months.

A summary of Common Stock option activity is as follows:

	Number of Options (in thousands)	Weighted Average Exercise Price
Outstanding at December 31, 2017	2,863	$ 4.85
Granted	867	$ 7.67
Exercised	(180)	$ 0.62
Forfeited or canceled	(90)	$ 10.53
Outstanding at March 31, 2018	3,460	$ 5.63

Fair Value Assumptions

The Company uses the Black-Scholes option pricing model to estimate the fair value of stock options granted under its equity compensation plans. The Black-Scholes model requires inputs for risk-free interest rate, dividend yield, volatility, and expected lives of the options. Because the Company has a limited history of stock purchase and sale activity, expected volatility is based on historical data from public companies that are similar to the Company in size and nature of operations. The Company will continue to use similar entity volatility information until its historical volatility is relevant to measure expected volatility for option grants. The Company accounts for forfeitures as they occur. The risk-free rate for periods within the contractual life of each option is based on the U.S. Treasury yield curve in effect at the time of the grant for a period commensurate with the expected term of the grant. The expected term (without regard to forfeitures) for options granted represents the period of time that options granted are expected to be outstanding and is derived from the contractual terms of the options granted and expected option-exercise behaviors. Prior to the Merger, Private Miragen estimated the fair value of underlying shares of its common stock using a third-party valuation report that derived the fair value using the probability-weighted expected return method. After

the Merger, the fair value of the underlying Common Stock is based on the closing price of the Common Stock on The Nasdaq Capital Market at the date of grant.

Table of Contents

Stock Options Granted to Employees

The weighted-average fair value of options granted during the three months ended March 31, 2018 and 2017 was $5.63 and $8.30, respectively. The fair value was determined by the Black-Scholes option pricing model using the following assumptions:

	Three Months Ended March 31,	
	2018	2017
Expected term, in years	6.34	6.35
Expected volatility	84.4 %	84.2 %
Risk-free interest rate	2.6 %	2.1 %
Expected dividend yield	— %	— %
Weighted-average grant date fair value of underlying Common Stock	$7.67	$11.37

Stock Options Granted to Non-Employees

The Company determines the value of Common Stock options issued to non-employees using the Black-Scholes option pricing model and adjusting the value of such awards to current fair value each reporting period until the awards are vested or a performance commitment has otherwise been reached. No Common Stock options were issued to non-employees during the three months ended March 31, 2018 and 2017.

Employee Stock Purchase Plan

The 2016 Employee Stock Purchase Plan (“ESPP”) allows qualified employees to purchase shares of the Company's Common Stock at a price equal to 85% of the lower of: (i) the closing price at the beginning of the offering period or (ii) the closing price at the end of the offering period. The Company expects that a new 6-month offering period will begin each August 22 and February 22. As of March 31, 2018, the Company had 0.4 million shares available for issuance and 37 thousand shares had been issued under the ESPP.

Share-Based Compensation Expense

Share-based compensation related to all equity awards issued pursuant to the 2008 Plan and 2016 Plan and for estimated shares to be issued under the ESPP for the current purchase period is included in the condensed consolidated statements of operations as follows:

	Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Research and development	$241	$123
General and administrative	549	296
Total share-based compensation expense	$790	$419

As of March 31, 2018, the Company had $10.4 million of total unrecognized employee share-based compensation costs, which the Company expects to recognize over a weighted-average remaining period of 3.2 years. As of March 31, 2018, based on the current estimate of fair value, the Company estimates that the remaining unrecognized

share-based compensation expense related to non-employees of $24 thousand will be recorded to expense over a weighted-average remaining period of 0.5 years.

12. NET LOSS PER SHARE

Basic net loss per share is computed by dividing the net loss available to common stockholders by the weighted-average number of Common Stock outstanding. Diluted net loss per share is computed similarly to basic net loss per share except that the denominator is increased to include the number of additional shares of Common Stock that would have been outstanding if the potential shares of Common Stock had been issued and if the additional shares of Common Stock were dilutive. Diluted net loss per share is the same as basic net loss per share of Common Stock, as the effects of potentially dilutive securities are antidilutive.

Table of Contents

Potentially dilutive securities include the following:

	March 31,	
	2018	2017
	(in thousands)	
Options to purchase Common Stock	3,460	2,953
Warrants to purchase Common Stock	49	25
Total	3,509	2,978

Table of Contents

FORWARD-LOOKING STATEMENTS

This quarterly report on Form 10-Q, or this Quarterly Report, contains forward-looking statements that involve substantial risks and uncertainties for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. All statements contained in this Quarterly Report other than statements of historical fact, including statements regarding our strategy, future operations, future financial position, future revenue, projected expenses, prospects, plans and objectives of management are forward-looking statements. The words “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “intend,” “plan,” “expect,” “predict,” “potential,” “opportunity,” “goals,” or “should,” and expressions are intended to identify forward-looking statements. Unless otherwise mentioned or unless the context requires otherwise, all references in this Quarterly Report to “Miragen,” “company,” “we,” “us” and “our” or similar references refer to Miragen Therapeutics, Inc., and our consolidated subsidiaries.

Such statements are based on management’s current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a result of many factors, including, without limitation:

- We have incurred losses since our inception, have a limited operating history on which to assess our business, and anticipate that we will continue to incur significant losses for the foreseeable future.

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

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

- We are heavily dependent on the success of our product candidates, which are in the early stages of clinical development. Some of our product candidates have produced results only in early stage or pre-clinical settings, or for other indications than those for which we contemplate conducting development and seeking U.S. Food and Drug Administration, or FDA, approval for, and we cannot give any assurance that we will generate sufficient data for any of our product candidates to receive regulatory approval in our planned indications, which will be required before they can be commercialized.

- Regardless of clinical trial results, the FDA and other regulatory agencies may fail to approve our product candidates for marketing.

- We may be unsuccessful in maintaining orphan-drug designation for our product candidates because even after an orphan drug is approved, the FDA can subsequently approve a different drug for the same indication if the FDA concludes that the later drug is clinically superior in that it is shown to be safer, more effective, or makes a major contribution to patient care.

- Clinical trials are costly, time consuming, and inherently risky, and we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.

- The approach we are taking to discover and develop novel therapeutics that target microRNAs is unproven and may never lead to marketable products.

- Our microRNA-targeted therapeutic product candidates are based on a relatively novel technology, which makes it unusually difficult to predict the time and cost of development, and the time and cost, or likelihood, of obtaining regulatory approval. To date, no microRNA-targeted therapeutics have been approved for marketing in the United States.

- Our product candidates may cause undesirable side effects or have other properties that could delay or prevent regulatory approval, limit the commercial viability of an approved label, or result in significant negative consequences following marketing approval, if any.

- We may use our financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

Table of Contents

- We face substantial competition, and our competitors may discover, develop, or commercialize products faster or more successfully than us.

- We may be unable to realize the potential benefits of any collaboration.

- We may attempt to form collaborations in the future with respect to our product candidates, but we may not be able to do so, which may cause us to alter our development and commercialization plans.

- We may not be able to develop or identify technology that can effectively deliver MRG-106, or cobomarsen, MRG-201, MRG-110, or any other of our microRNA-targeted product candidates to the intended diseased cells or tissues, and any failure in such delivery technology could adversely affect and delay the development of cobomarsen, MRG-201, MRG-110, and our other product candidates.

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

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, including those described in Part II, Item 1A, "Risk Factors" in this Quarterly Report and under a similar heading in any other periodic or current report we may file with the Securities and Exchange Commission, or SEC, in the future. 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 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 Quarterly Report may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

We undertake no obligation to revise or publicly release the results of any revision to these forward-looking statements, except as required by law. Given these risks and uncertainties, readers are cautioned not to place undue reliance on such forward-looking statements. All forward-looking statements are qualified in their entirety by this cautionary statement.

Table of Contents

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

The following discussion and analysis should be read together with our condensed consolidated financial statements and the related notes thereto included in Part I, Item 1 of this Quarterly Report, our consolidated financial statements and related notes thereto for the year ended December 31, 2017, included in our Annual Report on Form 10-K filed with the SEC on March 15, 2018. This discussion and other parts of this report contain forward-looking statements reflecting our current expectations that involve risks and uncertainties, such as our plans, objectives, expectations, intentions, and beliefs. See "Forward-Looking Statements" for a discussion of the uncertainties, risks and assumptions associated with these statements. Actual results and the timing of events could differ materially from those discussed in these forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those identified below and those discussed in the section entitled "Risk Factors" included elsewhere in this Quarterly Report.

Overview

We are a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapies with a specific focus on microRNAs and their role in certain diseases where there is a high unmet medical need. microRNAs regulate gene expression and play vital roles in influencing the pathways responsible for many disease processes. A leader in microRNA therapeutics discovery and development, we have advanced three product candidates, cobomarsen, MRG-201, and MRG-110, into clinical development.

Cobomarsen is an inhibitor of miR-155, a microRNA that is found at abnormally high levels in malignant cells of several blood cancers, as well as certain cells involved in inflammation. In our Phase 1 clinical trial of cobomarsen in cutaneous T-cell lymphoma, or CTCL, a high percentage of patients treated systemically demonstrated improvement in mSWAT score, which is a measurement of the severity of skin disease over a patient's entire body and commonly used by clinicians treating CTCL.

MRG-201 is a replacement for miR-29, a microRNA that is found at abnormally low levels in a number of pathological fibrotic conditions, including cutaneous, cardiac, renal, hepatic, pulmonary, and ocular fibrosis, as well as in systemic sclerosis. In a Phase 1 clinical trial of MRG-201, we observed a statistically-significant reduction in fibroplasia with no adverse effects on incisional wound healing in trial participants who received MRG-201.

MRG-110 is an inhibitor of miR-92, a microRNA expressed in endothelial cells, that has been shown to accelerate the formation of new blood vessels in preclinical models of heart failure, peripheral ischemia, and dermal wounding. The compound is being developed under our license and collaboration agreement, or the Servier Collaboration Agreement, with Les Laboratoires Servier and Institut de Recherches Servier, or, collectively, Servier, for use in various indications in which enhanced vascular density is expected to provide clinical benefit. We retain all commercial rights to MRG-110 in the United States and Japan, and Servier has commercial rights in the rest of the world.

In addition to these programs, we continue to develop a pipeline of wholly-owned preclinical product candidates. We believe that our preclinical product candidates offer the potential to treat a number of indications including oncology, visual pathologies, neurodegeneration, and hearing loss. The goal of our translational medicine strategy is to progress rapidly to first-in-human trials once we have adequately established the pharmacokinetics (the movement of a drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug), safety, and manufacturability of the product candidate in preclinical studies.

Recent Developments

Clinical Trial Updates

In May 2018, we closed enrollment in our Phase 1 CTCL clinical trial. We plan to release additional data from this study, including response rates from longer-term duration of treatment, in the first half of 2018.

In April 2018, we filed an Investigational New Drug Application, or IND, for MRG-201. We plan to initiate a Phase 2 clinical trial to evaluate MRG-201 in subjects with a predisposition for keloid formation in the second quarter of 2018.

In March 2018, Servier initiated a Phase 1 clinical trial for MRG-110 evaluating the safety and tolerability of MRG-110 in a systemic dosing protocol intended to support further clinical studies for the potential treatment of heart failure. The Phase 1 clinical trial is planned to enroll 49 male subjects aged 18 to 45, and the trial results will be analyzed for biomarkers that may

Table of Contents

provide mechanistic proof-of-concept and support further potential clinical trials of MRG-110 in the treatment of cardiovascular disease and certain other conditions where vascular flow is compromised.

In May 2018, in collaboration with Servier, we announced the initiation of a second Phase 1 clinical trial in the United States assessing the safety and tolerability of MRG-110 after intradermal administration in healthy volunteers. This clinical trial includes several exploratory endpoints that are intended to provide mechanistic proof-of-concept and biomarker validation to support potential use in patients at high risk for complications after surgical incisions or in patients with chronic wounds.

Preclinical Pipeline Programs

In May 2018, we unveiled a new program to evaluate microRNA mimics of the microRNA-183/96/182 cluster, for potential use in progressive vision loss. Mimics of this microRNA cluster have been shown to play an important role in the establishment and maintenance of neurosensory cells, including photoreceptors and hair cells (cells associated with hearing). We reported data showing mimics of this microRNA cluster were able to cause functional improvement of photoreceptors and vision in a preclinical model of retinal degeneration.

In May 2018, we also presented preclinical data demonstrating the potential of MRG-201 to inhibit the expression of multiple factors responsible for fibrosis in disease models in both the cornea and retina. In our studies, MRG-201 reduced expression of multiple collagens and other miR-29 target genes important in fibrogenesis, suggesting that MRG-201 may function as an effective therapeutic to inhibit either corneal or retinal fibrosis.

Financing

In February 2018, we entered into an underwriting agreement, or the Underwriting Agreement, with Jefferies LLC, Evercore Group L.L.C., and Deutsche Bank Securities Inc., as representatives of several underwriters, or the Underwriters, relating to the public offering of our common stock, or the Public Offering. In the Public Offering, we sold 7,414,996 shares of common stock at a price of $5.50 per share, which resulted in net proceeds of approximately $37.9 million after deducting underwriting commissions and discounts and other offering expenses payable by us.

Financial Operations Overview

Revenue

Our revenue consists primarily of upfront payments for licenses, milestone payments, and payments for other research services earned under our strategic alliance and collaboration agreement. We also recognize revenue for amounts received or receivable under certain grants we have been awarded.

In the future, we may generate revenue from a combination of license fees and other upfront payments, payments for research and development services, milestone payments, product sales, and royalties in connection with strategic alliances. We expect that any revenue we generate will fluctuate from quarter to quarter as a result of the timing of our achievement of preclinical, clinical, regulatory, and commercialization milestones, the timing and amount of payments relating to such milestones, and the extent to which any of our products are approved and successfully commercialized by us or our strategic alliance partners. If our strategic alliance partners do not elect or otherwise agree to fund our development costs pursuant to our strategic alliance agreements, or we or our strategic alliance partners fail to develop product candidates in a timely manner or to obtain regulatory approval for them, then our ability to generate future revenues, and our results of operations and financial position would be adversely affected.

29

Table of Contents

Research and development expenses

Research and development costs are expensed as incurred and include costs associated with our research activities, drug discovery efforts, and development of our therapeutic programs, which includes:

- employee-related expenses, including salaries, benefits, travel, and share-based compensation expense;
- external research and development expenses incurred under arrangements with third parties, such as contract research organizations, or CROs, contract manufacturing organizations, or CMOs, other clinical trial-related vendors, consultants, and our scientific advisors;
- license fees related to the acquisition and retention of certain licensed technology and intellectual property rights; and
- facilities, depreciation, and other allocated expenses, which include direct and allocated expenses for rent and maintenance of facilities, depreciation of leasehold improvements and equipment, and laboratory and other supplies.

We occasionally make non-refundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as expense in the period in which we receive the goods or when the services are performed.

We record upfront and milestone payments to acquire contractual rights to licensed technology as research and development expenses when incurred if there is uncertainty in our receiving future economic benefit from the acquired contractual rights. We consider future economic benefits from acquired contractual rights to licensed technology to be uncertain until such a drug candidate is approved by the FDA or when other significant risk factors are abated.

We expect our research and development expenses to increase for the foreseeable future as we continue to conduct our ongoing clinical trials, initiate additional clinical trials, and advance our preclinical research programs. The process of conducting clinical trials and preclinical studies necessary to obtain regulatory approval is costly and time consuming. We, or our strategic alliance partners, may never succeed in achieving marketing approval for any of our product candidates. The probability of success for each product candidate may be affected by numerous factors, including clinical data, preclinical data, competition, manufacturing capability, and commercial viability.

Successful development of future product candidates is highly uncertain and may not result in approved products. Completion dates and completion costs can vary significantly for each future product candidate and are difficult to predict. We anticipate we will make determinations as to which programs to pursue and how much funding to direct to each program on an ongoing basis in response to our ability to maintain or enter into new strategic alliances with respect to each program or potential product candidate, the scientific and clinical success of each future product candidate, and ongoing assessments as to each future product candidate’s commercial potential. We will need to raise additional capital and may seek additional strategic alliances in the future in order to advance our various programs.

General and administrative expenses

General and administrative expenses consist primarily of salaries and related benefits, including share-based compensation, related to our finance, accounting, human resources, legal, business development, and other support functions, professional fees for auditing, tax, and legal services, as well as insurance, board of director compensation, and other administrative expenses. In February 2017, we, then named Signal Genetics, Inc., completed a merger with a private corporation, then called Miragen Therapeutics, Inc., or Private Miragen, in which our wholly owned subsidiary was merged with and into Private Miragen. Immediately following this transaction, we completed a short-form merger with Private Miragen in which we were the surviving corporation and changed our name to

Miragen Therapeutics, Inc. These transactions are referred to herein as the Merger. Leading up to the Merger, we incurred incremental expenses related to both the Merger and the result of becoming a public company following completion of the Merger.

Other income (expense), net

Other income (expense) consists primarily of interest income and expense, and various income or expense items of a non-recurring nature. We earn interest income from interest-bearing accounts and money market funds. Interest expense is comprised of interest incurred under our notes payable.

Table of Contents

Critical Accounting Policies and Estimates

This discussion and analysis of financial condition and results of operations is based on our condensed consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles, or U.S. GAAP. The preparation of financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, and expenses. On an ongoing basis, we evaluate these estimates and judgments. We base our estimates on historical experience and on various assumptions that we believe to be reasonable under the circumstances. These estimates and assumptions form the basis for making judgments about the carrying values of assets and liabilities and the recording of expenses that are not readily apparent from other sources. Actual results may differ materially from these estimates. We believe that the accounting policy discussed below is critical to understanding our historical and future performance, as this policy relates to the more significant areas involving our judgments and estimates.

Clinical Trial and Preclinical Study Accruals

We make estimates of our accrued expenses as of each balance sheet date in our condensed consolidated financial statements based on certain facts and circumstances at that time. Our accrued expenses for preclinical studies and clinical trials are based on estimates of costs incurred for services provided by external service providers and for other trial-related activities. The timing and amount of expenses we incur though our external service providers depend on a number of factors, such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, we obtain information from various sources and estimate the level of effort or expense allocated to each period. Adjustments to our research and development expenses may be necessary in future periods as our estimates change.

Results of Operations

Comparison of the Three Months Ended March 31, 2018 and 2017

	Three Months Ended March 31,	
	2018	2017
	(in thousands)	
Revenue	$4,784	$462
Research and development expenses	(6,413)	(4,120)
General and administrative expenses	(2,990)	(3,281)
Other expense, net	(42)	(41)
Net loss	$(4,661)	$(6,980)

Revenue

Revenue increased to $4.8 million during the three months ended March 31, 2018, from $0.5 million during the three months ended March 31, 2017. The increase was due primarily to a €3.0 million (or $3.7 million) milestone payment earned under the Servier Collaboration Agreement during the three months ended March 31, 2018, as well as a $1.1 million increase in research and development and intellectual property activities reimbursable to us by Servier under the Servier Collaboration Agreement. The increases were partially offset by a $0.4 million decrease in grant revenue recognized during the first quarter of 2018.

Research and Development Expenses

Research and development expenses were $6.4 million during the three months ended March 31, 2018, compared to $4.1 million during the three months ended March 31, 2017. The increase in research and development expense of $2.3 million was driven primarily by:

- increased personnel-related costs of $0.9 million, due primarily to the growth of our research and development team;