MIRAGEN THERAPEUTICS, INC.
Form 10-Q
August 11, 2017
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UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-Q

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

For the quarterly period ended June 30, 2017

or

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

For the transition period from _____ to _____

Commission File 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 No

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

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

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

Emerging growth company

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

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

As of August 3, 2017, there were 21,483,706 shares of the registrant s Common Stock outstanding.

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Miragen Therapeutics, Inc.

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PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

Miragen Therapeutics, Inc.

Condensed Consolidated Balance Sheets

(in thousands, except share and per share data)

(unaudited)

	June 30, 2017	December 31, 2016
Assets		
Current assets:		
Cash and cash equivalents	$ 46,335	$ 22,104
Accounts receivable	539	20
Prepaid expenses and other current assets	2,476	1,753
Total current assets	49,350	23,877
Property and equipment, net	626	625
Other assets	50	258
Total assets	$ 50,026	$ 24,760
Liabilities, Preferred Stock, and Stockholders Equity (Deficit)		
Current liabilities:		
Accounts payable	$ 632	$ 1,007
Accrued liabilities	4,019	3,909
Current portion of notes payable	1,979	1,969
Total current liabilities	6,630	6,885
Notes payable, less current portion	1,871	2,820
Other liabilities	189	
Total liabilities	8,690	9,705
Commitments and contingencies		
Series A redeemable convertible preferred stock, $0.001 par value; 7,169,176 shares authorized; 7,149,176 shares issued and outstanding; liquidation preference of $21,448 at December 31, 2016		23,124
Series B redeemable convertible preferred stock, $0.001 par value; 2,183,318 shares authorized; 2,166,651 shares issued and outstanding; liquidation preference of $13,000 at December 31, 2016; stated at accreted redemption value		12,975
		40,877

Series C redeemable convertible preferred stock, $0.001 par value; 9,303,000 shares authorized; 9,268,563 shares issued and outstanding at December 31, 2016; liquidation preference of $41,060 at December 31, 2016; stated at accreted redemption value		
Stockholders equity (deficit):		
Common stock, $0.01 par value; 100,000,000 shares authorized; 21,483,540 and 833,744 shares issued and outstanding at June 30, 2017 and December 31, 2016, respectively	215	8
Additional paid-in capital	122,494	5,147
Accumulated deficit	(81,373)	(67,076)
Total stockholders equity (deficit)	41,336	(61,921)
Total liabilities, preferred stock, and stockholders equity (deficit)	$ 50,026	$ 24,760

See accompanying notes to these condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Operations

(in thousands, except share and per share data)

(unaudited)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2017	2016	2017	2016
Revenue:				
Collaboration revenue	$ 488	$ 847	$ 498	$ 1,764
Grant revenue	230	268	682	268
Total revenue	718	1,115	1,180	2,032
Operating expenses:				
Research and development	5,487	3,355	9,607	6,821
General and administrative	2,581	1,210	5,862	2,202
Total operating expenses	8,068	4,565	15,469	9,023
Loss from operations	(7,350)	(3,450)	(14,289)	(6,991)
Other income (expense):				
Interest and other income	102	9	132	16
Interest and other related expense	(64)	(83)	(135)	(172)
Net loss	(7,312)	(3,524)	(14,292)	(7,147)
Accretion of redeemable convertible preferred stock to redemption value		(12)	(5)	(24)
Net loss available to common stockholders	$ (7,312)	(3,536)	$ (14,297)	$ (7,171)
Net loss per share, basic and diluted	$ (0.34)	$ (5.88)	$ (0.87)	$ (11.92)
Weighted-average shares used to compute basic and diluted net loss per share	21,409,708	601,667	16,509,719	601,667

See accompanying notes to these condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Preferred Stock and Stockholders Equity (Deficit)

(in thousands, except share data)

(unaudited)

	Redeemable Convertible Preferred Stock						Stockholders Equity (Deficit)				
	Series A		Series B		Series C		Common stock		Additional Paid-in	Accumulated	Sto
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Capital	Deficit	
t r 31,	7,149,176	$ 23,124	2,166,651	$ 12,975	9,268,563	$ 40,877	833,744	$ 8	$ 5,147	$ (67,076)	$
of stock ors, net ce cost							6,359,628	64	39,092		
of ble le stock ption		1		1		3				(5)	
on of stock on	(7,149,176)	(23,125)	(2,166,651)	(12,976)	(9,268,563)	(40,880)	13,066,666	131	76,850		
of stock erse							1,024,960	10	194		
ication ed rrant on rrant									51		
of stock nless of							16,387				
of ions							182,155	2	146		

nce of stock								
sed ation						1,014		
							(14,292)	
t 2017	$	$	$	21,483,540	$ 215	$ 122,494	$ (81,373)	$

See accompanying notes to these condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Cash Flows

(in thousands)

(unaudited)

	Six Months Ended June 30,	
	2017	**2016**
Cash flows from operating activities:		
Net loss	$ (14,292)	$ (7,147)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	148	165
Share-based compensation expense	1,014	84
Non-cash interest expense	61	83
Change in fair value of preferred stock warrants		6
Unrealized gain on short term investments		5
Changes in operating assets and liabilities:		
Accounts receivable	(519)	(738)
Prepaid expenses and other assets	(268)	(440)
Deferred revenue		(346)
Accounts payable	(398)	182
Accrued liabilities	(1,007)	(487)
Net cash used in operating activities	(15,261)	(8,633)
Cash flows from investing activities:		
Cash acquired in reverse merger	1,280	
Purchases of property and equipment	(149)	(216)
Purchases of short-term investments		(4,009)
Net cash provided by (used in) investing activities	1,131	(4,225)
Cash flows from financing activities:		
Proceeds from the sale of common stock	40,703	
Payment of issuance costs associated with the sale of common stock	(1,490)	
Payment of notes payable	(1,000)	
Proceeds from the exercise of stock options	148	
Net cash provided by financing activities	38,361	
Net increase (decrease) in cash and cash equivalents	24,231	(12,858)
Cash and cash equivalents at beginning of period	22,104	21,235
Cash and cash equivalents at end of period	$ 46,335	$ 8,377

Supplemental disclosure of cash flow information				
Interest paid	$	77	$	82
Supplemental disclosure of non-cash investing and financing activities				
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	$	331	$	
Unpaid common stock issuance costs included in prepaid expenses and other assets, accounts payable, and accrued liabilities	$	57	$	
Reclassification of preferred stock warrant to common stock warrant	$	51	$	
Accretion of redeemable convertible preferred stock to redemption value	$	5	$	24

See accompanying notes to these condensed consolidated financial statements.

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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 therapeutics with a specific focus on microRNAs and their roles in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play vital roles in influencing the pathways responsible for many disease processes. The Company believes its experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine provides it with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways to result in disease modification. The Company uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. The Company s two lead product candidates, MRG-106 and MRG-201, are currently in clinical trials. The Company s clinical product candidate for the treatment of certain cancers and autoimmune diseases, MRG-106, is an inhibitor of microRNA-155, which is found at abnormally high levels in malignant cells of several blood cancers, as well as certain cells involved in inflammation. The Company s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for microRNA-29 (miR-29), which 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 addition to the Company s clinical programs, it continues to discover and develop a pipeline of preclinical product candidates. The goal of the Company s translational medicine strategy is to progress rapidly to first-in-human studies once it has established the pharmacokinetics (the movement of 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.

In January 2011, the Company formed its wholly-owned subsidiary, Miragen Therapeutics Europe Limited (Miragen Europe), for the sole purpose of submitting regulatory filings in Europe. Miragen Europe has no employees or operations.

On February 13, 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.

The holders of shares of Private Miragen common stock outstanding immediately prior to the Merger received approximately 0.7031 shares of the Company s common stock in exchange for each share of Private Miragen common stock in the Merger. Following the Merger on February 13, 2017, the combined company had 21,309,440 shares of common stock outstanding at a par value of $0.01 per share (the Common Stock) as compared to the par value of Private Miragen s common stock of $0.001 per share. 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.

Liquidity

The Company has incurred annual net operating losses since its inception. As of June 30, 2017, the Company had an accumulated deficit of $81.4 million and expects to continue to incur losses for the next several years. On February 13, 2017, the date of the Merger, Private Miragen received $40.7 million in cash, before offering expenses, from the issuance of common stock to investors. Management believes that the $46.3 million of cash and cash equivalents on hand at June 30, 2017 will be sufficient to fund its operations in the normal course of business and allow the Company to meet its liquidity needs through the end of 2018.

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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 Europe. 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, 2017, or for any other interim period, or for any other future year. The balance sheet as of December 31, 2016 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 8-K/A for the year ended December 31, 2016, filed with the SEC on March 31, 2017. 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, other than as disclosed.

Use of Estimates

The Company s 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 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 Company s License and Collaboration Agreement (the Servier Collaboration Agreement) with Les Laboratoires Servier and Institut de Recherches Servier (collectively, Servier), 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.

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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.

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.

Research and Development

Research and development costs are expensed as incurred and include compensation and related benefits, share-based compensation, license fees, laboratory supplies, facilities, and overhead costs. The Company occasionally makes 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 the Company receives the goods or when the services are performed.

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.

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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.

	June 30, 2017		December 31, 2016	
	Level 1	Level 3	Level 1	Level 3
	(in thousands)			
Assets:				
Money market funds (included in cash and cash equivalents)	$ 46,544	$	$ 22,189	$
Liabilities:				
Preferred and common stock warrants (included in accrued and other liabilities)	$	$ 82	$	$ 133

A reconciliation of the beginning and ending balances of the Company s liabilities measured at fair value using significant unobservable, or Level 3, inputs are as follows for the six months ended June 30, 2017 (in thousands):

Balance of liability as of December 31, 2016	$ 133
Reclassification of preferred stock warrant to common stock warrant	(51)
Balance of liability as of June 30, 2017	$ 82

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 its warrants to purchase common and preferred stock pursuant to ASC Topic 480, *Distinguishing Liabilities from Equity*, and classifies warrants for redeemable preferred stock and certain warrants for common stock as liabilities. The warrants are reported at their estimated fair value and any changes in fair value are reflected in interest expense and other related expenses.

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 two financial institutions.

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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 and six months ended June 30, 2017 and 2016.

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 (deficit). There were no elements of comprehensive loss during the three and six months ended June 30, 2017 and 2016.

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, and capitalized start-up costs. The Company has provided a valuation allowance for its entire net deferred tax assets since inception 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 and six months ended June 30, 2017 and 2016.

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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 (Topic 606)*, which outlines 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.

In March 2016, the FASB issued ASU No. 2016-08*, Revenue from Contracts with Customers (Topic 606): Principal versus Agent Considerations*. The purpose of this standard is to clarify the implementation of guidance on principal versus agent considerations related to ASU 2014-09. The standard has the same effective date as ASU 2014-09 described above.

In April 2016, the FASB issued ASU No. 2016-10, *Revenue from Contracts with Customer,* which provides clarity related to ASU 2014-09 regarding identifying performance obligations and licensing implementation. The standard has the same effective date as ASU 2014-09 described above.

In May 2016, the FASB issued ASU 2016-12: *Revenue from Contracts with Customers (Topic 606): Narrow-Scope Improvements and Practical Expedients*, which provides narrow scope improvements and practical expedients related to ASU 2014-09. The purpose of this standard is to clarify certain narrow aspects of ASU 2014-09, such as assessing the collectability criterion, presentation of sales taxes, and other similar taxes collected from customers, noncash consideration, contract modifications at transition, completed contracts at transition, and technical correction. The standard has the same effective date as ASU 2014-09 described above.

In December 2016, the FASB issued ASU 2016-20: *Technical Corrections and Improvements to Topic 606, Revenue from Contracts with Customers*. The amendments in this standard affect narrow aspects of guidance issued in ASU 2014-09. The standard has the same effective date as ASU 2014-09 described above.

The Company plans to adopt these new standards in the first quarter of 2019 and does not anticipate the adoption of these pronouncements to have a material impact with regard to its current contracts on its condensed consolidated financial statements. As of June 30, 2017, there were limited contracts that will be in effect (actively) as of the

transition date and, accordingly, 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.

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Deferred Taxes

In November 2015, the FASB issued ASU No. 2015-17*, Balance Sheet Classification of Deferred Taxes*. ASU No. 2015-17 requires that deferred tax liabilities and assets be classified as noncurrent in a classified statement of financial position. This standard is effective for the Company for financial statements issued for fiscal years beginning after December 15, 2017, and interim periods thereafter. The Company does not believe the adoption of this standard will have a material impact on its condensed consolidated financial statements due to the full valuation allowance on all net deferred tax assets.

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. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not 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 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. The Company currently has one lease for its primary business location that will be affected by the new standard. The Company is currently evaluating the impact of this standard on its condensed consolidated financial statements.

Share-based Compensation

In March 2016, the FASB issued ASU No. 2016-09*, Compensation Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, which is intended to simplify accounting for equity share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. This standard is effective for the Company for annual periods beginning after December 15, 2017, and interim periods thereafter.

Amendments related to the timing of when excess tax benefits are recognized, minimum statutory withholding requirements, forfeitures, and intrinsic value should be applied using a modified retrospective transition method by means of a cumulative-effect adjustment to equity as of the beginning of the period in which the guidance is adopted. Amendments related to the presentation of employee taxes paid on the statement of cash flows when an employer withholds shares to meet the minimum statutory withholding requirement should be applied retrospectively. Amendments requiring recognition of excess tax benefits and tax deficiencies in the income statement and the practical expedient for estimating the expected term should be applied prospectively. An entity may elect to apply the amendments related to the presentation of excess tax benefits on the statement of cash flows using either a prospective transition method or a retrospective transition method. 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 June 30, 2017 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, which was subsequently amended in May 2013, May 2014, May 2015, September 2016, and May 2017. Under the Servier Collaboration Agreement, the Company granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. In May 2017, the Company and Servier agreed to amend the Servier Collaboration Agreement to remove

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three existing targets, add one named target, and provide Servier with the right to add one additional target through September 2019. Servier also agreed to pay the Company a one-time milestone payment of approximately $0.5 million at a specified amount upon the earlier of the completion of a specified development goal or November 15, 2017. Under the terms of the amendment, the term of the Research Collaboration has been extended from October 2017 through September 2019.

Servier s rights to each named target is limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. The Company retains all rights in the United States and Japan.

The Company is eligible to receive development milestone payments of 5.8 million to 13.8 million ($6.6 million to $15.8 million as of June 30, 2017) and regulatory milestone payments of 10.0 million to 40.0 million ($11.4 million to $45.7 million as of June 30, 2017) for each target. Additionally, the Company may receive up to 175 million ($199.9 million as of June 30, 2017) 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.

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 term of the Research Collaboration extends through September 2019. Servier is responsible for funding the costs of the Research Collaboration, as defined under the Servier Collaboration Agreement. During the three months ended June 30, 2017 and 2016, the Company recognized as revenue amounts reimbursable under the Servier Collaboration Agreement of $0.5 million and $0.7 million, respectively. During the six months ended June 30, 2017 and 2016, the Company recognized as revenue amounts reimbursable under the Servier Collaboration Agreement of $0.5 million and $1.4 million, 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 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 which 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.

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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 measures 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 revenue during the three and six months ended June 30, 2017. During the three months and six months ended June 30, 2016, the Company recognized license revenue of $0.1 million and $0.4 million, respectively.

In total, for the three months ended June 30, 2017 and 2016, the Company recognized $0.5 million and $0.8 million, respectively, as revenue under the Servier Collaboration Agreement. For the six months ended June 30, 2017 and 2016, the Company recognized $0.5 million and $1.8 million, respectively, as revenue under the Servier Collaboration Agreement. Amounts incurred but not billed to Servier for research and related intellectual property activities totaled $0.5 million and $0.3 million as of June 30, 2017 and December 31, 2016, respectively. These amounts are included in prepaid expenses and other current assets in the Company s condensed consolidated balance sheets.

4. REVERSE MERGER

On February 13, 2017, Private Miragen completed the Merger as discussed in Note 1. For accounting purposes, Private Miragen is considered to be acquiring 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 own approximately 95.2% of the combined company s outstanding common stock immediately following the closing of the Merger; (ii) former Private Miragen directors hold all of the board seats in the combined company; and (iii) Private Miragen management holds 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 assets acquired in connection with this transaction were recorded at their estimated acquisition date fair values as of February 13, 2017, 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 to Private Miragen stockholders, at an exchange rate of approximately 0.7031 shares of Signal 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 of 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 on February 13, 2017, 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).

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 estimated preliminary purchase consideration.

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The following table summarizes the net assets acquired based on their estimated fair values as of February 13, 2017, 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:

	June 30, 2017	December 31, 2016
	(in thousands)	
Lab equipment	$ 2,185	$ 2,163
Furniture and fixtures	77	51
Computer hardware and software	332	281
Leasehold improvements	729	688
Property and equipment, gross	3,323	3,183
Less: accumulated depreciation and amortization	(2,697)	(2,558)
Property and equipment, net	$ 626	$ 625

During the three months ended June 30, 2017 and 2016, depreciation and amortization expense was $0.1 million for each period. During the six months ended June 30, 2017 and 2016, depreciation and amortization expense was $0.1 million and $0.2 million, respectively. Depreciation and amortization expense is recorded primarily in Research and development expense on the condensed consolidated statements of operations.

6. ACCRUED LIABILITIES

Accrued liabilities consisted of the following:

	June 30, 2017	December 31, 2016
	(in thousands)	
Accrued outsourced clinical and preclinical studies	$ 2,135	$ 1,684
Accrued employee compensation and related taxes	883	928
Accrued legal fees and expenses	381	759
Accrued other professional service fees	277	124

Accrued equipment and lab materials	98	
Value of liability-classified stock purchase warrants	82	133
Deferred and accrued facility lease obligations	67	221
Accrued property and franchise taxes	15	38
Other accrued liabilities	81	22
Total accrued liabilities	$ 4,019	$ 3,909

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7. NOTES PAYABLE

2015 Silicon Valley Bank Loan Agreement

In April 2015, Private Miragen entered into a loan and security agreement with Silicon Valley Bank (the 2015 SVB Loan Agreement) to borrow up to $10.0 million in two separate tranches. The first tranche of $5.0 million was funded in May 2015 and had a 30-month payment period following an 18-month interest-only payment period that ended in November 2016. Amounts outstanding bear interest at the prime rate minus 0.25% (4.00% at June 30, 2017), with a final payment fee equal to 5.50% of amounts borrowed. Borrowings are secured by a priority security interest, right, and title in all business assets, excluding the Company s intellectual property, which is subject to a negative pledge.

In connection with the first tranche, 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 June 30, 2017, 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 5.0%, and probability of 90.0%.

In December 2016, the 2015 SVB Loan Agreement was amended to extend the end of the draw period from December 31, 2016 to July 31, 2017. The Company chose not to draw the second $5.0 million tranche prior to the expiration of the draw period in July 2017.

Amounts outstanding under notes payable are as follows:

	June 30, 2017	December 31, 2016
	(in thousands)	
Principal amount outstanding	$ 3,667	$ 4,667
Unamortized debt discount	(8)	(14)
Unamortized debt issuance costs	(19)	(31)
Accretion of final payment fee	210	167
Total notes payable	3,850	4,789
Less: current maturities	(1,979)	(1,969)
Long-term notes payable, net of current portion	$ 1,871	$ 2,820

Future annual minimum principal payments of notes payable are as follows:

	June 30, 2017 (in thousands)
2017 (remainder of year)	$ 1,000
2018	2,000
2019	667
Total	$ 3,667

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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 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 June 30, 2017, the Company had five 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 six months ended June 30, 2017 and 2016, the Company incurred immaterial upfront and maintenance fees, which were recorded as research and development expense. 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

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other specified regions. Additionally, if the Company or 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 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 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 subsequently converted to 602,420 shares of Common Stock. These shares are now owned by Roche Finance Ltd, an affiliate of Roche. 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 in 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.

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.

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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 six months ended June 30, 2017 and 2016, the Company paid $0.5 million and $0.1 million, respectively, to Roche 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 into a subaward agreement in March 2015 (the Yale Agreements). The subaward agreement was subsequently amended in February 2016, November 2016, and January 2017. 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 pay the Company up to $1.1 million 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 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.

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 in July 2014. Under the t2cure Agreement, the Company has 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 ($3 thousand as of June 30, 2017); 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: (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 its sublicensees successfully commercialize any product candidate subject to the

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t2cure Agreement, it is responsible for royalty payments equal to percentages in the low-single digits upon net sales of licensed products and sublicense fees equal to a percentage in the low-twenties 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 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 in February 2015 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.

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During the three months ended June 30, 2017 and 2016, rent expense was $0.1 million for each period. During the six months ended June 30, 2017 and 2016, rent expense was $0.2 million for each period.

The Company is also required to pay for operating expenses. During the three months ended June 30, 2017 and 2016, operating expenses were $0.1 million for each period. During the six months ended June 30, 2017 and 2016, operating expenses related to the leased space were $0.2 million for each period.

Future annual minimum payments under the lease are as follows:

	June 30, 2017 (in thousands)
2017 (remainder of year)	$ 189
2018	391
2019	404
2020	277
Total	$ 1,261

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.

On February 13, 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

In February 2017, in conjunction with the Merger, all of the outstanding redeemable convertible preferred stock of Private Miragen converted into Private Miragen common stock at a ratio of 1:1 and was immediately exchanged for the Company s Common Stock at an exchange ratio of 0.7031 as a result of the Merger.

As of June 30, 2017, 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

right, 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.

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Common Stock Sales Agreement

On March 31, 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, and 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.

As of June 30, 2017, no shares had been sold under the ATM Agreement.

10. WARRANTS

Stock purchase warrant activity is as follows for the six months ended June 30, 2017:

	Common Stock Warrants		Preferred Stock Warrants	
	Number	Weighted Average Exercise Price	Number	Weighted Average Exercise Price
Outstanding at December 31, 2016	7,031	$ 0.57	25,779	$ 6.21
Warrants acquired in Merger	13,534	$ 80.70		$
Preferred stock warrants converted into Common Stock warrants	25,779	$ 6.21	(25,779)	$ 6.21
Exercises	(21,092)	$ 3.04		$
Outstanding at June 30, 2017	25,252	$ 47.21		$

A summary of outstanding Common Stock purchase warrants as of June 30, 2017 is as follows:

Number of Underlying Shares	Exercise Price	Expiration Date
13,534	$80.70	2019 & 2020
11,718	$8.53	2025

	25,252

In connection with the Merger, Private Miragen assumed 13,534 outstanding warrants to purchase shares of the Company s Common Stock at a weighted average exercise price of $80.70 per share. The assumed warrants expire on various dates in 2019 and 2020.

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11. SHARE-BASED COMPENSATION

Equity Incentive Plans

In February 2017, the Company s 2014 Stock Incentive Plan (the 2014 Plan) was terminated as a result of the Merger. There are no awards outstanding under the 2014 Plan and no future awards will be issued under the 2014 Plan.

As of June 30, 2017, there were 2,154,067 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.

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. As of June 30, 2017, there were 850,866 equity awards outstanding and 830,428 remaining equity awards available for future issuances 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, 2016	2,321	$ 1.44
Granted	869	$ 11.46
Exercised	(182)	$ (0.81)
Forfeited	(4)	$ (9.23)
Outstanding at June 30, 2017	3,004	$ 4.37

A summary of restricted stock award (RSA) activity is as follows:

	Number of Restricted Stock Awards (in thousands)	Weighted Average Grant Date Fair Value
Unvested at December 31, 2016		$
Granted	1	$ 12.00
Vested		$ 12.00
Unvested at June 30, 2017	1	$ 12.00

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During the six months ended June 30, 2017, the Company issued RSAs with a zero exercise price; therefore, the fair value of the RSAs was equal to their intrinsic value at the date of grant. During the six months ended June 30, 2017, the total grant date fair value of RSAs vested was $3 thousand. No RSAs were issued during the six months ended June 30, 2016.

Fair Value Assumptions

The Company uses the Black-Scholes option pricing model to estimate the fair value of stock options granted. 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 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 has not applied a forfeiture rate to its assumptions as the impact would not be material to the consolidated financial statements. 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 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.

Stock Options Granted to Employees

The weighted-average fair value of options granted during the six months ended June 30, 2017 and 2016 was $8.33 and $0.70, respectively. The fair value was determined by the Black-Scholes option pricing model using the following assumptions:

	Six Months Ended June 30,	
	2017	**2016**
Expected term, in years	6.36	5.00
Expected volatility	84.1%	84.0%
Risk-free interest rate	2.1%	1.1%
Expected dividend yield	%	%
Weighted average fair value of underlying Common Stock	$ 11.46	$ 1.05

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 six months ended June 30, 2017 and 2016.

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 June 30, 2017, the Company had 0.2 million shares available for issuance under the ESPP and no shares had been issued under the ESPP.

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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 June 30,		Six Months Ended June 30,	
	2017	2016	2017	2016
	(in thousands)			
Research and development	$ 257	$ 5	$ 380	$ 17
General and administrative	338	37	634	67
Total share-based compensation expense	$ 595	$ 42	$ 1,014	$ 84

	Three Months Ended June 30,		Six Months Ended June 30,	
	2017	2016	2017	2016
	(in thousands)			
Employees	$ 591	$ 40	$ 859	$ 78
Non-employee	4	2	155	6
Total share-based compensation expense	$ 595	$ 42	$ 1,014	$ 84

As of June 30, 2017, the Company had $7.6 million of total unrecognized employee share-based compensation costs, which the Company expects to recognize over a weighted-average remaining period of 3.3 years. As of June 30, 2017, based on the current estimate of fair value, the Company estimates that the remaining unrecognized share-based compensation expense related to non-employees of $0.1 million will be recorded to expense over a weighted-average remaining period of 1.2 years.

The total grant-date fair value of RSAs granted during the six months ended June 30, 2017 was $9 thousand. As of June 30, 2017, the unvested RSAs are expected to be amortized over the remaining weighted-average period of 0.3 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, since the effects of potentially dilutive securities are antidilutive.

Potentially dilutive securities include the following:

	June 30, 2017	June 30, 2016
	(in thousands)	
Options to purchase Common Stock	3,004	2,242
Warrants to purchase Common Stock	25	7
Redeemable convertible preferred stock		10,513
Warrants to purchase redeemable convertible preferred stock		26
Total	3,029	12,788

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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 shou 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 refere 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.

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

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

- We may be unsuccessful in maintaining orphan drug marketing exclusivity after regulatory approval of our product candidates, because the U.S. Food and Drug Administration, or FDA, can subsequently approve the same drug for the same indication from a different sponsor if it 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.

- We may be unsuccessful in gaining the benefits of orphan medicinal product designation after approval by the European Commission because, at the time of a marketing application, we may be unable to establish that our product candidate continues to meet the criteria for orphan-drug designation of the European Commission.

- 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 using microRNAs is unproven and may never lead to marketable products.

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

We may not be able to develop or identify technology that can effectively deliver MRG-106, MRG-201, 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 MRG-106, MRG-201, and our other product candidates.

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.

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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 preclinical settings, or for other indications than those for which we contemplate conducting development and seeking approval from the FDA, and we cannot give any assurance that we will generate data for any of our product candidates sufficiently supportive to receive regulatory approval in our planned indications, which will be required before they can be commercialized.

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.

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.

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 the 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.

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

You should read the following discussion and analysis of our financial condition and results of operations together with our condensed consolidated financial statements and 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, 2016, included in our Annual Report on Form 10-K filed with the SEC on March 24, 2017, and the consolidated financial statement and pro forma financial statements of then privately-held Miragen Therapeutics, Inc., or Private Miragen, included in our Form 8-K/A filed with the SEC on March 31, 2017. This discussion and other parts of this report contain forward-looking statements that involve risks and uncertainties, such as our plans, objectives, expectations, intentions, and beliefs. Our actual results 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 report.

Overview

We are a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their roles in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play vital roles in influencing the pathways responsible for many disease processes. We believe our experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine provide us with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways to result in disease modification. We use our expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Our two lead product candidates, MRG-106 and MRG-201, are currently in clinical trials. Our clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, which is found at abnormally high levels in several blood cancers. Our clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for microRNA-29, which 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 addition to our clinical programs, we continue to discover and develop a pipeline of preclinical product candidates. The goal of our translational medicine strategy is to progress rapidly to first-in-human studies once we have established the pharmacokinetics (the movement of 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.

In February 2016, we administered MRG-106 to the first subject in a multi-site, open-label, dose-ranging Phase 1 clinical trial that seeks to enroll up to 50 subjects with a confirmed diagnosis of mycosis fungoides, or MF. MF is a subtype of cutaneous T-cell lymphoma, or CTCL, in which malignant T-cells move to the skin and form patches (palpable flat lesions) or plaques and tumors. As of July 26, 2017, 24 subjects have been on study for up to approximately 10 months. MRG-106 has been generally safe and well tolerated with the exception of one patient who developed a worsening in itching compared to their baseline level. This event was deemed to be a dose limiting toxicity.

The Phase 1 open label clinical trial for MRG-106 has been expanded to target three additional hematological malignancies including adult T-cell leukemia/lymphoma, diffuse large B-cell lymphoma, and chronic lymphocytic leukemia, as in each case the disease process appears to be related to an increase in microRNA-155 levels. In all cases, subjects will have failed up to two prior therapies depending on indication. We expect to begin dosing subjects in these expanded indications in the second half of 2017. We may enroll up to 25 subjects per indication.

In 2018, we intend to initiate a Phase 2 clinical trial with MRG-106 to treat MF patients. Dosage levels and the duration of the study will be determined from data presently being collected from our Phase 1 trial.

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In November 2015, we initiated a single-center Phase 1, double-blind, placebo-controlled, single and multiple dose-escalation clinical trial of MRG-201. Fifty-four volunteers participated in the clinical trial, 47 of whom were administered MRG-201 and seven of whom were enrolled and underwent study procedures without receiving a dose of MRG-201. MRG-201 was generally safe and well-tolerated with injection site reactions of mild or moderate severity being the most common adverse events. The trial was completed in the second quarter of 2017, and we expect to present complete results at a scientific conference in the second half of 2017. Beginning in 2018, we intend to initiate a Phase 2a, double-blind randomized trial to evaluate MRG-201 in subjects with a predisposition for keloid formation.

On May 2, 2017, we entered into a fifth amendment, or the Fifth Amendment, to that certain license and collaboration agreement, or the Servier Collaboration Agreement, between us and Les Laboratoires Servier and the Institut de Recherches Servier, or Servier. The primary target of our collaboration is now microRNA-92, with MRG-110, an inhibitor of microRNA-92, as the lead compound. Together with Servier, we intend to advance MRG-110 into clinical development in 2018. MRG-110 inhibits the activity of microRNA-92a, which has been reported in multiple peer reviewed scientific publications to be a regulator of new blood vessel creation. This may indicate that MRG-110 could be useful in the treatment of cardiovascular disease and other diseases where vascular flow is compromised.

In addition to MRG-106, MRG-201, and MRG-110, we have a pipeline of wholly-owned, preclinical product candidates that target individual microRNAs thought to be at abnormally high or low levels in particular diseases. We believe our experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine allows us to identify and develop RNA-targeted drugs that are designed to regulate gene pathways to return diseased tissues to a healthy state. We believe that our drug discovery and development strategy will enable us to progress our product candidates from preclinical discovery to confirmation of mechanism of action in humans quickly and efficiently. The elements of this strategy include identification of biomarkers that may predict clinical benefit and monitoring outcomes in early-stage clinical trials to help guide later clinical development.

Recent Developments

Mergers

On February 13, 2017, we completed our merger with Private Miragen. Pursuant to the terms of the Agreement and Plan of Merger and Reorganization, or the Merger Agreement, Signal Merger Sub, Inc., our wholly-owned subsidiary, merged with and into Private Miragen, with Private Miragen surviving as our wholly-owned subsidiary, or the Merger. Immediately following the Merger, Private Miragen merged with and into us, with us as the surviving corporation, or the Short-Form Merger and, together with the Merger, or the Mergers. In connection with the Short-Form Merger, we changed our corporate name to Miragen Therapeutics, Inc. Our common stock, par value $0.01 per share, or the Common Stock, began trading on The NASDAQ Capital Market under the ticker symbol MGEN on February 14, 2017.

Unless otherwise noted, the discussion herein gives retroactive effect to the Mergers.

Financing

In February 2017, immediately prior to the closing of the Merger, Private Miragen issued and sold an aggregate of approximately $40.7 million of shares of Private Miragen s common stock to certain stockholders of Private Miragen and certain new investors at a per share price of $4.50 (not adjusted to reflect the exchange ratio of Private Miragen s capital stock effective as of the Merger), or the Concurrent Financing.

In April 2015, Private Miragen entered into a loan and security agreement with Silicon Valley Bank to borrow up to $10.0 million in two separate tranches. In December 2016, this agreement was amended to, among other things, extend the draw period from December 31, 2016 to July 31, 2017. On February 13, 2017, we became party to the loan and security agreement as a result of the Short Form Merger. The first tranche of $5.0 million was funded in May 2015 and is scheduled to be repaid over a 48-month period through April 2019, with interest-only payments during the first 18 months. The second tranche of up to $5.0 million was available to us under the amended agreement through July 31, 2017. We chose not to draw the second tranche before the end of its draw period in July 2017.

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Orphan-Drug Designation

On March 31, 2017, we announced that the FDA granted orphan-drug designation to our product candidate, MRG-106, for the treatment of MF. Additionally, on May 24, 2017, we announced that the European Commission granted orphan medicinal product designation to our product candidate, MRG-106, for the treatment of CTCL.

Amendment of Collaboration Agreement with Servier

On May 2, 2017, we entered into the Fifth Amendment to the Servier Collaboration Agreement, between us and Servier. Among other things, the Fifth Amendment removes the three existing targets under the Servier Collaboration Agreement and adds a new target, microRNA-92, and provides Servier with: (i) an exclusive license to research, develop, and commercialize MRG-110, our product candidate that targets microRNA-92 for the treatment of diseases through revascularization, in all countries, other than the United States and Japan where we retain all rights, as if microRNA-92 were an original target under the Servier Collaboration Agreement, and (ii) the right to obtain such an exclusive license for another target to be named by Servier no later than September 30, 2019. Additionally, the Fifth Amendment extends the term of the research collaboration between us and Servier until September 30, 2019 or the date of completion of the agreed upon research activities, whichever is later. Under the terms of the Fifth Amendment, Servier agreed to reimburse us for a specified amount of the costs associated with the manufacture and production of the MRG-110 drug product when the drug product is delivered and ready for use, and we agreed to be responsible for a specified amount of the pre-Phase 3 costs that we incur under the Servier Collaboration Agreement in the third quarter of 2017. Servier also agreed to pay us a one-time milestone payment at a specified amount upon the earlier of the completion of a specified development goal or November 15, 2017.

As a result of the Fifth Amendment, Servier s rights to the three removed targets and product candidates directed to such removed targets were terminated and returned to us.

Financial Operations Overview

Revenues

Our revenue generally consists of upfront payments for licenses, of milestone payments, and of payments for other research services under strategic alliance and collaboration agreements and grants.

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.

Research and development expenses

Research and development costs are expensed as incurred and include compensation and related benefits, share-based compensation, license fees, laboratory supplies, facilities, and overhead costs. 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.

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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.

Research and development expense consists of 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; 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 expect our research and development expenses to increase for the foreseeable future as we continue to conduct our ongoing clinical studies, initiate additional clinical studies, 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 executive, finance, legal, business development and support functions. Other general and administrative expenses include allocated facility-related costs and professional fees for auditing, tax, and legal services. During the six months ended June 30, 2017, we incurred incremental expenses as a result of the Merger and incremental expenses as a result of becoming a public company following completion of the Merger, including expenses related to our compliance with the rules and regulations of the SEC and The NASDAQ Stock Market, LLC, or NASDAQ, additional insurance, professional services, investor relations, and other administrative expenses. We

expect that general and administrative expenses will increase in the future as we expand our operating activities and incur additional costs associated with being a publicly-traded company.

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 for cash associated with our cash equivalents. Interest expense has historically been comprised of interest incurred under our outstanding notes payable.

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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 policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving our judgments and estimates.

Revenue Recognition

We recognize revenue from upfront payments for licenses or options to obtain licenses in the future and milestone payments that are generated from defined research or development events, as well as from amounts for other research and development services under strategic alliance and collaboration agreements. We recognize revenue when all four of the following criteria are met: (i) persuasive evidence of an arrangement exists; (ii) products have been delivered or services rendered; (iii) the selling price is fixed or determinable; and (iv) 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 these 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.

We recognize revenue from nonrefundable upfront license fees over the term of performance under the collaboration agreement. When the performance period is not specified, we estimate 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 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 our estimates.

Share-Based Compensation

We account for share-based compensation expense related to stock options granted to employees and members of our board of directors under our 2008 Equity Incentive Plan, or the 2008 Plan, and our 2016 Equity Incentive Plan, or the 2016 Plan, by estimating the fair value of each stock option or award on the date of grant using the Black-Scholes model. We recognize share-based compensation expense on a straight-line basis over the vesting term.

We account for stock options issued to non-employees by estimating the fair value of each 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.

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Research and Development

Research and development costs are expensed as incurred and include compensation and related benefits, share-based compensation, license fees, laboratory supplies, facilities, and overhead costs. We often make nonrefundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as expense in the period that 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.

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 CROs and manufacturing organizations and for other trial-related activities. Payments under our agreements with external service providers depend on a number of factors, such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, we obtain information from various sources and estimate the level of effort or expense allocated to each period. Adjustments to our research and development expenses may be necessary in future periods as our estimates change.

Results of Operations

Comparison of the Three Months Ended June 30, 2017 and 2016

	Three Months Ended June 30,	
	2017	2016
	(in thousands)	
Revenue	$ 718	$ 1,115
Research and development expenses	(5,487)	(3,355)
General and administrative expenses	(2,581)	(1,210)
Other income (expense), net	38	(74)
Net loss	$ (7,312)	$ (3,524)

Revenue

We recognized revenue of $0.7 million during the three months ended June 30, 2017, compared to $1.1 million recognized during the three months ended June 30, 2016. The decrease of $0.4 million was primarily due to decreases in license revenue and research and development related revenue under the Servier Collaboration Agreement.

Research and Development Expenses

Research and development expenses were $5.5 million during the three months ended June 30, 2017, compared to $3.4 million during the three months ended June 30, 2016. The increase in research and development expense of $2.1 million was driven primarily by:

- increased outsourced manufacturing expense of $1.3 million;

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increased personnel costs of $0.8 million, including share-based compensation, due to an increase in research and development headcount from 31 to 39 to support and expand our research and development activities; and

increased clinical trial expense of $0.3 million as our programs advance further into clinical development, offset by decreased outsourced preclinical research and development costs of $0.3 million.

General and Administrative Expenses

General and administrative expenses were $2.6 million during the three months ended June 30, 2017, compared to $1.2 million during the three months ended June 30, 2016. The increase in general and administrative expenses of $1.4 million was driven primarily by:

increased legal expense of $0.4 million primarily related to increased legal responsibilities of a public entity as well as increased costs related to patent filing, prosecution, and enforcement;

increased consulting and professional fees of $0.4 million, primarily related to costs associated with becoming a public company, which includes rebranding, investor relations, SEC filing-related costs, equity management and internal control compliance services;

increased personnel costs of $0.4 million, due to an increase in general and administrative headcount from 12 to 17 as well as an increase in share-based compensation; and

increased other administrative costs of $0.2 million.

Other income (expense), net

Net other non-operating income was $38 thousand during the three months ended June 30, 2017 compared to net other non-operating expense of $0.1 million during the three months ended June 30, 2016. Interest income (expense), net is comprised of interest expense and related charges associated with our outstanding notes payable as well as interest income from interest-bearing accounts. The increase in net other non-operating income is due to an increase in interest income earned during the three months ended June 30, 2017 compared to three months ended June 30, 2016, due to higher cash and cash equivalent balances from our Concurrent Financing in February 2017.

Comparison of the Six Months Ended June 30, 2017 and 2016

	Six Months Ended June 30,	
	2017	2016
	(in thousands)	
Revenue	$ 1,180	$ 2,032
Research and development expenses	(9,607)	(6,821)
General and administrative expenses	(5,862)	(2,202)

Other expense, net		(3)		(156)
Net loss	$	(14,292)	$	(7,147)

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Revenue

We recognized revenue of $1.2 million during the six months ended June 30, 2017, compared to $2.0 million recognized during the six months ended June 30, 2016. The decrease of $0.8 million was primarily due to a decrease of $1.2 million in revenue recognized under the Servier Collaboration Agreement, partially offset by an increase of $0.4 million in grant revenue.

The $1.2 million decrease in revenue under the Servier Collaboration Agreement resulted from less research and development activity during the six months ended June 30, 2017 compared to the six months ended June 30, 2016. We anticipate that revenue under the Servier Collaboration will increase in future periods as a result of the May 2017 amendment of the Servier Collaboration Agreement.

The $0.4 million increase in grant revenue was driven by increased research and development activities.

Research and Development Expenses

Research and development expenses were $9.6 million during the six months ended June 30, 2017, compared to $6.8 million during the six months ended June 30, 2016. The increase in research and development expense of $2.8 million was driven primarily by:

- increased outsourced manufacturing expense of $1.7 million;
- increased personnel costs of $1.2 million, due to an increase in research and development headcount from 31 to 39 to support and expand and our research and development capabilities, as well as increased share-based compensation expense; and
- decreased outsourced preclinical research and development costs of $0.6 million, partially offset by increased clinical trial expense of $0.5 million as our programs advance further into clinical development.

General and Administrative Expenses

General and administrative expenses were $5.9 million during the six months ended June 30, 2017, compared to $2.2 million during the six months ended June 30, 2016. The increase in general and administrative expenses of $3.7 million was driven primarily by:

- increased legal expense of $1.2 million primarily related to costs associated with the Merger, as well as increased legal responsibilities of a public entity as well as increased costs related to patent filing, prosecution, and enforcement;
- increased consulting and professional fees of $1.1 million, primarily related to costs associated with becoming a public company, which includes rebranding, investor relations, SEC filing-related costs, equity management and internal control compliance services;

increased personnel costs of $0.8 million, due to an increase in general and administrative headcount from 12 to 17 as well as an increase in share-based compensation; and

increased board and other administrative expenses of $0.6 million.

Other income (expense), net

Net other non-operating expense was $3 thousand during the six months ended June 30, 2017 compared to $0.2 million net other non-operating expense during the six months ended June 30, 2016. Interest expense, net is comprised of interest expense and related charges associated with our outstanding notes payable as well as interest income from interest-bearing accounts.

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The decrease in net expense is due to an increase in interest income earned during the six months ended June 30, 2017 compared to six months ended June 30, 2016, due to higher cash and cash equivalent balances from our Concurrent Financing in February 2017.

Liquidity and Capital Resources

We have no products approved for commercial sale and have not generated any revenue from product sales. We have funded our operations to date principally through proceeds from the private placement of preferred and common stock of $112.8 million (including notes payable that had previously converted to preferred stock) and proceeds under the Servier Collaboration Agreement.

On March 31, 2017, we entered into a Common Stock Sales Agreement, or the ATM Agreement, with Cowen and Company, LLC, or Cowen, under which we may offer and sell, from time to time, at our sole discretion, shares of Common Stock having an aggregate offering price of up to $50.0 million through Cowen as our sales agent. Our registration statement on Form S-3 included a prospectus covering the offering up to $50.0 million of shares of Common Stock in accordance with the ATM Agreement. As of June 30, 2017, we have not made any sales of our Common Stock under the ATM Agreement.

Since our inception and through June 30, 2017, we have generated cumulative losses of $81.4 million. Substantially all of our operating losses resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations.

We will continue to require substantial additional capital to continue our clinical development and potential commercialization activities. Accordingly, we will need to raise substantial additional capital to continue to fund our operations. The amount and timing of future funding requirements will depend on many factors, including the pace and results of our clinical development efforts, continued performance under our Servier Collaboration Agreement, securing additional partnerships and collaborations, and issuing debt or other financing vehicles. Our ability to secure capital is dependent upon a number of factors, including success in developing our technology and drug product candidates. Failure to raise capital as and when needed, on favorable terms or at all, would have a negative impact on our financial condition and our ability to develop our product candidates.

We expect to incur significant expenses and increasing operating losses for at least the next several years as we initiate and continue the clinical development of, and seek regulatory approval for, our product candidates and add personnel necessary to operate as a public company with an advanced clinical candidate pipeline of product candidates. In addition, operating as a publicly-traded company involves the hiring of additional financial and other personnel, upgrading financial information systems, and incurring costs associated with operating as a public company. We expect that our operating losses will fluctuate significantly from quarter to quarter and year to year due to timing of clinical development programs and efforts to achieve regulatory approval.

If we raise additional funds through the incurrence of indebtedness, the obligations related to such indebtedness could be senior to rights of holders of our capital stock and could contain covenants that may restrict our operations. Should additional capital not be available to us in the near term, or not be available on acceptable terms, we may be unable to realize value from our assets and discharge our liabilities in the normal course of business, which may, among other alternatives, cause us to further delay, substantially reduce, or discontinue operational activities to conserve our cash resources.

As of June 30, 2017, we had cash and cash equivalents of $46.3 million. We believe our current resources will be sufficient to fund our operations in the normal course of business and allow us to meet our liquidity needs through the

end of 2018.

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Summarized cash flows for the six months ended June 30, 2017 and 2016 are as follows:

	Six Months Ended June 30,		
	2017	2016	Change
		(in thousands)	
Net cash used in operating activities	$ (15,261)	$ (8,633)	$ (6,628)
Net cash provided by (used in) investing activities	1,131	(4,225)	5,356
Net cash provided by financing activities	38,361		38,361
Net increase (decrease) in cash and cash equivalents	$ 24,231	$ (12,858)	$ 37,089

Operating Activities

Net cash used in operating activities was $15.3 million for the six months ended June 30, 2017 compared to $8.6 million for the six months ended June 30, 2016. The $6.6 million increase in cash used in operating activities was primarily the result of increased net losses incurred during the six months ended June 30, 2017 compared to six months ended June 30, 2016. The increase in net loss was largely driven by increased legal expense and other professional fees related to the Merger and increased research and development costs.

Investing Activities

Net cash provided by investing activities was $1.1 million during the six months ended June 30, 2017 compared to $4.2 million net cash used in investing activities during the six months ended June 30, 2016. The $5.4 million increase in cash provided was primarily the result of the cash acquired in the Merger during the six months ended June 30, 2017 and purchases of short-term investments during the six months ended June 30, 2016 that did not recur in 2017.

Financing Activities

Net cash provided by financing activities was $38.4 million for the six months ended June 30, 2017, compared to zero net cash provided by financing activities during the six months ended June 30, 2016. The increase of $38.4 million was primarily due to the Concurrent Financing we completed immediately prior to the Merger. In February 2017, we received $40.7 million in proceeds from the sale of common stock, offset by costs of financing paid during the six months ended June 30, 2017 of $1.5 million. We also began making principal payments on our notes payable in November 2016, which resulted in a use of cash of $1.0 million during the six months ended June 30, 2017.

Commitments and Contingencies

As of June 30, 2017, we had no material commitments other than the liabilities reflected and commitments disclosed in our condensed consolidated financial statements.

Off-Balance Sheet Arrangements

We have not entered into any off-balance sheet arrangements and do not have any holdings in variable interest entities.

The JOBS Act

In April 2012, the Jumpstart Our Business Startups Act, or the JOBS Act, was enacted. Section 107 of the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. Thus, an emerging growth company can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of the extended transition period for adopting new or revised accounting standards. As a result of this election, our financial statements may not be comparable to companies that comply with public company effective dates.

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ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not applicable.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in the reports that we file under the Securities Exchange Act of 1934, as amended, or the Exchange Act, is recorded, processed, summarized, and reported within the time periods specified in the rules and forms of the SEC, and that such information is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosures. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

As required by Rule 13a-15(b) and Rule 15d-15(b) of the Exchange Act, an evaluation was carried out under the supervision and with the participation of management, including our principal executive officer and principal financial officer, of the effectiveness of our disclosure controls and procedures as of the end of the quarter covered by this report. Based on the foregoing, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective at a reasonable level of assurance.

Changes in Internal Control Over Financial Reporting

There have been no changes in our internal control over financial reporting that occurred during our most recent fiscal quarter that have materially affected, or are reasonably likely to materially effect, our internal control over financial reporting.

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PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

Not applicable.

ITEM 1A. RISK FACTORS

The business, financial condition, and operating results of the Company may be affected by a number of factors, whether currently known or unknown, including but not limited to those described below. Any one or more of such factors could directly or indirectly cause the Company s actual results of operations and financial condition to vary materially from past or anticipated future results of operations and financial condition. Any of these factors, in whole or in part, could materially and adversely affect the Company s business, financial condition, results of operations, and stock price. The following information should be read in conjunction with Part I, Item 2 Management s Discussion and Analysis of Financial Condition and Results of Operations and the condensed consolidated financial statements and related notes in Part I, Item 1, Financial Information of this Quarterly Report.

Risks Related to Our Financial Condition and Capital Requirements

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.

We are a clinical development-stage biopharmaceutical company with a limited operating history. We have incurred net losses in each year since Private Miragen s inception in 2006.

During the three months ended June 30, 2017 and 2016, net loss was $7.3 million and $3.5 million, respectively. During the six months ended June 30, 2017 and 2016, net loss was $14.3 million and $7.1 million, respectively. As of June 30, 2017, we had an accumulated deficit of $81.4 million.

As of June 30, 2017, we had cash and cash equivalents of $46.3 million. In September 2016, we received $16.1 million in financing through a follow-on sale of Private Miragen s Series C preferred stock. Additionally, in February 2017, we received $40.7 million in financing through the Concurrent Financing. We believe that we have sufficient capital to fund our operations in the normal course of business and to meet our liquidity needs through the end of 2018.

We will continue to require substantial additional capital to continue our clinical development and potential commercialization activities. Accordingly, we will need to raise substantial additional capital to continue to fund our operations. The amount and timing of our future funding requirements will depend on many factors, including the pace and results of our clinical development efforts. Failure to raise capital as and when needed, on favorable terms or at all, would have a negative impact on our financial condition and our ability to develop our product candidates.

We have devoted substantially all of our financial resources to identify, acquire, and develop our product candidates, including conducting clinical trials and providing general and administrative support for our operations. To date, we have financed our operations primarily through the sale of equity securities and convertible promissory notes. The amount of our future net losses will depend, in part, on the rate of our future expenditures and our ability to obtain funding through equity or debt financings, strategic collaborations, or grants. Biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of risk. We expect our losses to increase as we complete Phase 1 development and advance into Phase 2 development of our lead product candidates. We have not

yet commenced pivotal clinical trials for any product candidate and it may be several years, if ever, before we complete pivotal clinical trials or have a product candidate approved for commercialization. We expect to invest significant funds into the research and development of our current product candidates to determine the potential to advance these product candidates to regulatory approval.

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If we obtain regulatory approval to market a product candidate, our future revenue will depend upon the size of any markets in which our product candidates may receive approval, and our ability to achieve sufficient market acceptance, pricing, reimbursement from third-party payors, and adequate market share for our product candidates in those markets. Even if we obtain adequate market share for our product candidates, because the potential markets in which our product candidates may ultimately receive regulatory approval could be very small, we may never become profitable despite obtaining such market share and acceptance of our products.

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

- continue the clinical development of our product candidates;
- continue efforts to discover new product candidates;
- undertake the manufacturing of our product candidates or increase volumes manufactured by third parties;
- advance our programs into larger, more expensive clinical trials;
- initiate additional preclinical, clinical, or other trials or studies for our product candidates;
- seek regulatory and marketing approvals and reimbursement for our product candidates;
- establish a sales, marketing, and distribution infrastructure to commercialize any products for which we may obtain marketing approval and market for ourselves;
- seek to identify, assess, acquire, and/or develop other product candidates;
- make milestone, royalty, or other payments under third-party license agreements;
- seek to maintain, protect, and expand our intellectual property portfolio;
- seek to attract and retain skilled personnel; and
- experience any delays or encounter issues with the development and potential for regulatory approval of our clinical candidates such as safety issues, clinical trial accrual delays, longer follow-up for planned studies,

additional major studies, or supportive studies necessary to support marketing approval.

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

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

We have no products approved for commercialization and have never generated any revenue from product sales. Our ability to generate revenue and achieve profitability depends on our ability, alone or with strategic collaborators, to successfully complete the development of, and obtain the regulatory and marketing approvals necessary to commercialize one or more of our product candidates. We do not anticipate generating revenue from product sales for the foreseeable future. Our ability to generate future revenue from product sales depends heavily on our success in many areas, including but not limited to:

completing research and development of our product candidates;

obtaining regulatory and marketing approvals for our product candidates;

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manufacturing product candidates and establishing and maintaining supply and manufacturing relationships with third parties that are commercially feasible, meet regulatory requirements and our supply needs in sufficient quantities to meet market demand for our product candidates, if approved;

marketing, launching, and commercializing product candidates for which we obtain regulatory and marketing approval, either directly or with a collaborator or distributor;

gaining market acceptance of our product candidates as treatment options;

addressing any competing products;

protecting and enforcing our intellectual property rights, including patents, trade secrets, and know-how;

negotiating favorable terms in any collaboration, licensing, or other arrangements into which we may enter;

obtaining reimbursement or pricing for our product candidates that supports profitability; and

attracting, hiring, and retaining qualified personnel.

Even if one or more of the product candidates that we develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any approved product candidate. Portions of our current pipeline of product candidates have been in-licensed from third parties, which make the commercial sale of such in-licensed products potentially subject to additional royalty and milestone payments to such third parties. We will also have to develop or acquire manufacturing capabilities or continue to contract with contract manufacturers in order to continue development and potential commercialization of our product candidates. For instance, our current costs of manufacturing our drug product is not commercially feasible and we will need to develop or procure our drug product in a commercially feasible manner in order to successfully commercialize any future approved product, if any. Additionally, if we are not able to generate revenue from the sale of any approved products, we may never become profitable.

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

To the extent that we raise additional capital through the sale of equity, including pursuant to any sales under the ATM Agreement, convertible debt or other securities convertible into equity, the ownership interest of our stockholders will be diluted, and the terms of these new securities may include liquidation or other preferences that adversely affect rights of our stockholders. Debt financing, if available, would likely involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, making additional product acquisitions, or declaring dividends. For instance, our loan and security agreement with Silicon Valley Bank limits our ability to enter into an asset sale, enter into any change of control, incur additional indebtedness, pay any dividends, or enter into specified transactions with our affiliates. If we raise additional funds through strategic collaborations or licensing arrangements with third parties, we may have to

relinquish valuable rights to our product candidates or future revenue streams or grant licenses on terms that are not favorable to us. We cannot be assured that we will be able to obtain additional funding if and when necessary to fund our entire portfolio of product candidates to meet our projected plans. If we are unable to obtain funding on a timely basis, we may be required to delay or discontinue one or more of our development programs or the commercialization of any product candidates or be unable to expand our operations or otherwise capitalize on potential business opportunities, which could materially harm our business, financial condition, and results of operations.

We have also historically received funds from state and federal government grants for research and development. The grants have been, and any future government grants and contracts we may receive may be, subject to the risks and contingencies set forth below under the risk factor titled Reliance on government funding for our programs may add uncertainty to our research and commercialization efforts with respect to those programs that are tied to such funding and may impose

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requirements that limit our ability to take specified actions, increase the costs of commercialization and production of product candidates developed under those programs and subject us to potential financial penalties, which could materially and adversely affect our business, financial condition, and results of operations. Although we might apply for government contracts and grants in the future, we cannot be certain that we will be successful in obtaining additional grants for any product candidates or programs.

Risks Related to the Development of Our Product Candidates

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.

Clinical development is expensive, time consuming, and involves significant risk. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage of development. Events that may prevent successful or timely completion of clinical development include but are not limited to:

- inability to generate satisfactory preclinical, toxicology, or other in vivo or in vitro data or diagnostics to support the initiation or continuation of clinical trials;
- delays in reaching agreement on acceptable terms with clinical research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and clinical trial sites;
- delays in obtaining required institutional review board approval at each clinical trial site;
- failure to permit the conduct of a clinical trial by regulatory authorities, after review of an investigational new drug or equivalent foreign application or amendment;
- delays in recruiting qualified patients in our clinical trials;
- failure by clinical sites or CROs or other third parties to adhere to clinical trial requirements;
- failure by our clinical sites, CROs or other third parties to perform in accordance with the good clinical practices requirements of the FDA or applicable foreign regulatory guidelines;
- patients dropping out of our clinical trials;

adverse events or tolerability or animal toxicology issues significant enough for the FDA or other regulatory agencies to put any or all clinical trials on hold;

occurrence of adverse events associated with our product candidates;

changes in regulatory requirements and guidance that require amending or submitting new clinical protocols;

the cost of clinical trials of our product candidates;

negative or inconclusive results from our clinical trials, which may result in our deciding, or regulators requiring us, to conduct additional clinical trials or abandon development programs in other ongoing or planned indications for a product candidate; and

delays in reaching agreement on acceptable terms with third-party manufacturers and the time for manufacture of sufficient quantities of our product candidates for use in clinical trials.

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Any inability to successfully complete clinical development and obtain regulatory approval for our product candidates could result in additional costs to us or impair our ability to generate revenue. In addition, if we make manufacturing or formulation changes to our product candidates, we may need to conduct additional preclinical trials and the results obtained from such new formulation may not be consistent with previous results obtained. Clinical trial delays could also shorten any periods during which our products have patent protection and may allow competitors to develop and bring products to market before we do, which could impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

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

The scientific discoveries that form the basis for our efforts to discover and develop our product candidates are relatively recent. To date, neither we nor any other company has received regulatory approval to market therapeutics utilizing microRNA-targeted molecules. The scientific evidence to support the feasibility of developing drugs based on these discoveries is both preliminary and limited. Successful development of microRNA therapeutic products by us will require solving a number of issues, including providing suitable methods of stabilizing the microRNA material and delivering it into target cells in the human body. In addition, any product candidates that we develop may not demonstrate in patients the chemical and pharmacological properties ascribed to them in laboratory and preclinical trials, and they may interact with human biological systems in unforeseen, ineffective, or even harmful ways. For instance, our clinical and preclinical data to date is not validated and we have no way of knowing if after validation our clinical trial data will be complete and consistent. If we do not successfully develop and commercialize product candidates based upon this technological approach, we may not become profitable and the value of our capital stock may decline.

Further, our focus on microRNA technology for developing product candidates as opposed to multiple, more proven technologies for drug development, increases the risk associated with our business. If we are not successful in developing an approved product using microRNA technology, we may not be able to identify and successfully implement an alternative product development strategy. In addition, work by other companies pursuing similar technologies may encounter setbacks and difficulties that regulators and investors may attribute to our product candidates, whether appropriately or not.

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

We have concentrated our research and development efforts to date on a limited number of product candidates based on our microRNA therapeutic platform and identifying our initial targeted disease indications. Our future success depends on our successful development of viable product candidates. Only two of our product candidates, MRG-106 and MRG-201, are in clinical development, and the remainder of our product candidates are in preclinical development. There can be no assurance that we will not experience problems or delays in developing our product candidates and that such problems or delays will not cause unanticipated costs, or that any such development problems can be solved.

Additionally, the FDA has relatively limited experience with microRNA-targeted therapeutics. No regulatory authority has granted approval to any person or entity, including us, to market or commercialize microRNA therapeutics, which may increase the complexity, uncertainty, and length of the regulatory approval process for our product candidates. If our microRNA product candidates fail to prove to be safe, effective, or commercially viable, our product candidate pipeline would have little, if any, value, which would have a material adverse effect on our

business, financial condition, or results of operations.

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The clinical trial and manufacturing requirements of the FDA, the European Medicines Agency, and other regulatory authorities, and the criteria these regulators use to determine the safety and efficacy of a product candidate, vary substantially according to the type, complexity, novelty and intended use, and market of the product candidate. The regulatory approval process for novel product candidates such as microRNA therapeutics can be more expensive and take longer than for other, better known or more extensively studied product candidates. It is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for our product candidates in either the United States or the European Union or other agencies or how long it will take to commercialize our product candidates, even if approved for marketing. Approvals by one regulatory agency may not be indicative of the approval requirements of other regulatory bodies. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product candidate to market could decrease our ability to generate sufficient product revenue, and our business, financial condition, results of operations, and prospects may be harmed.

We may not be able to develop or identify a technology that can effectively deliver MRG-106, MRG-201, 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 MRG-106, MRG-201, and our other product candidates.

In connection with our Phase 1 clinical trials of MRG-106 and MRG-201, we have used intravenous, subcutaneous, and intradermal injections as the route of administration. We cannot be certain that these routes of administration will be capable of delivering adequate levels of MRG-106, MRG-201, or our other product candidates to produce a therapeutic response for all indications. While we are continuing to evaluate the use of subcutaneous, intravenous, and intradermal injections in different indications, and additional delivery technologies and routes of administration that might enable us to target specific cells with our product candidates, we cannot be certain whether we will be successful in developing such alternative delivery mechanisms. Our failure to effectively deliver any of our product candidates to the intended diseased cells or tissues could adversely affect and delay the development of our product candidates.

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

Undesirable side effects caused by our product candidates could cause us or regulatory authorities to interrupt, delay, or terminate clinical trials. They additionally may result in a delay of regulatory approval by the FDA or comparable foreign authorities, or, even in the instance that an affected product candidate is approved, may result in a restrictive drug label.

Our MRG-106 and MRG-201 product candidates have been studied in only a limited number of patients with a confirmed diagnosis of mycosis fungoides, or MF, and healthy volunteers, respectively, and the most common adverse events of any grade were injection site reactions, including pain, itchiness, and swelling. We have not yet begun any clinical trials of MRG-110 in humans. We may experience a higher rate or severity of adverse events and comparable or higher rates of discontinuation in testing in our future clinical trials. There is no guarantee that additional or more severe side effects will not be identified through ongoing clinical trials of our product candidates for current and other indications. Undesirable side effects and negative results for other indications may negatively impact the development and potential for approval of our product candidates for their proposed indications.

Additionally, even if one or more of our product candidates receives marketing approval, and we or others later identify undesirable side effects caused by such products, potentially significant negative consequences could result, including but not limited to:

regulatory authorities may withdraw approvals of such products;

regulatory authorities may require additional warnings on the label;

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- we may be required to create a Risk Evaluation and Mitigation Strategy, which could include a medication guide outlining the risks of such side effects for distribution to patients, a communication plan for healthcare providers, and/or other elements to assure safe use;

- we could be sued and held liable for harm caused to patients; and

- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of a product candidate, even if approved, and could significantly harm our business, results of operations, and prospects.

Our product development program may not uncover all possible adverse events that patients who take MRG-106, MRG-201, or our other product candidates may experience. The number of subjects exposed to MRG-106, MRG-201, or our other product candidates and the average exposure time in the clinical development program may be inadequate to detect rare adverse events that may only be detected once the product is administered to more patients and for greater periods of time.

Clinical trials by their nature utilize a sample of the potential patient population. However, with a limited number of subjects and limited duration of exposure, we cannot be fully assured that rare and severe side effects of MRG-106, MRG-201, or our other product candidates will be uncovered. Such rare and severe side effects may only be uncovered with a significantly larger number of patients exposed to the drug. If such safety problems occur or are identified after MRG-106, MRG-201, or another product candidate reaches the market, the FDA may require that we amend the labeling of the product or recall the product or may even withdraw approval for the product.

Our microRNA therapeutic approach is novel. Negative public opinion and increased regulatory scrutiny of microRNA or other nucleic acid-based therapies may damage public perception of the safety of our product candidates and adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.

MicroRNA therapy remains a novel technology, with no microRNA therapy product approved to date in the United States. Public perception may be influenced by claims that microRNA therapy is unsafe, and microRNA therapy may not gain the acceptance of the public or the medical community. In particular, our success will depend upon physicians who specialize in the treatment of the diseases targeted by our product candidates, prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments with which they are familiar and for which greater clinical data may be available. More restrictive government regulations or negative public opinion regarding microRNA or other nucleic acid-based therapeutics could have an adverse effect on our business, financial condition, or results of operations and may delay or impair the development and commercialization of our product candidates or demand for any products we may develop. Serious adverse events in microRNA clinical trials for our competitors products, even if not ultimately attributable to the relevant product candidates, and the resulting publicity, could result in increased government regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our product candidates, stricter labeling requirements for those product candidates that are approved, and a decrease in demand for any such product candidates. For instance, in June 2016, the FDA placed a regulatory hold on the clinical trial of a microRNA- or nucleic acid-focused biopharmaceutical company with a microRNA product candidate for the treatment of hepatitis C virus due to serious adverse events in that trial. Another microRNA-focused biopharmaceutical company also voluntarily halted an ongoing Phase 1 clinical trial for a microRNA therapy for multiple cancers in September 2016 due to multiple immune-related severe adverse events. We cannot predict what effect, if any, these clinical holds will have on the government and public perception

of our product candidates.

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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 preclinical settings, or for other indications than those for which we contemplate conducting development and seeking FDA approval, and we cannot give any assurance that we will generate data for any of our product candidates sufficiently supportive to receive regulatory approval in our planned indications, which will be required before they can be commercialized.

We have invested substantially all of our effort and financial resources to identify, acquire, and develop our portfolio of product candidates. Our future success is dependent on our ability to successfully further develop, obtain regulatory approval for, and commercialize one or more product candidates. We currently generate no revenue from sales of any products, and we may never be able to develop or commercialize a product candidate.

We currently have two product candidates in Phase 1 clinical trials. Of these product candidates, MRG-106 has only been administered in patients with MF. This is only one of the multiple indications for which we plan to develop this product candidate. Additionally, our clinical and preclinical data to date is not validated, and we have no way of knowing if after validation our clinical trial data will be complete and consistent. There can be no assurance that the data that we develop for our product candidates in our planned indications will be sufficiently supportive to obtain regulatory approval.

In addition, none of our product candidates have advanced into a pivotal clinical trial for our proposed indications, and it may be years before any such clinical trial is initiated and completed, if at all. We are not permitted to market or promote any of our product candidates before we receive regulatory approval from the FDA or comparable foreign regulatory authorities, and we may never receive such regulatory approval for any of our product candidates. We cannot be certain that any of our product candidates will be successful in clinical trials or receive regulatory approval. Further, our product candidates may not receive regulatory approval even if they are successful in clinical trials. If we do not receive regulatory approvals for our product candidates, we may not be able to continue our operations.

Product development involves a lengthy and expensive process with an uncertain outcome, and results of earlier preclinical and clinical trials may not be predictive of future clinical trial results.

Clinical testing is expensive and generally takes many years to complete, and the outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. Additionally, microRNAs are a new class of drug target and as such may have some potentially unknown risks from both an efficacy and safety perspective. The results of preclinical trials and early clinical trials of our product candidates may not be predictive of the results of larger, later-stage controlled clinical trials. Product candidates that have shown promising results in early-stage clinical trials may still suffer significant setbacks in subsequent clinical trials. Our clinical trials to date have been conducted on a small number of patients in limited numbers of clinical sites for a limited number of indications. We will have to conduct larger, well-controlled trials in our proposed indications to verify the results obtained to date and to support any regulatory submissions for further clinical development. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles despite promising results in earlier, smaller clinical trials. For instance, in June 2016, the FDA placed a regulatory hold on the clinical trial of a microRNA-focused biopharmaceutical company with a microRNA product candidate for the treatment of hepatitis C virus due to serious adverse events in that trial. Another microRNA-focused biopharmaceutical company also voluntarily halted an ongoing Phase 1 clinical trial for a microRNA therapy for multiple cancers in September 2016 due to multiple immune-related severe adverse events. Moreover, clinical data are often susceptible to varying interpretations and analyses. We do not know whether any Phase 2, Phase 3, or other clinical trials we may conduct will demonstrate consistent or adequate efficacy and safety with respect to the proposed indication for use sufficient to receive regulatory approval or market our drug candidates.

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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.

Because we have limited financial and human resources, we may forego or delay pursuit of opportunities with some programs or product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or more profitable market opportunities. Our spending on current and future research and development programs and future product candidates for specific indications may not yield any commercially viable products. We may also enter into additional strategic collaboration agreements to develop and commercialize some of our programs and potential product candidates in indications with potentially large commercial markets. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaborations, licensing, or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate, or we may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement.

We may find it difficult to enroll patients in our clinical trials given the limited number of patients who have the diseases for which our product candidates are being studied. Difficulty in enrolling patients could delay or prevent clinical trials of our product candidates.

Identifying and qualifying patients to participate in clinical trials of our product candidates is essential to our success. The timing of our clinical trials depends in part on the rate at which we can recruit patients to participate in clinical trials of our product candidates, and we may experience delays in our clinical trials if we encounter difficulties in enrollment.

The eligibility criteria of our planned clinical trials may further limit the available eligible trial participants as we expect to require that patients have specific characteristics that we can measure or meet the criteria to assure their conditions are appropriate for inclusion in our clinical trials. For instance, our Phase 1 clinical trial of MRG-106 includes patients with MF. The estimated prevalence of MF is 16,000 to 20,000 cases in the United States and only a subset of this group satisfies the enrollment criteria for our MRG-106 clinical trial. We may not be able to identify, recruit, and enroll a sufficient number of patients to complete our clinical trials in a timely manner because of the perceived risks and benefits of the product candidate under study, the availability and efficacy of competing therapies and clinical trials, and the willingness of physicians to participate in our planned clinical trials. If patients are unwilling to participate in our clinical trials for any reason, the timeline for conducting trials and obtaining regulatory approval of our product candidates may be delayed.

If we experience delays in the completion of, or termination of, any clinical trials of our product candidates, the commercial prospects of our product candidates could be harmed, and our ability to generate product revenue from any of these product candidates could be delayed or prevented. In addition, any delays in completing our clinical trials would likely increase our overall costs, impair product candidate development, and jeopardize our ability to obtain regulatory approval relative to our current plans. Any of these occurrences may harm our business, financial condition, and prospects significantly.

We may face potential product liability, and, if successful claims are brought against us, we may incur substantial liability and costs. If the use or misuse of our product candidates harms patients, or is perceived to harm patients even when such harm is unrelated to our product candidates, our regulatory approvals, if any, could be revoked or otherwise negatively impacted, and we could be subject to costly and damaging product liability claims. If we are

unable to obtain adequate insurance or are required to pay for liabilities resulting from a claim excluded from, or beyond the limits of, our insurance coverage, a material liability claim could adversely affect our financial condition.

The use or misuse of our product candidates in clinical trials and the sale of any products for which we may obtain marketing approval exposes us to the risk of potential product liability claims. Product liability claims might be brought against us by consumers, healthcare providers, pharmaceutical companies, or others selling or otherwise coming into contact with our product candidates and approved products, if any. There is a risk that our product candidates may induce adverse events. If we

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cannot successfully defend against product liability claims, we could incur substantial liability and costs. Some of our microRNA therapeutics have shown adverse events in clinical trials, including injection site reactions and pain at the injection site, nausea, diarrhea, decreased white blood cell and platelet counts, neutropenia, elevated aspartate aminotransferase, alanine aminotransferase, and creatine kinase levels, prolonged partial thromboplastin time, blurred vision, itchiness, fatigue, headache, and microscopic hematuria, among others. There is a risk that our future product candidates may induce similar or more severe adverse events. Patients with the diseases targeted by our product candidates may already be in severe and advanced stages of disease and have both known and unknown significant preexisting and potentially life-threatening health risks. During the course of treatment, patients may suffer adverse events, including death, for reasons that may be related to our product candidates. Such events could subject us to costly litigation, require us to pay substantial amounts of money to injured patients, delay, negatively impact, or end our opportunity to receive or maintain regulatory approval to market our products, or require us to suspend or abandon our commercialization efforts. Even in a circumstance in which an adverse event is unrelated to our product candidates, the investigation into the circumstance may be time-consuming or inconclusive. These investigations may delay our regulatory approval process or impact and limit the type of regulatory approvals our product candidates receive or maintain.

As a result of these factors, a product liability claim, even if successfully defended, could have a material adverse effect on our business, financial condition, or results of operations.

Although we have product liability insurance, which covers our clinical trials in the United States, for up to $5.0 million per occurrence, up to an aggregate limit of $5.0 million, our insurance may be insufficient to reimburse us for any expenses or losses we may suffer. We will also likely be required to increase our product liability insurance coverage for the advanced clinical trials that we plan to initiate. If we obtain marketing approval for any of our product candidates, we will need to expand our insurance coverage to include the sale of commercial products. There is no way to know if we will be able to continue to obtain product liability coverage and obtain expanded coverage, if we require it, in sufficient amounts to protect us against losses due to liability, on acceptable terms, or at all. We may not have sufficient resources to pay for any liabilities resulting from a claim excluded from, or beyond the limits of, our insurance coverage. Where we have provided indemnities in favor of third parties under our agreements with them, there is also a risk that these third parties could incur liability and bring a claim under such indemnities. An individual may bring a product liability claim against us alleging that one of our product candidates causes, or is claimed to have caused, an injury or is found to be unsuitable for consumer use. Any such product liability claims may include allegations of defects in manufacturing, defects in design, failure to warn of dangers inherent in the product, negligence, strict liability, and a breach of warranties. Claims could also be asserted under state consumer protection acts. Any product liability claim brought against us, with or without merit, could result in:

- withdrawal of clinical trial volunteers, investigators, patients or trial sites, or limitations on approved indications;
- the inability to commercialize, or if commercialized, decreased demand for, our product candidates;
- if commercialized, product recalls, labeling, marketing or promotional restrictions, or the need for product modification;

initiation of investigations by regulators;

loss of revenues;

substantial costs of litigation, including monetary awards to patients or other claimants;

liabilities that substantially exceed our product liability insurance, which we would then be required to pay ourselves;

an increase in our product liability insurance rates or the inability to maintain insurance coverage in the future on acceptable terms, if at all;

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the diversion of management s attention from our business; and

damage to our reputation and the reputation of our products and our technology.

Product liability claims may subject us to the foregoing and other risks, which could have a material adverse effect on our business, financial condition, or results of operations.

Risks Related to Regulatory Approval of Our Product Candidates and Other Legal Compliance Matters

A potential breakthrough therapy designation by the FDA for our product candidates may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.

We may seek a breakthrough therapy designation from the FDA for some of our product candidates. A breakthrough therapy is defined as a drug or biological product that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug or biological product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs or biological products that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA could also be eligible for accelerated approval.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review, or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of our product candidates qualify and are designated as breakthrough therapies, the FDA may later decide that the drugs or biological products no longer meet the conditions for designation and the designation may be rescinded.

We may seek Fast Track designation for one or more of our product candidates, but we might not receive such designation, and even if we do, such designation may not actually lead to a faster development or regulatory review or approval process.

If a product candidate is intended for the treatment of a serious condition and nonclinical or clinical data demonstrate the potential to address unmet medical need for this condition, a product sponsor may apply for FDA Fast Track designation. If we seek Fast Track designation for a product candidate, we may not receive it from the FDA. However, even if we receive Fast Track designation, Fast Track designation does not ensure that we will receive marketing approval or that approval will be granted within any particular timeframe. We may not experience a faster development or regulatory review or approval process with Fast Track designation compared to conventional FDA procedures. In addition, the FDA may withdraw Fast Track designation if it believes that the designation is no longer supported by data from our clinical development program. Fast Track designation alone does not guarantee qualification for the FDA s priority review procedures.

Even if we obtain regulatory approval for a product, we will remain subject to ongoing regulatory requirements.

If any of our product candidates are approved, we will be subject to ongoing regulatory requirements with respect to manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing clinical trials, and submission of safety, efficacy, and other post-approval information, including both federal and state requirements in the United States, and requirements of comparable foreign regulatory authorities.

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Manufacturers and manufacturers facilities are required to continuously comply with FDA and comparable foreign regulatory authority requirements, including ensuring that quality control and manufacturing procedures conform to current Good Manufacturing Practices, or cGMP, regulations and corresponding foreign regulatory manufacturing requirements. As such, we and our contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any new drug application or marketing authorization application.

Any regulatory approvals that we receive for our product candidates may be subject to limitations on the approved indicated uses for which the product candidate may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the product candidate. We will be required to report adverse reactions and production problems, if any, to the FDA and comparable foreign regulatory authorities. Any new legislation addressing drug safety issues could result in delays in product development or commercialization, or increased costs to assure compliance. If our original marketing approval for a product candidate was obtained through an accelerated approval pathway, we could be required to conduct a successful post-marketing clinical trial in order to confirm the clinical benefit for our products. An unsuccessful post-marketing clinical trial or failure to complete such a trial could result in the withdrawal of marketing approval.

If a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, or disagrees with the promotion, marketing or labeling of a product, the regulatory agency may impose restrictions on that product or us, including requiring withdrawal of the product from the market. If we fail to comply with applicable regulatory requirements, a regulatory agency or enforcement authority may, among other things:

- issue warning letters;
- impose civil or criminal penalties;
- suspend or withdraw regulatory approval;
- suspend any of our ongoing clinical trials;
- refuse to approve pending applications or supplements to approved applications submitted by us;
- impose restrictions on our operations, including closing our contract manufacturers facilities; or
- require a product recall.

Any government investigation of alleged violations of law would be expected to require us to expend significant time and resources in response and could generate adverse publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect our ability to develop and commercialize our products, and the

value of the company and our operating results would be adversely affected.

Healthcare legislative reform measures may have a material adverse effect on our business, financial condition, or results of operations.

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, in March 2010, the Affordable Care Act was passed, which substantially changes the way healthcare is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The Affordable Care Act, among other things, addresses a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected, increases the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extends the rebate program to individuals enrolled in Medicaid managed care organizations, establishes annual fees and taxes on manufacturers of specified branded prescription drugs, and promotes a new Medicare Part D coverage gap discount program.

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Since its enactment, certain aspects of the Affordable Care Act have faced Congressional and Judicial challenges. On January 20, 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from, or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. Congress is currently considering, and could consider in the future, legislation to replace the Affordable Care Act or elements thereof. We cannot predict how the Affordable Care Act, its possible repeal, or any legislation Congress passes to replace the Affordable Care Act will affect our business.

In addition, other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted, and we expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand or lower pricing for our product candidates or additional pricing pressures.

We may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, and health information privacy and security laws. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.

If we obtain FDA approval for any of our product candidates and begin commercializing those products in the United States, our operations may be subject to various federal and state fraud and abuse laws, including, without limitation, the federal Anti-Kickback Statute, the federal False Claims Act, and Physician Payments Sunshine Act, and regulations. These laws may impact, among other things, our relationships with principal investigators and consultants and our proposed sales, marketing, and education programs. In addition, we may be subject to patient privacy regulation by both the federal government and the states in which we conduct our business. The laws that may affect our ability to operate include:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons from knowingly and willfully soliciting, receiving, offering, or paying remuneration, directly or indirectly, to induce, or in return for, the purchase or recommendation of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs;

- federal civil and criminal false claims laws and civil monetary penalties law, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third-party payors that are false or fraudulent;

- the Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created new federal criminal statutes that prohibit, among other things, executing a scheme to defraud any healthcare benefit program and making false statements relating to healthcare matters;

- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and their implementing regulations, which imposes specified obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security, and transmission of individually identifiable health information

without the appropriate authorization, on entities subject to the law, such as healthcare providers, health plans, and healthcare clearinghouses and their respective business associates that perform services for them that involve the creation, use, maintenance, or disclosure of individually identifiable health information;

the federal Physician Payment Sunshine Act under the Affordable Care Act requires manufacturers of drugs, devices, biologics, and medical supplies to report annually to the U.S. Department of Health and Human Services information related to payments and other transfers of value to physicians, other healthcare providers, and teaching hospitals, and ownership and investment interests held by physicians and other healthcare providers, as well as their immediate family members and applicable group purchasing organizations; and

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state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws that may apply to items or services reimbursed by any third-party payor, including governmental and private payors, to comply with the pharmaceutical industry s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures, and state laws governing the privacy and security of health information in specified circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of our business activities could be subject to challenge under one or more of such laws. In addition, recent healthcare reform legislation has strengthened these laws. For example, the Affordable Care Act, among other things, amends the intent requirement of the federal Anti-Kickback Statute and criminal healthcare fraud statutes, such that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate the law. Moreover, the Affordable Care Act provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act.

If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, disgorgement, damages, fines, contractual damages, reputational harm, diminished profits and future earnings, exclusion from participation in government healthcare programs, such as Medicare and Medicaid, including imprisonment, additional reporting requirements and/or oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

Reliance on government funding for our programs may add uncertainty to our research and commercialization efforts with respect to those programs that are tied to such funding and may impose requirements that limit our ability to take specified actions, increase the costs of commercialization and production of product candidates developed under those programs and subject us to potential financial penalties, which could materially and adversely affect our business, financial condition, and results of operations.

During the course of our development of our product candidates, we have been funded in part through federal and state grants, including but not limited to the funding we received from Yale pursuant to a subcontract agreement with Yale. In addition to the funding we have received to date, we have applied and intend to continue to apply for federal and state grants to receive additional funding in the future. Contracts and grants funded by the U.S. government, state governments and their related agencies include provisions that reflect the government s substantial rights and remedies, many of which are not typically found in commercial contracts, including powers of the government to:

require repayment of all or a portion of the grant proceeds, in specified cases with interest, in the event we violate specified covenants pertaining to various matters that include a failure to achieve;

specify milestones or terms relating to use of grant proceeds, or to comply with specified laws;

terminate agreements, in whole or in part, for any reason or no reason;

reduce or modify the government s obligations under such agreements without the consent of the other party;