
U. S. SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 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, 2019**
- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to .

Commission File Number 001-36860

IOVANCE BIOTHERAPEUTICS, INC.

(Exact name of issuer as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

75-3254381
(I.R.S. employer
identification number)

999 Skyway Road, Suite 150, San Carlos, CA 94070
(Address of principal executive offices and zip code)

(650) 260-7120
(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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

Large accelerated filer
Non-accelerated filer

Accelerated filer
Smaller reporting company
Emerging growth company

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

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

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

<u>Title of each class</u>	<u>Trading Symbol(s)</u>	<u>Name of each exchange on which registered</u>
Common stock, par value \$0.000041666 per value	IOVA	The Nasdaq Stock Market, LLC

At July 25, 2019, the issuer had 123,830,506 shares of common stock, par value \$0.000041666 per share, outstanding.

IOVANCE BIOTHERAPEUTICS, INC.
FORM 10-Q
For the Quarter Ended June 30, 2019

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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

**IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Balance Sheets
(in thousands, except share information)**

	June 30, 2019	December 31, 2018
	(unaudited)	
ASSETS		
Current Assets		
Cash and cash equivalents	\$ 76,912	\$ 82,152
Short-term investments	327,241	386,371
Prepaid expenses and other current assets	6,785	6,640
Total Current Assets	410,938	475,163
Operating lease right-of-use assets	11,719	—
Property and equipment, net	4,472	2,683
Restricted cash	5,450	—
Long-term assets	3,345	2,975
Total Assets	\$ 435,924	\$ 480,821
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current Liabilities		
Accounts payable	\$ 12,782	\$ 2,739
Accrued expenses	13,570	11,659
Operating lease liabilities	7,484	—
Total Current Liabilities	33,836	14,398
Non-Current Liabilities		
Operating lease liabilities	4,613	—
Other liabilities	53	230
Total Non-Current Liabilities	4,666	230
Total Liabilities	38,502	14,628
Commitments and contingencies (Note 9)		
Stockholders' Equity		
Series A Convertible Preferred Stock, \$0.001 par value; 17,000 shares authorized, 194 shares issued and outstanding as of June 30, 2019 and December 31, 2018 (aggregate liquidation value of \$194)	—	—
Series B Convertible Preferred Stock, \$0.001 par value; 50,000,000 shares authorized; 5,854,845 shares issued and outstanding as of June 30, 2019 and December 31, 2018 (aggregate liquidation value of \$27,811)	6	6
Common stock, \$0.000041666 par value; 300,000,000 and 150,000,000 shares authorized, 123,820,508 and 123,415,576 shares issued and outstanding as of June 30, 2019 and December 31, 2018, respectively	5	5
Additional paid-in capital	854,596	838,984
Accumulated other comprehensive income (loss)	372	(42)
Accumulated deficit	(457,557)	(372,760)
Total Stockholders' Equity	397,422	466,193
Total Liabilities and Stockholders' Equity	\$ 435,924	\$ 480,821

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

IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Statements of Operations
(unaudited; in thousands, except per share information)

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2019	2018	2019	2018
Revenues	\$ —	\$ —	\$ —	\$ —
Costs and expenses				
Research and development expenses	39,298	24,551	70,203	44,463
General and administrative expenses	10,867	6,827	19,948	13,792
Total costs and expenses	50,165	31,378	90,151	58,255
Loss from operations	(50,165)	(31,378)	(90,151)	(58,255)
Other income				
Interest income, net	2,614	718	5,650	1,080
Net Loss	\$ (47,551)	\$ (30,660)	\$ (84,501)	\$ (57,175)
Net Loss Per Common Share, Basic and Diluted	\$ (0.38)	\$ (0.34)	\$ (0.68)	\$ (0.65)
Weighted Average Common Shares Outstanding, Basic and Diluted	123,567	90,236	123,491	87,310

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

IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Statements of Comprehensive Loss
(unaudited; in thousands)

	Three Months Ended		Six Months Ended	
	June 30,		June 30,	
	2019	2018	2019	2018
Net Loss	\$ (47,551)	\$ (30,660)	\$ (84,501)	\$ (57,175)
Other comprehensive loss:				
Unrealized gain / (loss) on short-term investments	234	(3)	414	(3)
Comprehensive Loss	<u>\$ (47,317)</u>	<u>\$ (30,663)</u>	<u>\$ (84,087)</u>	<u>\$ (57,178)</u>

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

IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Statements of Stockholders' Equity
(unaudited; in thousands, except share information)

	Series A Convertible Preferred Stock		Series B Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated other Comprehensive Income	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount	Shares	Amount	Shares	Amount				
Balance - December 31, 2018	194	\$ —	5,854,845	\$ 6	123,415,576	\$ 5	\$ 838,984	\$ (42)	\$ (372,760)	\$ 466,193
Adoption of ASU 2018-07						—	296		(296)	—
Stock-based compensation expense							12,272			12,272
Vesting of restricted shares issued for services					14,532	1	(1)			—
Tax payments related to shares withheld for vested restricted stock units							(94)			(94)
Common stock issued upon exercise of stock options					422,900	—	3,474			3,474
Unrealized gain on short-term investments								414		414
Cancellation of common shares from settlement of dispute					(32,500)	(1)	(335)			(336)
Net loss									(84,501)	(84,501)
Balance - June 30, 2019	<u>194</u>	<u>\$ —</u>	<u>5,854,845</u>	<u>\$ 6</u>	<u>123,820,508</u>	<u>\$ 5</u>	<u>\$ 854,596</u>	<u>\$ 372</u>	<u>\$ (457,557)</u>	<u>\$ 397,422</u>
Balance - December 31, 2017	1,694	\$ —	7,378,241	\$ 7	73,164,914	\$ 3	\$ 394,651	\$ —	\$ (249,180)	\$ 145,481
Stock-based compensation expense							9,326			9,326
Vesting of restricted shares issued for services					14,546					
Tax payments related to shares withheld for vested restricted stock awards							(122)			(122)
Common stock issued upon exercise of warrants					1,656,510		4,141			4,141
Common stock issued upon exercise of stock options					905,153		6,828			6,828
Common stock sold in public offering, net of offering costs					15,000,000		162,093			162,093
Conversion of convertible preferred stock into common stock	(1,500)		(1,250,548)	(1)	2,000,549	1				—
Unrealized loss on short-term investments								(3)		(3)
Net loss									(57,175)	(57,175)
Balance - June 30, 2018	<u>194</u>	<u>\$ —</u>	<u>6,127,692</u>	<u>\$ 6</u>	<u>92,741,672</u>	<u>\$ 4</u>	<u>\$ 576,917</u>	<u>\$ (3)</u>	<u>\$ (306,355)</u>	<u>\$ 270,569</u>

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



IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Statements of Stockholders' Equity
(unaudited; in thousands, except share information)

	Series A Convertible Preferred Stock		Series B Convertible Preferred Stock		Common Stock		Additional Paid-In Capital	Accumulated other Comprehensive Income	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount	Shares	Amount	Shares	Amount				
Balance – March 31, 2019	194	\$ —	5,854,845	\$ 6	123,395,113	\$ 5	\$ 844,789	\$ 138	\$ (410,006)	\$ 434,932
Stock-based compensation expense							6,426			6,426
Vesting of restricted shares issued for services					7,495	—	(1)			(1)
Tax payments related to shares withheld for vested restricted stock units							(23)			(23)
Common stock issued upon exercise of stock options					417,900	—	3,405			3,405
Unrealized gain on short-term investments								234		234
Net loss									(47,551)	(47,551)
Balance – June 30, 2019	194	\$ —	5,854,845	\$ 6	123,820,508	\$ 5	\$ 854,596	\$ 372	\$ (457,557)	\$ 397,422
Balance – March 31, 2018	1,694	\$ —	7,378,241	\$ 7	89,605,417	\$ 3	\$ 568,243	\$ —	\$ (275,695)	\$ 292,558
Stock-based compensation expense							5,222			5,222
Vesting of restricted shares issued for services					7,495					
Tax payments related to shares withheld for vested restricted stock awards							(62)			(62)
Common stock issued upon exercise of warrants					926,129		2,315			2,315
Common stock issued upon exercise of stock options					202,082	—	1,198			1,198
Conversion of convertible preferred stock into common stock	(1,500)		(1,250,549)	(1)	2,000,549	1	1			1
Unrealized loss on short-term investments								(3)		(3)
Net loss									(30,660)	(30,660)

Balance – June 30, 2018	<u>194</u>	<u>\$ —</u>	<u>6,127,692</u>	<u>\$ 6</u>	<u>92,741,672</u>	<u>\$ 4</u>	<u>\$ 576,917</u>	<u>\$ (3)</u>	<u>\$ (306,355)</u>	<u>\$ 270,569</u>
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The accompanying notes are an integral part of these condensed consolidated financial statements.

IOVANCE BIOTHERAPEUTICS, INC.
Condensed Consolidated Statements of Cash Flows
(unaudited; in thousands)

	Six Months Ended June 30,	
	2019	2018
Cash Flows from Operating Activities		
Net loss	\$ (84,501)	\$ (57,175)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	560	453
Noncash lease expense	3,031	—
Loss on disposal of assets	—	9
Gain on settlement of dispute	(336)	—
Accretion of discounts on investments	(2,430)	(1)
Stock-based compensation expense	12,272	9,326
Changes in assets and liabilities:		
Prepaid expenses, other assets, and long-term assets	(515)	1,604
Operating lease liabilities (Right-of-use assets)	(2,651)	—
Accounts payable	9,951	3,686
Accrued expenses and other liabilities	1,734	326
Net cash used in operating activities	<u>(62,885)</u>	<u>(41,772)</u>
Cash Flows from Investing Activities		
Maturities of short-term investments	263,102	—
Purchase of short-term investments	(201,129)	(30,084)
Purchase of property and equipment	(2,257)	(440)
Net cash provided by (used in) investing activities	<u>59,716</u>	<u>(30,524)</u>
Cash Flows from Financing Activities		
Tax payments related to shares withheld for vested restricted stock awards	(95)	(122)
Proceeds from the issuance of common stock upon exercise of warrants	—	4,141
Proceeds from the issuance of common stock upon exercise of options	3,474	6,828
Proceeds from the issuance of common stock, net	—	162,093
Net cash provided by financing activities	<u>3,379</u>	<u>172,940</u>
Net increase in cash, cash equivalents, and restricted cash	<u>210</u>	<u>100,644</u>
Cash, Cash Equivalents, and Restricted Cash Beginning of Period	<u>82,152</u>	<u>145,373</u>
Cash, Cash Equivalents, and Restricted Cash End of Period	<u>\$ 82,362</u>	<u>\$ 246,017</u>
Supplemental disclosure of non-cash investing and financing activities:		
Unrealized gain (loss) on short-term investments	\$ 414	\$ (3)
Acquisitions of property and equipment included in accounts payable	(92)	(278)
Conversion of convertible preferred stock to common stock	—	1

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

IOVANCE BIOTHERAPEUTICS, INC.
NOTES TO THE CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(unaudited)

NOTE 1. GENERAL ORGANIZATION AND BUSINESS

Iovance Biotherapeutics, Inc. (the “Company”, “we”, “us” or “our”) is a clinical-stage biopharmaceutical company focused on the development and commercialization of novel cancer immunotherapy products designed to harness the power of a patient’s own immune system to eradicate cancer cells. Tumor infiltrating lymphocyte (TIL) therapy is a platform technology that has been licensed from National Cancer Institute (NCI) primarily based on data in metastatic melanoma and advanced cervical cancer. The Company has developed its own proprietary and scalable manufacturing method which is being further investigated in multiple indications. The Company’s lead product candidates include, lifileucel for metastatic melanoma, and LN-145 for advanced cervical cancer. Both product candidates are autologous adoptive cell therapy utilizing TIL, which are T cells derived from patients’ tumors. In addition to metastatic melanoma and advanced cervical cancer, the Company is investigating the effectiveness and safety of TIL therapy for the treatment of squamous cell carcinoma of the head and neck and metastatic non-small cell lung cancer through company sponsored trials, as well as other oncology indications through collaborations. The Company is currently conducting the pivotal cohort of its C-144-01 clinical trial of lifileucel in patients with metastatic melanoma. The Company is also conducting a pivotal trial of LN-145, C-145-04, in patients with advanced cervical cancer. On June 1, 2017, the Company reincorporated to become a company governed by Delaware corporation laws.

Basis of Presentation of Unaudited Condensed Consolidated Financial Information

The unaudited condensed consolidated financial statements of the Company for the three and six months ended June 30, 2019 and 2018 have been prepared in accordance with accounting principles generally accepted in the United States of America (“GAAP”) for interim financial information and pursuant to the requirements for reporting on Form 10-Q and Regulation S-K. Accordingly, they do not include all the information and footnotes required by GAAP for complete financial statements. However, such information reflects all adjustments (consisting solely of normal recurring adjustments), which are, in the opinion of management, necessary for the fair presentation of the financial position and the results of operations. Results shown for interim periods are not necessarily indicative of the results to be obtained for a full fiscal year. The balance sheet information as of December 31, 2018 was derived from the audited financial statements included in the Company’s financial statements as of and for the year ended December 31, 2018 included in the Company’s Annual Report on Form 10-K filed with the Securities and Exchange Commission (the “SEC”) on February 28, 2019. These financial statements should be read in conjunction with that report.

Liquidity

The Company is currently engaged in the development of therapeutics to treat cancer, specifically solid tumors. The Company currently does not have any commercial products and has not yet generated any revenues from its business. The Company currently does not anticipate that it will generate any revenues from the sale or licensing of any of its product candidates during the 12 months from the date these financial statements are issued. The Company has incurred a net loss of \$84.5 million for the six months ended June 30, 2019 and used \$62.9 million of cash in its operating activities during the six months ended June 30, 2019. In January 2018, the Company closed an underwritten public offering of 15,000,000 shares of the Company’s common stock at a public offering price of \$11.50 per share, before underwriting discounts. The net proceeds from the offering, after deducting the underwriting discounts and commissions and other offering expenses payable by the Company, were \$162.0 million. In October 2018, the Company completed an underwritten public offering of 25,300,000 shares of the Company’s common stock at a public offering price of \$9.97 per share, before underwriting discounts. The net proceeds from the offering, after deducting the underwriting discounts and commissions and other offering expenses payable by the Company, were \$236.7 million. As of June 30, 2019, the Company had \$404.1 in cash, cash equivalents and short-term investments (\$76.9 million of cash and cash equivalents and \$327.2 million in short-term investments).

The Company expects to further increase its research and development activities, which will increase the amount of cash used during 2019 and beyond. Specifically, the Company expects continued spending on its current and planned clinical trials, continued expansion of manufacturing activities, including construction of a manufacturing facility, higher payroll expenses as the Company increases its professional and scientific staff, increased research and development activities and initiation of pre-commercial activities. However, the extent and the timing of these expenditures are under the control of the Company. Based on the funds the Company has available as of the date these financial statements are

issued, the Company believes that it has sufficient capital to fund its anticipated operating expenses for at least next twelve months from the date these financial statements are issued

Concentrations of Risk

The Company is subject to credit risk from our portfolio of cash equivalents and short-term investments. Under its investment policy, the Company limits amounts invested in such securities by credit rating, maturity, industry group, investment type and issuer, except for securities issued by the U.S. government. The Company does not believe it is exposed to any significant concentrations of credit risk from these financial instruments. The goals of its investment policy, in order of priority, are as follows: safety and preservation of principal and diversification of risk; liquidity of investments sufficient to meet cash flow requirements; and a competitive after-tax rate of return.

NOTE 2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Cash, Cash Equivalents, Restricted Cash, and Short-term Investments

The Company's cash and cash equivalents include short-term investments with original maturities of three months or less when purchased. The Company's short-term investments are classified as "available-for-sale". The Company includes these investments in current assets and carries them at fair value. Unrealized gains and losses on available-for-sale securities are included in accumulated other comprehensive loss. The cost of debt securities is adjusted for the amortization of premiums and accretion of discounts to maturity. Such amortization and accretion are included in net interest income in the consolidated statements operations. Gains and losses on securities sold are recorded based on the specific identification method and are included in net interest income in the consolidated statement of operations. The Company has not incurred any realized gains or losses from sales of securities to date. The Company's investment policy limits investments to certain types of instruments such as certificates of deposit, money market instruments, obligations issued by the U.S. government and U.S. government agencies as well as corporate debt securities, and places restrictions on maturities and concentration by type and issuer.

The Company maintains a certain minimum balance, currently \$5.5 million in a segregated bank account in connection with a letter of credit for the benefit of the landlord for its commercial manufacturing facility used as a security deposit for the lease (See Note 9 - Leases). This amount is classified as Restricted Cash on the Balance Sheet. The letter of credit will expire on May 28, 2020, however, it will be automatically extended, without written agreement, for one-year periods to May 28 in each succeeding calendar year, through at least 60 days after the lease expiration rate. Further, on the expiration of the seventh year of the lease, and each anniversary date thereafter, the letter of credit may be decreased by \$1,000,000, with a minimum security deposit of \$1,450,000 maintained through the end of the lease term. As of June 30, 2019, restricted cash consisted of \$5.5 million and this amount has been classified as non-current asset on the Company's consolidated balance sheets.

The following table provides a reconciliation of cash, cash equivalents, and restricted cash, reported within the condensed consolidated balance sheets that sum to the total of the same such amounts shown in the condensed consolidated statement of cash flows:

	June 30, 2019	June 30, 2018
Cash	\$ 76,912	\$ 246,017
Restricted cash (included in non-current assets on the consolidated balance sheets)	5,450	—
Total cash, cash equivalents and restricted cash	<u>\$ 82,362</u>	<u>\$ 246,017</u>

Loss per Share

Basic net loss per share is computed by dividing the net loss by the weighted average number of common shares outstanding during the period.

Diluted net loss per share is computed by dividing the net loss by the sum of the weighted average number of shares of common stock outstanding and the dilutive common stock equivalent shares outstanding during the period. The Company's potentially dilutive common stock equivalent shares, which include incremental common shares issuable upon (i) the exercise of outstanding stock options and warrants (ii) vesting of restricted stock units and restricted stock

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awards, and (iii) conversion of preferred stock, are only included in the calculation of diluted net loss per share when their effect is dilutive.

At June 30, 2019 and 2018, the following outstanding common stock equivalents have been excluded from the calculation of net loss per share because their impact would be anti-dilutive.

	June 30,	
	2019	2018
Stock options	9,205,672	6,837,817
Warrants	—	4,644,706
Series A Convertible Preferred Stock*	97,000	97,000
Series B Convertible Preferred Stock*	5,854,845	6,127,692
Restricted stock units	45,828	91,665
	<u>15,203,345</u>	<u>17,798,880</u>

* on an as-converted basis

The dilutive effect of potentially dilutive securities would be reflected in diluted earnings per common share by application of the treasury stock method. Under the treasury stock method, an increase in the fair market value of the Company's common stock could result in a greater dilutive effect from potentially dilutive securities.

Fair Value Measurements

Under Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (“ASC”) 820, Fair Value Measurements and Disclosures, fair value is defined as the price at which an asset could be exchanged, or a liability transferred in a transaction between knowledgeable, willing parties in the principal or most advantageous market for the asset or liability. Where available, fair value is based on observable market prices or parameters or derived from such prices or parameters. Where observable prices or parameters are not available, valuation models are applied.

Assets and liabilities recorded at fair value in the Company’s financial statements are categorized based upon the level of judgment associated with the inputs used to measure their fair value. Hierarchical levels directly related to the amount of subjectivity associated with the inputs to fair valuation of these assets and liabilities, are as follows:

Level 1—Inputs are unadjusted, quoted prices in active markets for identical assets at the reporting date. Active markets are those in which transactions for the asset or liability occur in sufficient frequency and volume to provide pricing information on an ongoing basis.

Level 2—Are inputs, other than quoted prices included in Level 1, that are either directly or indirectly observable for the asset or liability through correlation with market data at the reporting date and for the duration of the instrument’s anticipated life.

The fair valued assets the Company holds that are generally assessed under Level 2 are corporate bonds and commercial paper. The Company utilizes third party pricing services in developing fair value measurements where fair value is based on valuation methodologies such as models using observable market inputs, including benchmark yields, reported trades, broker/dealer quotes, bids, offers and other reference data. The Company uses quotes from external pricing service providers and other on-line quotation systems to verify the fair value of investments provided by its third-party pricing service providers. The Company reviews independent service auditor’s reports from its third-party pricing service providers particularly regarding the controls over pricing and valuation of financial instruments and ensure that its internal controls address certain control deficiencies, if any, and complementary user entity controls are in place.

The Company does not have fair valued assets classified under Level 2 as of June 30, 2019 and December 31, 2018.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities and which reflect management’s best estimate of what market participants would use in pricing the asset or liability at the reporting date. Consideration is given to the risk inherent in the valuation technique and the risk inherent in the inputs to the model.

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The Company's financial instruments consist of cash and cash equivalents, short-term investments, and accounts payable, all of which are reported at their respective fair value on its consolidated balance sheets.

The Company does not have fair valued assets classified under Level 3 as of June 30, 2019 and December 31, 2018.

As of June 30, 2019 and December 31, 2018, financial assets measured at fair value on a recurring basis are categorized in the table below based upon the lowest level of significant input to the valuations (in thousands):

	Assets at Fair Value as of June 30, 2019			
	Level 1	Level 2	Level 3	Total
U.S. treasury securities	\$ 187,695	\$ —	\$ —	\$ 187,695
U.S. government agency securities	139,546	—	—	139,546
Total	\$ 327,241	\$ —	\$ —	\$ 327,241

	Assets at Fair Value as of December 31, 2018			
	Level 1	Level 2	Level 3	Total
U.S. treasury securities	\$ 265,393	\$ —	\$ —	\$ 265,393
U.S. government agency securities	120,978	—	—	120,978
Total	\$ 386,371	\$ —	\$ —	\$ 386,371

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates. Significant estimates include valuation of short-term investments, accounting for potential liabilities, the valuation allowance associated with the Company's deferred tax assets, the assumptions made in valuing stock instruments issued for services and used in measuring operating lease right-of-use assets and operating lease liabilities.

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Iovance Biotherapeutics, Inc. and its wholly-owned subsidiary, Iovance Biotherapeutics GmbH. All intercompany accounts and transactions have been eliminated. The U.S. dollar is the functional currency for all the Company's consolidated operations.

Leases

The Company determines if an arrangement includes a lease at inception. Operating leases are included in its condensed consolidated balance sheet as Operating lease right-of-use assets and Operating lease liabilities as of June 30, 2019. Operating lease right-of-use assets represent our right to use an underlying asset for the lease term and operating lease liabilities represent our obligation to make lease payments arising from the lease. Operating lease right-of-use assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. In determining the net present value of lease payments, the Company uses an estimated incremental borrowing rate that is applicable to the Company based on the information available at later of the lease commencement date or the date of adoption of Accounting Standard Update (ASU) No. 2016-02 and ASU No. 2018-10, Leases (together "Topic 842"). The operating lease right-of-use assets also include any lease payments made less lease incentives. The Company's leases may include options to extend or terminate the lease, which is considered in the lease term when it is reasonably certain that the Company will exercise any such options. Lease expense is recognized on a straight-line basis over the expected lease term. The Company has elected not to apply the recognition requirements of Topic 842 for short-term leases.

For lease agreements entered into after the adoption of Topic 842 that include lease and non-lease components, such components are generally accounted for separately.

Prior period amounts continue to be reported in accordance with our historic accounting under previous lease guidance, Topic 840. See “Recently Adopted Accounting Pronouncements - Leases” below, for more information about the impact of the adoption on Topic 842.

Stock-Based Compensation

The Company periodically grants stock options to employees and non-employees in non-capital raising transactions as compensation for services rendered. The Company accounts for stock option grants to employees based on the authoritative guidance provided by the FASB where the value of the award is measured on the date of grant and recognized over the vesting period. Upon the adoption of ASU No. 2018-07, Compensation-Stock Compensation (“Topic 718”), the Company accounts for stock option grants to non-employees in the similar manner as stock option grants to employees, therefore no longer requiring a remeasurement at the then-current fair values at each reporting date until the share options have vested. The nonemployee awards that contain a performance condition that affects the quantity or other terms of the award are measured based on the outcome that is probable.

The fair value of the Company's common stock option grants is estimated using a Black-Scholes option pricing model, which uses certain assumptions related to risk-free interest rates, expected volatility, expected life of the common stock options, and future dividends. For non-employee stock option awards, an option term is used in the Black-Scholes option pricing model in lieu of expected life of the common stock options. The stock-based compensation expense is recorded based upon the value derived from the Black-Scholes option pricing model. The assumptions used in the Black-Scholes option pricing model could materially affect compensation expense recorded in future periods.

The Company has in the past issued restricted stock units (RSU) and restricted stock awards (RSA) as part of its share-based compensation programs. The Company measures the compensation cost with respect to RSU and RSA issued to employees based upon the estimated fair value of the equity instruments at the date of the grant, which is recognized as an expense over the period during which an employee is required to provide services in exchange for the award.

The fair value of restricted stock units is based on the closing price of the Company’s common stock on the grant date.

Total stock-based compensation expense related to all of the Company’s stock-based awards was recorded on the statements of operations as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Research and development	\$ 2,720	\$ 2,381	\$ 5,421	\$ 4,381
General and administrative	3,706	2,841	6,851	4,945
Total stock-based compensation expenses	<u>\$ 6,426</u>	<u>\$ 5,222</u>	<u>\$ 12,272</u>	<u>\$ 9,326</u>

Total stock-based compensation expenses broken down based on each individual instrument were as follows (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
Stock option expenses	\$ 6,359	\$ 5,155	\$ 12,138	\$ 9,192
Restricted stock award expenses	—	—	—	—
Restricted stock unit expenses	67	67	134	134
Total stock-based compensation expenses	<u>\$ 6,426</u>	<u>\$ 5,222</u>	<u>\$ 12,272</u>	<u>\$ 9,326</u>

Preferred Stock

The Company applies the accounting standards for distinguishing liabilities from equity when determining the classification and measurement of its preferred stock. Preferred shares subject to mandatory redemption are classified as liability instruments and are measured at fair value. Conditionally redeemable preferred shares (including preferred shares that feature redemption rights that are either within the control of the holder or subject to redemption upon the

occurrence of uncertain events not solely within the Company's control) are classified as temporary equity. At all other times, preferred shares are classified as stockholders' equity.

Convertible Instruments

The Company applies the accounting standards for derivatives and hedging and for distinguishing liabilities from equity when accounting for hybrid contracts that feature conversion options. The accounting standards require companies to bifurcate conversion options from their host instruments and account for them as free-standing derivative financial instruments according to certain criteria. The criteria include circumstances in which (i) the economic characteristics and risks of the embedded derivative instrument are not clearly and closely related to the economic characteristics and risks of the host contract, (ii) the hybrid instrument that embodies both the embedded derivative instrument and the host contract is not re-measured at fair value under otherwise applicable generally accepted accounting principles with changes in fair value reported in earnings as they occur and (iii) a separate instrument with the same terms as the embedded derivative instrument would be considered a derivative instrument. The derivative is subsequently marked to market at each reporting date based on current fair value, with the changes in fair value reported in results of operations.

Conversion options that contain variable settlement features such as provisions to adjust the conversion price upon subsequent issuances of equity or equity linked securities at exercise prices more favorable than that featured in the hybrid contract generally result in their bifurcation from the host instrument.

The Company also records, when necessary, deemed dividends for the intrinsic value of the conversion options embedded in preferred stock based upon the difference between the fair value of the underlying common stock at the commitment date of the transaction and the effective conversion price embedded in the preferred stock.

Recent Accounting Pronouncements

Leases

On January 1, 2019, the Company adopted Topic 842, which establishes a new lease accounting method for lessees. The updated guidance requires an entity to recognize assets and liabilities arising from a lease for both financing and operating leases, along with additional qualitative and quantitative disclosures. The Company elected the package of practical expedients requiring no reassessment of whether any expired or existing contracts are or contain leases, the lease classification of any expired or existing leases, or initial direct costs for any existing leases. The standard had a material impact on its consolidated balance sheets by recognizing Operating lease right-of-use assets and Operating lease liabilities for operating leases but did not have an impact on our consolidated statement of operations or cash flows. The adoption of the Topic 842 resulted in recognition of Operating lease right-of-use assets of \$10.4 million, \$4.9 million of Operating lease liabilities – current, and \$5.8 million of Operating lease liabilities – noncurrent as of January 1, 2019, the date of adoption.

Improvements to Nonemployee Share-Based Payment Accounting

On January 1, 2019, the Company adopted Topic 718, which eliminates the separate accounting method for nonemployee share-based payment awards and generally requires companies to account for share-based payment transactions with nonemployees in the same manner as share-based payment transactions with employees. Under the new guidance, nonemployee share-based payment transactions are measured at the grant-date fair value and are no longer remeasured at the then-current fair values at each reporting date until the share options have vested. The guidance requires a modified-retrospective approach in transition. The Company compared the cumulative amounts that were recorded for its nonemployee share-based payments through December 31, 2018 immediately preceding the date of adoption to the cumulative amounts that should be recognized at the adoption date and recognized a cumulative effect of the transition adjustment of \$0.3 million to retained earnings as of the date of adoption, January 1, 2019.

Presentation of Stockholders' Equity

In August 2018, the Security Exchange Commission (SEC) adopted the final rule under SEC Release No. 33-10532, "Disclosure Update and Simplification," amending certain disclosure requirements that were redundant, duplicative, overlapping, outdated or superseded. In addition, the amendments expanded the disclosure requirements on the analysis of stockholders' equity for interim financial statements. Under the amendments, an analysis of changes in each caption of stockholders' equity presented in the balance sheet must be provided in a note or separate statement. The

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Company has included its presentation of changes in stockholders' equity in this Quarterly Report on Form 10-Q for the three and six months ended June 30, 2019 and 2018.

Fair Value Measurements Disclosure

In August 2018, the FASB issued ASU No. 2018-13 Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement, which eliminates disclosure requirement regarding transfers between level 1 and level 2 of the fair value hierarchy, however, adds disclosure requirements on the range and weighted average used to develop significant unobservable inputs for level 3 fair value measurements. The Company adopted the guidance on January 1, 2019, however, there was no adjustment required to its disclosures as it did not have fair value assets classified under level 2 or 3 as of June 30, 2019 and December 31, 2018.

Financial Instruments

In June 2016, the FASB issued ASU 2016-13, Financial Instruments - Credit Losses, and also issued subsequent amendments to the initial guidance, ASU 2018-19, ASU 2019-04, and ASU 2019-05 (collectively, Topic 326), to introduce a new impairment model for recognizing credit losses on financial instruments based on an estimate of current expected credit losses (CECL). Under Topic 326, an entity is required to estimate CECL on available-for-sale (AFS) debt securities only when the fair value is below the amortized cost of the asset and is no longer based on an impairment being “other-than-temporary”. Topic 326 also requires the impairment calculation on an individual security level and requires an entity use present value of cash flows when estimating the CECL. The credit-related losses are required to be recognized through earnings and non-credit related losses are reported in other comprehensive income. In April 2019, the FASB further clarified the scope of Topic 326 and addressed issues related to accrued interest receivable balances, recoveries, variable interest rates and prepayment. Topic 326 will be effective for public entities in fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. The new guidance will require modified retrospective application to all outstanding instruments, with a cumulative effect adjustment recorded to opening retained earnings as of the beginning of the first period in which the guidance becomes effective. The Company does not believe the adoption of this new guidance will have any material impact on its consolidated financial statements.

Cloud Computing Arrangements

In August 2018, the FASB issued ASU 2018-15, Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40) Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract (ASU 2018-15), to help entities evaluate the accounting for fees paid by a customer in a cloud computing arrangement (hosting arrangement) by providing guidance for determining when the arrangement includes a software license. The guidance provided generally means that an intangible asset is recognized for the software license and, to the extent that the payments attributable to the software license are made over time, a liability also is recognized. If a cloud computing arrangement does not include a software license, the entity should account for the arrangement as a service contract. This generally means that the fees associated with the hosting element (service) of the arrangement are expensed as incurred. ASU 2018-15 is effective for fiscal years beginning subsequent to December 15, 2019. The Company is currently assessing the potential impact of adopting ASU 2018-15 on its consolidated financial statements and related disclosures.

Reclassifications

Certain amounts within the balance sheets for the prior period have been reclassified to conform with the current period presentation. These reclassifications had no impact on the Company's previously reported financial position or cash flows for any of the periods presented.

NOTE 3. CASH EQUIVALENTS AND SHORT-TERM INVESTMENTS

Cash equivalents and short-term investments consist of the following (in thousands):

	June 30, 2019	December 31, 2018
Cash equivalents - Money market funds	\$ 33,250	\$ 25,968
Cash equivalents - U.S government securities	9,979	—
Cash equivalents total	<u>\$ 43,229</u>	<u>\$ 25,968</u>

Cash equivalents in the tables above exclude cash demand deposits of \$33.7 million and \$56.2 million as of June 30, 2019 and December 31, 2018, respectively.

Short-term Investments	June 30, 2019	December 31, 2018
U.S. treasury securities	\$ 187,695	\$ 265,393
U.S. government agency securities	139,546	120,978
Short-term investments total	<u>\$ 327,241</u>	<u>\$ 386,371</u>

The cost and fair value of cash equivalents and short-term investments at June 30, 2019 and December 31, 2018 were as follows (in thousands):

As of June 30, 2019	Cost	Accretion	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. treasury securities	\$ 186,540	\$ 923	\$ 232	\$ —	\$ 187,695
U.S. government agency securities	138,499	907	140	—	139,546
Total	<u>\$ 325,039</u>	<u>\$ 1,830</u>	<u>\$ 372</u>	<u>\$ —</u>	<u>\$ 327,241</u>

As of December 31, 2018	Cost	Accretion	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
U.S. treasury securities	\$ 264,619	\$ 813	\$ 19	\$ (58)	\$ 265,393
U.S. government agency securities	120,653	328	21	(24)	120,978
Total	<u>\$ 385,272</u>	<u>\$ 1,141</u>	<u>\$ 40</u>	<u>\$ (82)</u>	<u>\$ 386,371</u>

Unrealized gains and losses are included in accumulated other comprehensive loss. All short-term investments held by the Company as of June 30, 2019 and December 31, 2018 have a maturity of less than one year.

NOTE 4. BALANCE SHEET COMPONENTS

Accrued expenses consist of the following (in thousands):

	June 30, 2019	December 31, 2018
Accrued payroll and employee related expenses	\$ 3,944	\$ 4,113
Legal and related services	790	825
Clinical related	4,446	3,424
Manufacturing related	3,410	2,684
Accrued other	980	489
Deferred rent - current	—	124
	<u>\$ 13,570</u>	<u>\$ 11,659</u>

NOTE 5. STOCKHOLDERS' EQUITY

Public Offerings and Common Stock

In September 2017, the Company closed an underwritten public offering of 8,846,154 shares of the Company's common stock at a public offering price of \$6.50 per share, before underwriting discounts, which included 1,153,846 shares issued upon the exercise in full by the underwriters of their option to purchase additional shares at the public offering price less the underwriting discounts. The gross proceeds from the offering, before deducting the underwriting discounts and commissions and other offering expenses payable by the Company, were \$57.5 million, with net proceeds to the Company of \$53.7 million.

In January 2018, the Company closed an underwritten public offering of 15,000,000 shares of the Company's common stock at a public offering price of \$11.50 per share, before underwriting discounts, which included 1,956,521 shares issued upon the exercise in full by the underwriter of its option to purchase additional shares at the public offering price less the underwriting discount. The gross proceeds from the offering, before deducting the underwriting discounts and commissions and other offering expenses payable by the Company, were \$172.5 million, with net proceeds to the Company of \$162.0 million.

On October 17, 2018, the Company completed an underwritten public offering of 25,300,000 shares of the Company's common stock at a public offering price of \$9.97 per share, before underwriting discounts, which included 3,300,000 shares issued upon the exercise in full by the underwriter of its option to purchase additional shares at the public offering price less the underwriting discount. The gross proceeds from the offering, before deducting the underwriting discounts and commissions and other estimated offering expenses payable by the Company, were \$252.2 million, with net proceeds to the Company of \$236.7 million.

On June 10, 2019, the certificate of incorporation of the Company was amended to increase the number of authorized shares of the Company's common stock, par value \$0.000041666, from 150,000,000 shares to 300,000,000 shares (the "Certificate of Amendment"). The Certificate of Amendment was approved by the Company's stockholders at the Company's 2019 Annual Meeting of Stockholders held on June 10, 2019.

Preferred Stock

The Company's certificate of incorporation authorizes the issuance of up to 50,000,000 shares of "blank check" preferred stock. At June 30, 2019, 17,000 shares were designated as Series A Convertible Preferred Stock ("Series A Convertible Preferred Stock") and 11,500,000 shares were designated as Series B Convertible Preferred Stock ("Series B Convertible Preferred Stock").

Series A Convertible Preferred Stock

A total of 17,000 shares of Series A Convertible Preferred Stock have been authorized for issuance under the Company's Certificate of Designation of Preferences and Rights of Series A Convertible Preferred Stock. The shares of Series A Convertible Preferred Stock have a stated value of \$1,000 per share and are initially convertible into shares of common stock at a price of \$2.00 per share, subject to adjustment.

The Series A Convertible Preferred Stock may, at the option of each investor, be converted into fully paid and non-assessable shares of common stock. The holders of shares of Series A Convertible Preferred Stock do not have the right to vote on matters that come before the Company's stockholders. In the event of any dissolution or winding up of the Company, proceeds shall be paid pari passu among the holders of common stock and preferred stock, pro rata based on the number of shares held by each holder. The Company may not declare, pay or set aside any dividends on shares of capital stock of the Company (other than dividends on shares of common stock payable in shares of common stock) unless the holders of the Series A Convertible Preferred Stock shall first receive an equal dividend on each outstanding share of Series A Convertible Preferred Stock. The common shares issued were determined on a formula basis of 500 common shares for each share of Series A Convertible Preferred Stock converted.

No Shares of Series A Convertible Preferred Stock were converted during the six months ended June 30, 2019. 1,500 shares of Series A Convertible Preferred Stock were converted into 750,000 shares of common stock during the six months ended June 30, 2018. At June 30, 2019 and 2018, 194 shares of Series A Convertible Preferred Stock (that are convertible into 97,000 shares of common stock) remained outstanding.

Series B Convertible Preferred Stock

A total of 11,500,000 shares of Series B Convertible Preferred Stock are authorized for issuance under the Company's Series B Certificate of Designation of Rights, Preferences and Privileges of Series B Convertible Preferred Stock. The shares of Series B Convertible Preferred Stock have a stated value of \$4.75 per share and are convertible into shares of the Company's common stock at an initial conversion price of \$4.75 per share.

Holders of Series B Convertible Preferred Stock are entitled to dividends on an as-if-converted basis in the same form as any dividends actually paid on shares of the Series A Convertible Preferred Stock or the Company's common stock. So long as any Series B Convertible Preferred Stock remains outstanding, the Company may not redeem, purchase or otherwise acquire any material amount of the Series A Convertible Preferred Stock or any securities junior to the Series B Convertible Preferred Stock.

No shares of Series B Convertible Preferred Stock were converted during the six months ended June 30, 2019. 1,250,549 shares of Series B Convertible Preferred Stock were converted into 1,250,549 shares of common stock during the six months ended June 30, 2018. At June 30, 2019 and 2018, 5,854,845 and 6,127,692 shares of Series B Preferred Stock (that are convertible into 5,854,845 and 6,127,692 shares of common stock) remained outstanding, respectively.

Cancellation of Common Shares

On September 30, 2013, the Company and a third party entered into an agreement under which the Company issued 50,000 shares of unregistered stock in the Company to the third party. On January 16, 2019, the two parties entered into a confidential settlement agreement in connection with a dispute related to their prior relationship and activities. As part of the settlement, the third party returned 32,500 shares of common stock to the Company for cancellation and retained the remaining 17,500 shares. The Company included a gain of \$335,000 on cancellation of 32,500 shares in Other income in its condensed consolidated statement of operations.

NOTE 6. STOCK BASED COMPENSATION

Stock Plans

On October 14, 2011, the Company adopted the 2011 Equity Incentive Plan (the "2011 Plan"). Employees, directors, consultants and advisors of the Company are eligible to participate in the 2011 Plan. The 2011 Plan initially had 180,000 shares of common stock reserved for issuance in the form of incentive stock options, non-qualified options, common stock, and grant appreciation rights. The 2011 Plan was not approved by the Company's stockholders within the required one-year period following its adoption and, accordingly, no incentive stock options can be granted under the 2011 plan, but non-qualified options, common stock and grant appreciation rights can still be granted. In August 2013, the Company's Board of Directors and a majority of the Company's stockholders approved an amendment to increase the number of shares available under the 2011 Plan from 180,000 shares to 1,700,000 shares, and an amendment to increase the number of options or other awards that can be granted to any one person during a twelve (12) month period from 50,000 shares to 300,000 shares. The foregoing amendment to the 2011 Plan became effective in September 2013. On August 20, 2014, the Company's Board of Directors amended the 2011 Plan to increase the number of shares available for issuance upon the exercise of stock options under the 2011 Plan from 1,700,000 to 1,900,000 shares, effective immediately. As of June 30, 2019, 151,240 shares were available for future grant under the 2011 Plan.

On September 19, 2014, the Company's Board of Directors adopted the Iovance Biotherapeutics, Inc. 2014 Equity Incentive Plan (the "2014 Plan"). The 2014 Plan was approved by the Company's stockholders at the Company's 2014 Annual Meeting of Stockholders held in November 2014. The 2014 Plan, as approved by the stockholders, authorized the issuance up to an aggregate of 2,350,000 shares of the Company's common stock. On April 10, 2015, the Board of Directors amended the 2014 Plan to increase the total number of shares that can be issued under the 2014 Plan to 4,000,000 shares of the Company's common stock. The increase in shares available for issuance under the 2014 Plan was approved by the Company's stockholders at the Company's 2015 Annual Meeting of Stockholders in June 2015.

On August 16, 2016, the Company's stockholders approved an increase in the total number of shares that can be issued under the 2014 Plan to 9,000,000 shares of the Company's common stock. As of June 30, 2019, 36,024 shares were available for grant under the Company's 2014 Plan.

On April 22, 2018, the Board of Directors adopted the Iovance Biotherapeutics, Inc. 2018 Equity Incentive Plan (the "2018 Plan"). The 2018 Plan was approved by the Company's stockholders at the Annual Meeting of Stockholders

held in June 2018. The 2018 Plan as approved by the stockholders authorized the issuance up to an aggregate of 6,000,000 shares of common stock reserved for issuance in the form of incentive (qualified) stock options, non-qualified options, common stock, stock appreciation rights, restricted stock awards, restricted stock units, other stock-based awards, other cash-based awards or any combination of the foregoing. As of June 30, 2019, 4,029,500 shares were available for grant under the 2018 Plan.

Restricted Stock Units

On June 1, 2016, the Company entered into a restricted stock unit agreement with the Company's new Chief Executive Officer, Maria Fardis, Ph.D., pursuant to which the Company granted Dr. Fardis 550,000 non-transferrable restricted stock units at fair market value of \$5.87 per share as an inducement for employment pursuant to Nasdaq Listing Rule 5635(c)(4). The 550,000 restricted stock units vest in installments as follows: (i) 137,500 restricted stock units vested upon the first anniversary of the effective date of Dr. Fardis' employment agreement; (ii) 275,000 restricted stock units vest upon the satisfaction of certain clinical trial milestones; and (iii) 137,500 restricted stock units vest in equal monthly installments over the 36-month period following the first anniversary of the effective date of Dr. Fardis' employment, provided that Dr. Fardis has been continuously employed with the Company as of such vesting dates. As of June 30, 2019, 45,828 restricted stock units remained unvested.

Stock-based compensation expense for restricted stock units are measured based on the closing fair market value of the Company's common stock on the date of grant. The stock-based compensation expenses relating to restricted stock units were \$0.1 million and \$0.1 million for the three months ended June 30, 2019 and 2018, respectively, and \$0.1 million and \$0.1 million for the six months ended June 30, 2019 and 2018, respectively, recorded as part of general and administrative expenses.

As of June 30, 2019, \$0.3 million of total unrecognized compensation costs related to non-vested restricted stock units to be recognized over a weighted average period of 0.92 years.

Stock Options

A summary of the status of stock options at June 30, 2019, and the changes during the six months then ended, is presented in the following table:

	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contract Life	Aggregate Intrinsic Value (in thousands)
Outstanding at January 1, 2019	6,889,287	\$ 10.25		
Granted	3,066,300	12.09		
Exercised	(422,900)	8.22		
Expired/Forfeited	(327,015)	12.01		
Outstanding at June 30, 2019	<u>9,205,672</u>	<u>\$ 10.89</u>	<u>8.31</u>	<u>126,117</u>
Options exercisable at June 30, 2019	<u>3,965,687</u>	<u>\$ 9.25</u>	<u>7.33</u>	<u>\$ 61,231</u>

The Company recorded stock-based compensation expenses related to options of \$6.4 million and \$5.2 million for the three months ended June 30, 2019 and 2018, respectively, and \$12.1 million and \$9.2 million for the six months ended June 30, 2019 and 2018, respectively. As of June 30, 2019, there was \$43.8 million of total unrecognized compensation expense related to the options to be recognized over a weighted average period of 2.09 years.

The weighted average grant date fair value for employee options granted under the Company's stock option plans during the six months ended June 30, 2019 and 2018 was \$7.98 and \$15.26 per option respectively.

The aggregate intrinsic value in the table above reflects the total pre-tax intrinsic value (the difference between the Company's closing stock price on the last trading day of the quarter ended June 30, 2019 and the exercise price of the options, multiplied by the number of in-the-money stock options) that would have been received by the option holders had all option holders exercised their options on June 30, 2019. The intrinsic value of the Company's stock options changes based on the closing price of the Company's common stock.

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The following table summarizes the assumptions relating to options granted pursuant to the Company's equity incentive plans for the six months ended June 30, 2019 and 2018:

Assumptions:	Six Months Ended June 30,	
	2019	2018
Expected term (years)	6.06	5.13 – 6.50
Expected volatility	70.78%	167.54% – 200.28%
Risk-free interest rate	2.59%	2.27% – 2.97%
Expected dividend yield	0%	0%

Expected Dividend Yield —The Company has never paid dividends and does not expect to pay dividends in the foreseeable future.

Risk-Free Interest Rate —The risk-free interest rate was based on the market yield currently available on United States Treasury securities with maturities approximately equal to the option's expected term.

Expected Term —The expected term of the stock option grants was calculated based on historical exercises, cancellations, and forfeitures of stock options and outstanding option shares.

Expected Volatility —The expected volatility is based on the historical volatility for the Company's stock over a period equal to the expected terms of the options.

Forfeiture Rate —The Company recognizes forfeitures as they occur.

Each of the inputs discussed above is subjective and generally requires significant management judgment.

NOTE 7. LICENSES AND AGREEMENTS

National Institutes of Health (“NIH”) and the National Cancer Institute (“NCI”)

Cooperative Research and Development Agreement (“CRADA”)

In August 2011, the Company signed a five-year CRADA with the NCI to work with Dr. Steven Rosenberg on developing adoptive cell immunotherapies that are designed to destroy metastatic melanoma cells using a patient's tumor infiltrating lymphocytes.

In January 2015, the Company executed an amendment to the CRADA to include four new indications. As amended, in addition to metastatic melanoma, the CRADA included the development of TIL therapy for the treatment of patients with bladder, lung, triple-negative breast, and Human Papilloma Virus (“HPV”)-associated cancers.

In August 2016, the NCI and the Company entered into a second amendment to the CRADA. The principal changes effected by the second amendment included (i) extending the term of the CRADA by another five years to August 2021, and (ii) modifying the focus on the development of unmodified TIL as a stand-alone therapy or in combination with FDA licensed products and commercially available reagents routinely used for adoptive cell therapy. The parties will continue the development of improved methods for the generation and selection of TIL with anti-tumor reactivity in metastatic melanoma, bladder, lung, breast, and HPV-associated cancers.

Pursuant to the terms of the CRADA, the Company is currently required to make quarterly payments of \$0.5 million to the NCI for support of research activities. To the extent the Company licenses patent rights relating to a TIL-based product candidate, the Company will be responsible for all patent-related expenses and fees, past and future, relating to the TIL-based product candidate. In addition, the Company may be required to supply certain test articles, including TIL, grown and processed under cGMP conditions, suitable for use in clinical trials, where the Company holds the investigational new drug application for such clinical trial. The extended CRADA has a five-year term expiring in August 2021. The Company or the NCI may unilaterally terminate the CRADA for any reason or for no reason at any time by providing written notice at least 60 days before the desired termination date. The Company recorded costs associated with the CRADA of \$0.5 million for the three months ended June 30, 2019 and 2018, and \$1.0 million for the six months ended June 30, 2019 and 2018 as research and development expenses.

Patent License Agreement Related to the Development and Manufacture of TIL

Effective October 5, 2011, the Company entered into an Exclusive Patent License Agreement (the “Patent License Agreement”) with the NIH, an agency of the United States Public Health Service within the Department of Health and Human Services, which was subsequently amended on February 9, 2015 and October 2, 2015. Pursuant to the Patent License Agreement, as amended, the NIH granted the Company licenses, including exclusive, co-exclusive, and non-exclusive licenses, to certain technologies relating to autologous tumor infiltrating lymphocyte adoptive cell therapy products for the treatment of metastatic melanoma, lung, breast, bladder and HPV-positive cancers. The Patent License Agreement requires the Company to pay royalties based on a percentage of net sales (which percentage is in the mid-single digits), a percentage of revenues from sublicensing arrangements, and lump sum benchmark royalty payments on the achievement of certain clinical and regulatory milestones for each of the various indications and other direct costs incurred by the NIH pursuant to the agreement.

Exclusive Patent License Agreement Related to TIL Selection

On February 10, 2015, the Company entered into an exclusive patent license agreement (the “Exclusive Patent License Agreement”) with the NIH under which the Company received an exclusive license to the NIH’s rights to patent-pending technologies related to methods for improving adoptive cell therapy through more potent and efficient production of TIL from melanoma tumors by selecting for T-cell populations that express various inhibitory receptors. Unless terminated sooner, the license shall remain in effect until the last licensed patent right expires.

Under the Exclusive Patent License Agreement, the Company agreed to pay customary royalties based on a percentage of net sales of a licensed product (which percentage is in the mid-single digits), a percentage of revenues from sublicensing arrangements, and lump sum benchmark payments upon the successful completion of clinical studies involving licensed technologies, the receipt of the first FDA approval or foreign equivalent for a licensed product or process resulting from the licensed technologies, the first commercial sale of a licensed product or process in the United States, and the first commercial sale of a licensed product or process in any foreign country.

H. Lee Moffitt Cancer Center

Research Collaboration and Clinical Grant Agreements with Moffitt

In December 2016, the Company entered into a new three-year Sponsored Research Agreement with H. Lee Moffitt Cancer Center (“Moffitt”). At the same time, the Company entered into a clinical grant agreement with Moffitt to support an ongoing clinical trial at Moffitt that combines TIL therapy with nivolumab for the treatment of patients with metastatic melanoma. In June 2017, the Company entered into a second clinical grant agreement with Moffitt to support a new clinical trial at Moffitt that combines TIL therapy with nivolumab for the treatment of patients with non-small cell lung cancer, under which the Company obtained a non-exclusive, royalty-free license to any new Moffitt inventions made in the performance of the agreement. Under both clinical grant agreements with Moffitt, the Company has non-exclusive rights to clinical data arising from the respective clinical trials. The Company recorded research and development costs of \$0.2 million and \$1.0 million for the three months ended June 30, 2019 and 2018, respectively, and \$0.5 million and \$1.6 million for the six months ended June 30, 2019 and 2018, respectively, in connection with the research collaboration and clinical grant agreements with Moffitt.

Exclusive License Agreements with Moffitt

The Company entered into a license agreement with Moffitt (the “First Moffitt License”), effective as of June 28, 2014, under which the Company received a world-wide license to Moffitt’s rights to patent-pending technologies related to methods for improving TIL for adoptive cell therapy using toll-like receptor agonists. Unless earlier terminated, the term of the license extends until the earlier of the expiration of the last issued patent related to the licensed technology or 20 years after the effective date of the license agreement.

Pursuant to the First Moffitt License, the Company paid an upfront licensing fee in the amount of \$0.1 million. A patent issuance fee will also be payable under the First Moffitt License, upon the issuance of the first U.S. patent covering the subject technology. In addition, the Company agreed to pay milestone license fees upon completion of specified milestones, customary royalties based on a specified percentage of net sales (which percentage is in the low single digits) and sublicensing payments, as applicable, and annual minimum royalties beginning with the first sale of products based on the licensed technologies, which minimum royalties will be credited against the percentage royalty payments otherwise payable in that year. The Company will also be responsible for all costs associated with the

preparation, filing, maintenance and prosecution of the patent applications and patents covered by the First Moffitt License related to the treatment of any cancers in the United States, Europe and Japan and in other countries designated by the Company in agreement with Moffitt. No expenses were recorded for the First Moffitt License for the three and six months ended June 30, 2019 and 2018.

The Company entered into a license agreement with Moffitt effective as of May 7, 2018 (the “Second Moffitt License”), under which the Company received a license to Moffitt’s rights to patent-pending technologies related to the use of 4-1BB agonists in conjunction with TIL manufacturing processes and therapies. The Company continues to develop TIL therapies using 4-1BB agonists in manufacturing in conjunction with M.D. Anderson Cancer Center.

Pursuant to the Second Moffitt License, the Company paid an upfront licensing fee in the amount of \$0.1 million in 2018. An annual license maintenance fee will be also payable commencing on the first anniversary of the effective date. In addition, the Company agreed to pay an annual commercial use payment for each indication for which a first sale has occurred, which in the aggregate amounts to up to \$0.4 million a year. The Company recorded \$0.1 million for the three and six months ended June 30, 2019 and 2018 as research and development expenses in connection with the Second Moffitt License.

PolyBioCept

PolyBioCept Exclusive and Co-Exclusive License Agreement

On September 14, 2016, the Company entered into an exclusive and co-exclusive license agreement (the “PolyBioCept Agreement”) with PolyBioCept AB, a corporation organized under the laws of Sweden (“PolyBioCept”). Under the PolyBioCept Agreement, the Company received the exclusive right and license to PolyBioCept’s intellectual property to develop, manufacture, market and genetically engineer TIL produced by expansion, selection and enrichment using a proprietary cytokine cocktail. The Company also received a co-exclusive license (with PolyBioCept) to develop, manufacture and market genetically engineered TIL under the same intellectual property. The licenses were for use in all cancers and were worldwide in scope, with the exception that the uses in melanoma were not included for certain countries of the former Soviet Union. On June 13, 2019, the Company terminated the PolyBioCept Agreement.

The Company paid PolyBioCept a total of \$2.5 million as an up-front exclusive license payment. No expense was recorded for the three and six months ended June 30, 2019 and 2018 in connection with this agreement. The Company believes it does not owe additional amounts to PolyBioCept.

M.D. Anderson Cancer Center

Strategic Alliance Agreement

On April 17, 2017, the Company entered into a Strategic Alliance Agreement (the “SAA”) with M.D. Anderson Cancer Center (“MDACC”) under which the Company and MDACC agreed to conduct clinical and preclinical research studies. The Company agreed in the SAA to provide total funding not to exceed approximately \$14.2 million for the performance of the multi-year studies under the SAA. In return, the Company acquired all rights to inventions resulting from the studies and has been granted a non-exclusive, sub-licensable, royalty-free, and perpetual license to specified background intellectual property of MDACC reasonably necessary to exploit, including the commercialization thereof. The Company has also been granted certain rights in clinical data generated by MDACC outside of the clinical trials to be performed under the SAA. The SAA’s term shall continue in effect until the later of the fourth anniversary of the SAA or the completion or termination of the research and receipt by the Company of all deliverables due from MDACC thereunder. In May 2017, the Company made a prepayment of \$1.4 million under this agreement. The Company recorded \$0.4 million and \$0.1 million associated with the MDACC SAA for the three months ended June 30, 2019 and 2018, respectively, and \$1.6 and \$0.1 million for the six months ended June 30, 2019 and 2018, respectively, as research and development expenses.

MedImmune

In December 2015, the Company entered into a collaboration agreement (the “MedImmune Agreement”) with MedImmune, the global biologics research and development arm of AstraZeneca (“MedImmune”), to conduct clinical and preclinical research immuno-oncology. Under the MedImmune Agreement, the Company funded and sought to conduct at least one clinical trial combining MedImmune’s PD-L1 inhibitor, durvalumab, with TIL for the treatment of patients. MedImmune supplied durvalumab for the clinical trials. On April 3, 2019, the Company and MedImmune

announced that the study was closed because of a changing treatment landscape and a lack of enrollment, and the collaboration agreement was terminated as of April 1, 2019.

WuXi Apptech, Inc. (“WuXi”)

In November 2016, the Company entered into a three-year manufacturing and services agreement (“MSA”) with WuXi AppTech, Inc. (“Wuxi”) pursuant to which WuXi agreed to provide manufacturing and other services. Under the agreement, the Company entered into two statements of work for two cGMP manufacturing suites to be established and operated by WuXi for the Company, one of the suites is expected to be capable of being used for the commercial manufacture of our products. The statements of work for each facility include a fixed component to reserve a dedicated suite and a variable component, mainly labor and materials used during the manufacturing process. The fee payable under the first statement of work for the use of one of the manufacturing suites during the first year of the agreement, including the fees for the necessary personnel, was \$2.5 million. The second statement of work, under which WuXi agreed to establish and operate a second, dedicated suite for a late stage/commercial manufacturing cGMP suite requires the Company to pay approximately \$5.9 million during the first year of the agreement. The Company and WuXi have extended the term of the related statements of work until May 2020. The Company recorded costs associated with agreements with WuXi of \$6.8 million and \$3.3 million for three months ended June 30, 2019 and 2018 respectively, and \$10.7 million and \$6.0 million for the six months ended June 30, 2019 and 2018, respectively, as research and development expenses.

NOTE 8. LEGAL PROCEEDINGS

Class Action Lawsuit. On April 10, 2017, the SEC announced settlements with the Company and with other public companies and unrelated parties in the *In the Matter of Certain Stock Promotion* investigation. The Company’s settlement with the SEC is consistent with its previous disclosures (including in our Annual Report on Form 10-K that the Company filed with the SEC on March 9, 2017). On April 14, 2017, a purported shareholder filed a complaint seeking class action status in the United States District Court, Northern District of California for violations of the federal securities laws (*Leonard DeSilvio v. Lion Biotechnologies, Inc., et al.*, case no. 3:17cv2086) against the Company and three of its former officers and directors. On April 19, 2017, a second class action complaint (*Amra Kuc vs. Lion Biotechnologies, Inc., et al.*, case no. 3:17-cv-2188) was filed in the same court. Both complaints allege, among other things, that the defendants violated the federal securities laws by making materially false and misleading statements, or by failing to make certain disclosures, regarding the actions taken by Manish Singh, the former CEO, and the former investor relations firm that were the subject of the *In the Matter of Certain Stock Promotions* investigation. On July 20, 2017, the plaintiff in the *Kuc* case filed a notice to voluntarily dismiss that case. The court entered an order dismissing the *Kuc* complaint on July 21, 2017. On July 26, 2017, the court appointed a movant as lead plaintiff. On September 8, 2017, the lead plaintiff filed an amended complaint (*Jay Rabkin v. Lion Biotechnologies, Inc., et al.*, case no. 3:17-cv-2086) seeking class action status that alleges, among other things, that the defendants violated federal securities laws by making materially false and misleading statements, or by failing to make certain disclosures, regarding the actions taken by Manish Singh and its former investor relations firm that were the subject of the *In the Matter of Certain Stock Promotions* SEC investigation. On February 5, 2018, the court entered an order dismissing two of plaintiff’s six claims. As the result of mediation, on September 28, 2018, lead plaintiff filed an unopposed motion for settlement, the cost of which, if approved, is expected to be borne by the Company’s insurance carrier and would result in no loss to the Company. The court gave preliminary approval to the proposed settlement on November 30, 2018. A hearing was held on April 12, 2019 to determine whether the proposed settlement was fair, reasonable, and adequate, and whether the claims should be dismissed. On April 17, 2019, the court approved the final settlement, involving a payment of \$3,250,000 by the Company’s insurance carrier to a settlement fund, awarded attorney’s fees and costs to be paid to plaintiff’s counsel from the settlement fund, approved the plan of allocation for settlement class members, and ordered that the claims against the Company should be dismissed with prejudice. The Company does not expect to incur any costs or expenses in connection with this settlement.

Derivative Lawsuits. On December 15, 2017, a purported stockholder derivative complaint was filed by plaintiff Kevin Fong against the Company, as nominal defendant, and certain of the current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:17-cv-1806). The complaint alleges breaches of fiduciary duties, unjust enrichment, and violations of Section 14(a) of the Securities Exchange Act of 1934 and Rule 14a-9 promulgated thereunder arising from the SEC’s investigation in the *In the Matter of Certain Stock Promotions* investigation and our April 10, 2017 settlement thereof, and seeks unspecified damages on behalf of the Company and injunctive relief. On March 28, 2018, a purported stockholder derivative complaint was filed by plaintiff Nazeer Khaleeluddin on behalf of the Company, against the Company, as nominal defendant, and certain of the

Company's current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:18-cv-00469). The complaint alleges, among other things, violations of securities law, breach of fiduciary duty, aiding and abetting, waste of corporate assets, and unjust enrichment. The complaint is based on claims arising from the SEC's investigation in the *In the Matter of Certain Stock Promotions* investigation and the Company's April 10, 2017 settlement thereof, and seeks unspecified damages on behalf of the Company and injunctive relief. On May 1, 2018, the court consolidated this case with the aforementioned purported stockholder derivative case filed by plaintiff Kevin Fong. The Company intends to vigorously defend against the foregoing complaints. Based on the early stage of the litigation, it is not possible to estimate the amount or range of possible loss that might result from an adverse judgment or a settlement of these matters.

Solomon Capital, LLC. On April 8, 2016, a lawsuit titled *Solomon Capital, LLC, Solomon Capital 401(K) Trust, Solomon Sharbat and Shelhav Raff v. Lion Biotechnologies, Inc.* was filed by Solomon Capital, LLC, Solomon Capital 401(k) Trust, Solomon Sharbat and Shelhav Raff against the Company in the Supreme Court of the State of New York, County of New York (index no. 651881/2016). The plaintiffs allege that, between June and November 2012 they provided to the Company \$0.1 million and that they advanced and paid on behalf of the Company an additional \$0.2 million. The complaint further alleges that the Company agreed to (i) provide them with promissory notes totaling \$0.2 million, plus interest, (ii) issue a total of 111,425 shares to the plaintiffs (before the 1-for-100 reverse split of our common stock effected in March 2013), and (iii) allow the plaintiffs to convert the foregoing funds into our securities in the next transaction. The plaintiffs allege that they should have been able to convert their advances and payments into shares of our common stock in the restructuring that was affected in May 2013. Based on the foregoing, the plaintiffs allege causes for breach of contract and unjust enrichment and demand judgment against the Company in an unspecified amount exceeding \$1.5 million, plus interest and attorneys' fees. On June 3, 2016, the Company filed an answer and counterclaims in the lawsuit. In its counterclaims, the Company alleges that the plaintiffs misrepresented their qualifications to assist the Company in fundraising and that they failed to disclose that they were under investigation for securities laws violations. The Company is seeking damages in an amount exceeding \$0.5 million and an order rescinding any and all agreements that the plaintiffs contend entitled them to obtain stock in the Company. On April 19, 2017, the court granted plaintiffs' counsel's motion to withdraw from the case. On May 25, 2017, plaintiffs filed a notice that they had hired new counsel. On June 7, 2017, the judge presiding over the case recused herself because of a conflict of interest arising from her relationship with plaintiffs' new attorneys and the case was subsequently assigned to a new judge. On April 20, 2018, the court held a hearing regarding plaintiff's motion to dismiss the Company's amended counterclaims and affirmative defense for fraudulent inducement. On August 15, 2018, the court entered an order granting the plaintiffs' motion and dismissed the Company's amended counterclaims and eleventh affirmative defense for fraudulent inducement without leave to amend. On September 14, 2018, the Company filed a notice of appeal related to this order, and on November 5, 2018, the Company filed its memorandum of law in support of its appeal of the order dismissing the Company's amended counterclaims and affirmative defense for fraudulent inducement. On January 2, 2019, plaintiffs filed their memorandum of law in opposition to the appeal. On January 18, 2019, the Company filed its reply brief in support of its appeal of the order dismissing its amended counterclaims and affirmative defense for fraudulent inducement. On April 4, 2019, the appellate court ordered that the Company's amended counterclaims and its affirmative defense for fraudulent inducement be reinstated.

The Company intends to vigorously defend the complaint and pursue its counterclaims.

Litigation Involving Dr. Steven Fischkoff. On June 13, 2017, in an action titled *Steven Fischkoff v. Lion Biotechnologies, Inc. and Maria Fardis*, Dr. Steven Fischkoff, its former Vice President and Chief Medical Officer, filed a lawsuit against the Company in the Supreme Court of the State of New York, County of New York. Dr. Fischkoff was dismissed by the Company on March 28, 2017. Dr. Fischkoff was terminated "for cause" as that term is defined in his employment agreement. In his complaint, Dr. Fischkoff alleges breaches of his employment agreement and violation of New York Labor Law for failure to pay monies purportedly owed to him, and seeks to recover amounts including severance pay and retention bonus (totaling \$300,000), a prorated incentive bonus, and amounts relating to unvested options to 150,000 shares of our common stock, together with prejudgment interest, costs, expenses and attorneys' fees. On July 5, 2017, the Company filed a removal petition and removed the lawsuit to the United States District Court for the Southern District of New York, where the case has been assigned case no. 1:17-cv-05041. On July 14, 2017, the Company filed a partial answer and counterclaims against Dr. Fischkoff, denying his allegations, and alleging breach of contract and related claims, breach of fiduciary duty, and state and federal trade secret misappropriation and related claims, and sought a temporary restraining order and preliminary injunction against Dr. Fischkoff. On July 18, 2017, the court issued a temporary restraining order against Dr. Fischkoff requiring him to return the Company's materials, prohibiting him from disclosing or using its materials, and granting expedited discovery. On June 25, 2018, pursuant to a stipulation between the parties, the court entered a permanent injunction prohibiting Dr. Fischkoff from disclosing,

possessing, or using any of the Company's proprietary materials or trade secrets. On July 5, 2018, the court entered an order dismissing two of Dr. Fischkoff's claims against the Company and Dr. Fardis. On October 18, 2018, Dr. Fischkoff amended his complaint to assert a new claim for defamation arising from SEC filings in which the Company provided the information about this litigation.

The Company intends to vigorously defend against Dr. Fischkoff's lawsuit and pursue the Company's counterclaims. Based on the current stage of the litigation, it is not possible to estimate the amount or range of (i) a possible loss that might result from an adverse judgment or settlement of this action, or (ii) the potential recovery that might result from a favorable judgment or a settlement of this action.

Other Matters. During the second quarter of 2016, warrants representing 128,500 shares were exercised. The 128,500 shares of common stock had previously been registered for re-sale. However, the Company believes that these 128,500 warrant shares were sold by the holders in open market transactions in May 2016 at a time when the registration statement was ineffective. Accordingly, those sales were not made in accordance with Sections 5 and 10(a)(3) of the Securities Act of 1933, as amended, and the purchasers of those shares may have rescission rights (if they still own the shares) or claims for damages (if they no longer own the shares). The amount of any such liability is uncertain and as such, an accrual for any potential loss has not been made. The Company believes that any claims brought against it would not result in a material impact to the Company's financial position or results of operations. The Company has not accrued a loss for a potential claim associated with this matter as it is unable to estimate any at this time.

In connection with the Company's reincorporation from Nevada to Delaware in 2017, the Company (as a Delaware corporation) untimely filed a post-effective amendment to adopt a Form S-8 registration statement that the Company filed (as a Nevada corporation) to register the shares underlying the 2011 Plan. Before the Company filed the required post-effective amendment, options to purchase 200,000 shares were exercised under the 2011 Plan. The effect of the delayed post-effective amendment filing on the 200,000 option shares is uncertain, but the issuance and sale of the shares may not have been in compliance with the Form S-8 registration statement. The existence of any liability to the Company, and the amount of any such liability to the Company, as a result of the issuance of the 200,000 shares is uncertain. Accordingly, no accrual for a potential claim has been made by the Company in its financial statements.

The Company may be involved, from time to time, in legal proceedings and claims arising in the ordinary course of its business. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. The Company accrues amounts, to the extent they can be reasonably estimated, that it believes are adequate to address any liabilities related to legal proceedings and other loss contingencies that it believes will result in a probable loss. While there can be no assurances as to the ultimate outcome of any legal proceeding or other loss contingency involving the Company, management does not believe any pending matter will be resolved in a manner that would have a material adverse effect on the Company's financial position, results of operations or cash flows.

NOTE 9. LEASES

As described further in "Note 2. Summary of Significant Accounting Policies", the Company adopted Topic 842 as of January 1, 2019. Prior period amounts have not been adjusted and continue to be reported in accordance with its historic accounting under ASU Topic 840- Leases (Topic 840).

Facilities Leases

The Company has evaluated the following existing facility leases and determined that, effective upon the adoption of Topic 842, they were all operating leases. Operating lease right-of-use assets and liabilities were recognized as of January 1, 2019 based on the present value of the remaining lease payments over the lease term. As the Company's leases do not provide an implicit rate, the Company utilized a third party in determining an incremental borrowing rate based on the information available as of the adoption date of Topic 842 to obtain the present value of lease payments. The Company's lease terms may include options to extend or terminate the lease which are included in the lease term when it is reasonably certain that it will exercise any such options. Lease expense is recognized on a straight-line basis over the expected lease term. The Company elected not to apply the recognition requirements of Topic 842 for short-term leases that have a lease term of 12 months or less.

Tampa Lease

In December 2014, the Company commenced a five-year non-cancellable operating lease with the University of South Florida Research Foundation for a 5,115 square foot facility located in Tampa, Florida. The facility is part of the

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University of South Florida research park and is used as the Company's research and development facilities. The Company has the option to extend the lease term of this facility for an additional five-year period on the same terms and conditions, except that the base rent for the renewal term will be increased in accordance with the applicable consumer price index.

In April 2015, the Company amended the original lease agreement to increase the rentable space to 6,043 square feet. In September 2016, the Company further increased the rentable space to 8,673 square feet. The per square foot cost and term of the lease were unchanged, and rent payments are approximately \$20,000 per month. The lease expires in December 2019. The Company has notified the landlord of its intent to renew the lease under the existing terms.

San Carlos Lease

On August 4, 2016, the Company entered into an agreement to lease 8,733 square feet in San Carlos, California. The term of the lease is 54 months subsequent to the commencement date and will expire in April 2021. Monthly lease payments are approximately \$38,000.

On April 28, 2017, the Company entered into a sublease agreement with Teradata US, Inc., pursuant to which the Company agreed to sublease certain office space located adjacent to the Company's headquarters for approximately \$26,000 per month. The space consists of approximately 11,449 rentable square feet in the building located in San Carlos, California. The sublease for this space expired on October 31, 2018. Monthly lease payments were approximately \$26,000.

On October 19, 2018, the Company entered into an agreement to lease 12,322 square feet of office space located adjacent to the Company's headquarters in San Carlos, California. This lease replaces the sublease of 11,449 square feet of office space in the same facility that expired on October 31, 2018. The term of the lease is 30 months subsequent to the commencement date, November 1, 2018, and will expire in April 2021. Monthly lease payments are approximately \$59,000, subject to an annual increase of 3%.

On June 19, 2019, the Company entered into a first amendment (the "Amended Lease") to its previously disclosed lease agreement with Hudson Skyway Landing, LLC (the "Lease") for additional space at its corporate headquarters in San Carlos, California. Under the Amended Lease, the Company will lease an additional 8,110 square feet (the "Expansion Space"), for a total of approximately 20,432 square feet of space on the first floor of the building located at 999 Skyway Road, San Carlos, California, commonly known as Skyway Landing II. The term of the Amended Lease remains the same as that of the Lease and expires on April 30, 2021, unless earlier terminated in accordance with the Amended Lease. The Company's monthly base rent for the Expansion Space under the Amended Lease will be approximately \$39,000 for the first year, and \$40,000 for the second year.

New York Lease

The Company leased office space in New York for a monthly rental of approximately \$18,000 a month from January 2017 through July 2017. On June 5, 2017, the Company entered into an agreement whereby the Company will lease office space from August 1, 2017 to July 31, 2018, for approximately \$9,000 a month. On April 20, 2018, the Company entered into an agreement to extend the lease term to January 31, 2019 for approximately \$7,000 a month. On November 2, 2018, the Company entered into an agreement to extend the lease term to July 31, 2019 for approximately \$4,000 a month. On May 1, 2019, the Company entered into an agreement to extend the lease term to January 31, 2020 for approximately \$4,000 a month.

Philadelphia Office Lease

On May 2, 2019, the Company entered into an agreement to lease approximately 1,500 square feet of office space in Philadelphia, Pennsylvania until July 1, 2019 for a rate of \$2,000 a month, and then approximately 4,500 square feet of office space for the remainder of a three-year term at an initial rate of \$11,063 per month, subject to annual increases of 2.5%.

Commercial Manufacturing Facility Agreement

On May 28, 2019, the Company entered into a lease agreement with 300 Rouse Boulevard, LLC (the "Commercial Manufacturing Facility Lease") for a build-to-suit commercial manufacturing facility, laboratories, and offices located in Philadelphia, Pennsylvania. Under the Commercial Manufacturing Facility Lease, the Company will

lease approximately 136,000 rentable square feet of space in a building to be located at 300 Rouse Boulevard, Philadelphia, Pennsylvania (the “Premises”). The commercial manufacturing facility is expected to be constructed in two phases: Phase I-A, the construction of the commercial manufacturing facility, with approximately 66,000 rentable square feet of space; and Phase I-B, the construction of offices and laboratories, with approximately 70,000 rentable square feet of space. The Commercial Manufacturing Facility Lease is for a term of 242 months, commencing on the earlier of (i) the date on which the Company occupies any portion of the Premises for the normal operation of its business or (ii) the date that is the later of (A) one hundred sixty (160) days after the Phase I-A substantial completion date, currently anticipated to be July 16, 2020, or (B) the Phase I-B Substantial Completion Date (the “Commencement Date”). The Commencement Date shall be extended by one day for each day of landlord delay, net of any tenant delay, as defined in the Lease. The Commercial Manufacturing Facility Lease includes an option to extend the term of the lease, exercisable under certain conditions as described in the Commercial Manufacturing Facility Lease, such that the overall term, when added to the initial term, shall be 359 months, by giving the landlord prior written notice thereof at least 18 months in advance of the expiration date.

Beginning on the Commencement Date, the Company’s monthly base rent under the Lease will be approximately \$320,000, subject to an annual increase of 2% for the first ten years, and an annual increase of the greater of 2% or 75% of the average ten-year consumer price index. Beginning in 2020, the Company will be responsible for paying operating expenses, which are expected to be approximately \$53,000 per month in 2020.

Manufacturing Contracts

The Company uses contract manufacturing organizations (collectively the “CMOs” and each a “CMO”) to manufacture and supply TILs for clinical and commercial purposes. The CMO contractual obligations consist of the use of manufacturing facilities and minimum fixed commitment fees, such as personnel, general support fees, and minimum production or material fees. In addition to the minimum fixed commitment fees, the CMO contractual obligations include variable costs such as production and material costs in excess of the minimum quantity specified in each CMO agreement. During the term of each CMO agreement, the Company has access to and control of the use of a dedicated suite in each of the CMOs’ facilities for manufacturing activities. In conjunction with the adoption of Topic 842 on January 1, 2019, the Company reevaluated all of its material contracts it has, to determine whether they contain a lease under the current lease guidance Topic 840. An arrangement is considered a lease or contains a lease if an underlying asset is explicitly or implicitly identified and use of the asset is controlled by the customer. Based on this evaluation, the Company concluded that all of its contracts with CMOs contained embedded operating leases because the suites used for its production are implicitly identified, is only used by the Company exclusively during the contractual term of the arrangements, and the CMOs have no substantive contractual rights to substitute the facilities used by the Company. Further, the Company controls the use of the facilities by obtaining all of the economic benefits from the use of the facilities and direct the use of the facilities throughout the period of use. The terms of the CMO contracts include options to terminate the lease with an advance notice of five to six months. The termination clauses and extension clauses are included in the calculation of the lease term for each of the CMOs when it is reasonably certain that it will not exercise such options.

The guidance requires the Company to first identify a lease deliverable and non-lease deliverable included in the arrangements, and then allocate the fixed contractual consideration to the lease deliverable(s) and the non-lease deliverable(s) on a relative standalone selling price basis to determine the amount of operating lease right-of-use assets and liabilities. The Company identified the use of a dedicated suite as a single lease deliverable, and related labor services as a single non-lease deliverable in each of the CMO arrangements. Judgment is required to determine the relative standalone selling price of each deliverable as the observable standalone selling prices are not readily available. Therefore, management used estimates and assumptions in determining relative standalone selling price of lease of a suite and labor service using information that includes market and other observable inputs to the extent possible.

The Company leases certain furniture and equipment that has a lease term of 12 months or less. Since the commencement date does not include an option to purchase the underlying asset, the Company elected not to apply the recognition requirements of Topic 842 for short-term leases, however, the lease costs that pertain to the short-term leases are disclosed in the components of lease costs table below.

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The balance sheet classification of the Company's right-of-use asset and lease liabilities was as follows:

	June 30, 2019
Operating lease right-of-use assets	\$ 11,719
Operating lease liabilities	
Current portion included in current liabilities	7,484
long-term portion included in non-current liabilities	4,613
Total Operating lease liabilities	<u>\$ 12,097</u>

The components of lease expenses, which were included in Total expenses in the Company's consolidated statement of operations, were as follows:

	For the Three Months Ended June 30, 2019	For the Six Months Ended June 30, 2019
Operating lease cost	\$ 1,681	\$ 3,275
Variable lease cost	1,045	1,941
Short-term lease cost	18	37
Total lease cost	<u>\$ 2,744</u>	<u>\$ 5,253</u>

Variable lease cost is determined based on performance or usage in accordance with the contractual agreements, and not based on an index or rate.

Cash paid for amounts included in the measurement of lease liabilities for the three and six months ended June 30, 2019 was \$2.0 million and \$3.4 million, respectively, and were included in Net cash used by operating activities in its consolidated statement of cash flows. Upon the adoption of Topic 842 on January 1, 2019, the Company increased noncash balances of operating lease right-of-use assets and operating lease liabilities by \$10.4 million and \$10.7 million, respectively. The Company additionally increased noncash balance of operating lease right-of-use assets and operating lease liability by \$3.3 million for the three months ended June 30, 2019 and \$4.3 million as a result of lease modifications and additional lease agreements entered by the Company.

As of June 30, 2019, the maturities of the Company's operating lease liabilities were as follows (in thousands):

	Facility leases	CMO embedded leases	Total
Remainder of 2019	\$ 964	\$ 3,352	\$ 4,316
2020	1,696	4,818	6,514
2021	577	1,410	1,987
2022	—	131	131
2023	—	—	—
Thereafter	—	—	—
Total lease payments	<u>\$ 3,237</u>	<u>\$ 9,711</u>	<u>\$ 12,948</u>
Less: Present value adjustment	(349)	(502)	(851)
Operating lease liabilities	<u>\$ 2,888</u>	<u>\$ 9,209</u>	<u>\$ 12,097</u>

Operating lease liabilities are based on the net present value of the remaining lease payments over the remaining lease term. In determining the present value of lease payments, the Company used its incremental borrowing rate based on the information available at the date of adoption of Topic 842 or the date of lease modifications. As of June 30, 2019, the weighted average remaining lease term is 1.71 years and the weighted average discount rate used to determine the operating lease liabilities was 8.2%. As of June 30, 2019, we have a finance lease for the commercial manufacturing facility that has not yet commenced. This finance lease will commence in 2020 with a lease term of 20 years.

Disclosures related to periods prior to adoption of Topic 842

As required, the following disclosure is provided for periods prior to adoption. Minimum lease commitments as of December 31, 2018 that have initial or remaining lease terms in excess of one year are as follows:

	Facility leases	CMO embedded leases	Total
2019	\$ 1,373	\$ 5,088	\$ 6,461
2020	1,223	3,366	4,589
2021	418	994	1,412
2022	—	144	144
2023	—	—	—
Thereafter	—	—	—
Total lease payments	<u>\$ 3,014</u>	<u>\$ 9,592</u>	<u>\$ 12,606</u>

NOTE 10. RELATED PARTY TRANSACTIONS

A former member of the Company's Board of Directors was an attorney at a law firm, TroyGould PC, that rendered legal services to the Company during the period of his directorship until June 6, 2018, but did not provide legal services to the Company himself during that period. The Company paid TroyGould PC \$0.1 million and \$0.2 million for the three months ended June 30, 2019 and 2018, respectively, and \$0.2 million and \$0.3 million for the six months ended June 30, 2019 and 2018, respectively.

On September 14, 2017, the Company entered into a three-year consulting agreement with Iain Dukes, D. Phil, the Chairman of the Board of Directors. As compensation for his consulting services, the Company granted Dr. Dukes a stock option to purchase up to 150,000 shares of the Company's common stock, at an exercise price of \$7.30 per share. Under the consulting agreement, Dr. Dukes agreed to provide the Company with services regarding business development opportunities, licensing transactions and technology acquisitions by the Company, and any such strategic initiatives appropriate for the Company that Dr. Dukes may identify. The granted stock options vest in 12 quarterly installments (with 1/12th of the option shares having vested on the date of grant). The vesting of the granted stock options will accelerate, and the entire award will become fully vested upon the closing of a significant licensing transaction, a material product acquisition, a material strategic transaction, or upon a change of control transaction. The Company recognized \$0.1 million and \$0.2 million in stock-based compensation expense related to this consulting agreement during the three months ended June 30, 2019 and 2018, respectively and \$0.2 million and \$0.6 million for the six months ended June 30, 2019 and 2018, respectively. In addition, in connection with the adoption of ASC 2018-07, the Company recognized \$0.3 million to retained earnings as of January 1, 2019.

Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations.

The management’s discussion and analysis of financial condition as of June 30, 2019 and results of operations for the three and six months ended June 30, 2019, should be read in conjunction with management’s discussion and analysis of financial condition and results of operations included in our Annual Report on Form 10-K for the year ended December 31, 2018, which was filed with the Securities and Exchange Commission, or SEC, on February 28, 2019. Our discussion includes forward-looking statements based upon current expectations that involve risks and uncertainties, such as our plans, objectives, expectations and intentions. Actual results and the timing of events could differ materially from those anticipated in these forward-looking statements as a result of a number of factors, including those set forth under the “Business” section of our Annual Report on Form 10-K and elsewhere in this and other reports we file with the SEC. We use words such as “anticipate,” “estimate,” “plan,” “project,” “continuing,” “ongoing,” “expect,” “believe,” “intend,” “may,” “will,” “should,” “could,” and similar expressions to identify forward-looking statements. All forward-looking statements included in this report are based on information available to us on the date hereof and, except as required by law, we assume no obligation to update any such forward-looking statements. Unless the context requires otherwise, references in this Quarterly Report on Form 10-Q to “Iovance,” “we,” “us” and “our” refer to Iovance Biotherapeutics, Inc. and our subsidiaries.

Overview

We are a clinical-stage biopharmaceutical company focused on the development and commercialization of cell therapies as novel cancer immunotherapy products designed to harness the power of a patient’s own immune system to eradicate cancer cells. Tumor infiltrating lymphocyte, or TIL, therapy is a platform technology that has been licensed from National Cancer Institute (NCI) primarily based on data in metastatic melanoma, metastatic and advanced cervical cancer. Iovance further has optimized the manufacturing process for TIL to a shorter process with a cryopreserved product called Gen-2. The Company has developed its own proprietary and scalable manufacturing method, which is being further investigated in multiple indications. Our lead product candidates include lifileucel for metastatic melanoma and LN-145 for advanced cervical cancer. Both product candidates are autologous adoptive cell therapies utilizing TIL, which are T cells derived from patients’ tumors. In addition to metastatic melanoma and advanced cervical cancer, we are investigating the effectiveness and safety of TIL therapy for the treatment of squamous cell carcinoma of the head and neck and metastatic non-small cell lung cancer through our sponsored trials, as well as other oncology indications through collaborations.

We are conducting an on-going Phase 2 clinical trial, C-144-01, of our lead product candidate, lifileucel, for the treatment of metastatic melanoma. This multicenter pivotal trial is enrolling patients with melanoma whose disease has progressed following treatment with at least one systemic therapy, including a PD-1 inhibitor and if BRAF mutated, a BRAF inhibitor, or a combination of BRAF and MEK inhibitors (National Clinical Trial identification number NCT02360579). Cohort 4 of the C-144-01 clinical trial is a single-arm cohort intended to be used for the registration of lifileucel. The C-144-01 trial uses our proprietary Generation 2, or Gen 2, manufacturing process. We completed and closed enrollment of patients into Cohort 2 of the C-144-01 trial in 2018. We announced that the first patient was dosed in Cohort 4 of this trial in March 2019. Cohort 4 is being enrolled with a prospective definition of objective response rate, or ORR, read out by a Blinded Independent Review Committee, or BIRC, as the primary endpoint based on our interpretation of discussions with the U.S. Food and Drug Administration, or FDA. FDA also acknowledged the potential acceptability of single-arm data from Cohort 4 for registration. In October 2018, we announced that lifileucel had received a Regenerative Medicine Advanced Therapy, or RMAT, designation from the FDA. Updated results from Cohort 2 of the C-144-01 clinical trial were reported at the American Society of Clinical Oncology, or ASCO, annual meeting on June 1, 2019. In 66 patients with metastatic melanoma, treatment with lifileucel resulted in an ORR of 38%, with 2 complete responses and 23 partial responses. The disease control rate, or DCR, was 80%. Patients were heavily pretreated and had a mean of 3.3 prior therapies. The median duration of response, or DOR, had not been reached. The median follow-up was 8.8 months. The adverse event profile was generally consistent with the underlying advanced disease and the profile of the lymphodepletion and IL-2 regimens.

In addition to our ongoing trial in metastatic melanoma, we are conducting clinical trials of LN-145, TIL therapy in cervical, head and neck cancers, and other cancers. C-145-04 is an ongoing Phase 2, multicenter trial that will assess the safety and efficacy of LN-145 for the treatment of patients with recurrent, metastatic or persistent cervical cancer (NCT03108495). In February 2019, LN-145 received Fast Track designation from the FDA for development in the treatment of cervical cancer with disease progression on or after chemotherapy. In March 2019, the protocol for this trial was amended to increase the sample size to 59 and to modify the primary endpoint of ORR to be determined by BIRC.

In May 2019, LN-145 received Breakthrough Therapy designation, or BT, from the FDA for the development in the treatment of cervical cancer. Updated results from the C-145-04 clinical trial were reported at the ASCO annual meeting on June 1, 2019. In 27 patients with advanced cervical cancer, treatment with LN-145 resulted in an ORR of 44%. In the study there were 3 complete responses and 9 partial responses. The DCR was 85%. Patients were heavily pretreated and had a mean of 2.4 prior therapies. The DOR had not been reached. The median follow-up was 7.4 months. The adverse event profile was generally consistent with the underlying advanced disease and the profile of the lymphodepletion and IL-2 regimens. Based on an End of Phase 2 meeting held with the FDA in June 2019, the FDA has acknowledged that results from the C-145-04 clinical trial may be sufficient to support registration in the treatment of patients with advanced cervical cancer. In accordance with the FDA's recommendations, a new version of the protocol will further define the patient population. We plan to include in the biologics license application, or BLA, patients who have progressed following initial systemic therapy for recurrent or metastatic disease, which constitutes almost all of the more advanced patients enrolled to date. We also plan to expand the sample size of the C-145-04 clinical trial to include at least 75 of the appropriate patient population.

C-145-03 is an ongoing Phase 2, multicenter trial that we are conducting to assess the safety and efficacy of LN-145 for the treatment of patients with recurrent metastatic squamous cell carcinoma of the head and neck (NCT03083873). In October 2018, we reported that, to date, preliminary data for 13 patients in the C-145-03 clinical trial yielded an ORR of 31% with a DOR ranging from 2.8 to 7.6 months. The adverse event profile remained consistent with previous reports. We continue to enroll patients in this study.

We are also investigating the potential of our TIL therapies in earlier lines of treatment and in combination with pembrolizumab. IOV-COM-202 is a Phase 2, multicenter trial that is composed of four cohorts to enroll up to a total of 48 patients (NCT03645928). In Cohort 1A, we intend to enroll advanced unresectable or metastatic melanoma patients who have not received prior immunotherapy, including checkpoint inhibitors such as anti-PD-1/anti-PD-L1 therapy. The patients will receive lifileucel in combination with pembrolizumab. In Cohort 2A, we intend to enroll advanced head and neck squamous cell carcinoma patients who are also naïve to prior immunotherapy including anti-PD-1/anti-PD-L1 therapy. The patients will receive LN-145 in combination with pembrolizumab. We recently opened Cohort 3A to enroll non-small cell lung cancer patients who are also naïve to prior immunotherapy including anti-PD-1/anti-PD-L1 therapy. The patients in Cohort 3A will receive LN-145 in combination with pembrolizumab. In Cohort 3B, we are enrolling non-small cell lung cancer patients who have previously received systemic therapy which could include checkpoint inhibitors. The patients will receive LN-145. In May 2019, we reported that the first patient was dosed in Cohort 1A, which represents the first instance of a patient naïve to checkpoint inhibitor treatment receiving our TIL therapy in combination with pembrolizumab.

We closed the IOV-LUN-201 clinical trial, investigating TIL therapy in non-small cell lung cancer, or NSCLC, in combination with anti-PD-L1 therapy, in April 2019, and instead opened Cohort 4 of the IOV-COM-202 trial as described above, to adapt our clinical development plans to reflect advances in the treatment landscape for non-small cell lung cancer.

As part of our collaboration program with the MD Anderson Cancer Center, or MDACC, two Phase 2 trials were initiated in 2018. Both trials are sponsored by MDACC. The first trial, 2017-0672 (NCT03449108), is intended to allow for investigation of LN-145 manufactured by us using our manufacturing process to treat patients with soft tissue sarcoma, osteosarcoma and platinum resistant ovarian cancer. A second trial under the collaboration with MDACC is active as well (NCT03610490). This trial uses TIL manufactured by MDACC using urelumab, a 4-1BB agonistic antibody, as part of the manufacturing process. The data obtained using this manufacturing process may not be representative of our data using our Gen 2 manufacturing process. We are also collaborating with Roswell Park Cancer Institute on a clinical trial using our LN-145 product for the treatment of patients with bladder cancer in combination with the anti-PD1 antibody pembrolizumab. This trial is now open for enrollment.

Our current product candidate pipeline and selected investigator-sponsored proof-of-concept studies are summarized in the graph below:

	Regimen	Trial	Indication	N	Partner	Phase 1	Phase 2	Pivotal
Company sponsored studies	Lifileucel	C-144-01	Melanoma	164	—	████████████████████		
	LN-145	C-145-04	Cervical cancer	59*	—	████████████████████		
	LN-145	C-145-03	Head & neck cancer	47	—	████████████████		
	Lifileucel + pembrolizumab	IOV-COM-202	Melanoma	48	—	████████████		
	LN-145 + pembrolizumab		Head & neck					
LN-145 + pembrolizumab	Non-small cell lung							
Select Investigator sponsored proof-of-concept studies	MDA TIL	NCT03610490	Ovarian, sarcomas, pancreatic	~54	MDAnderson Cancer Network	████████████		
	LN-145	NCT03449108	Ovarian, sarcomas	~54	MDAnderson Cancer Network	████████████		
	LN-145 + pembrolizumab	NCT03935347	Bladder cancer	12	ROSWELL PARK	██████████		

We plan to file an investigational new drug application, or IND, later in 2019 for our peripheral blood lymphocyte therapy IOV-2001 for the treatment of patients with chronic lymphocytic leukemia. IOV-2001 is a non-genetically modified, polyclonal T cell product that is manufactured using a nine-day process from 50 mL of patient's blood. We have also entered into a collaboration with a Canadian institution, Centre hospitalier de l'Université de Montreal, or CHUM, under which CHUM agreed to conduct a clinical study using a PD-1 positive selected TIL product manufactured by a CHUM collaborator using a process developed by CHUM. We are also developing our own TIL selection processes for future clinical testing.

We currently own seven recently granted or allowed U.S. patents for compositions and methods of treatment in a broad range of cancers relating to our Gen 2 manufacturing process, including U.S. Patent Nos. 10,166,257, 10,130,659, and 10,272,113. Our owned and licensed intellectual property portfolio also includes patent applications relating to TIL, marrow infiltrating, and peripheral blood lymphocyte therapies, methods of manufacturing, the use of costimulatory molecules in TIL therapy and manufacturing, stable and transient genetically-modified TIL therapies, and methods of treating patient subpopulations.

In May 2019, we announced that we had entered into a lease agreement to build an approximately 136,000 square foot production facility in Philadelphia, Pennsylvania for future commercial and clinical production of autologous TIL products, including lifileucel and LN-145. The facility will allow production according to FDA guidelines and is designed to provide scalability using modular processes. The facility will be designed and built for an ultimate maximum capacity to manufacture TIL products for several thousands of patients annually. Iovance expects to invest approximately \$75 million over three years for equipment and construction of the manufacturing suites. The facility is expected to be completed in 2021.

Results of Operations

Revenues

We have not yet generated any revenues since our formation. We currently do not anticipate that we will generate any revenues during 2019 from the sale or licensing of our products. Our ability to generate revenues in the future will depend on our ability to complete the development of our product candidates and to obtain regulatory approval for them.

Costs and expenses

Research and Development (in thousands)

	Three Months Ended		Increase		Six Months Ended		Increase	
	June 30,		(Decrease)		June 30,		(Decrease)	
	2019	2018	\$	%	2019	2018	\$	%
Research and development	\$ 39,298	\$ 24,551	14,747	60 %	\$ 70,203	\$ 44,463	25,740	58 %
Stock-based compensation expense included in research and development expense	2,720	2,381	339	14 %	5,421	4,381	1,040	24 %

Research and development expense for the three months ended June 30, 2019 increased by \$14.7 million, or 60%, compared to the same period in 2018. The increase in research and development expenses was primarily attributable to (i) the initial costs to transfer the manufacturing process to a CMO for additional manufacturing capacity, (ii) an increase in total patients in our clinical studies which in turn results in higher study costs, and (iii) an increase in research and development headcount.

Research and development expense for the six months ended June 30, 2019 increased by \$25.7 million, or 58%, compared to the same period in 2018. The increase in research and development expenses was primarily attributable to (i) initial costs to transfer the manufacturing process to a CMO costs for additional manufacturing capacity (ii) higher costs for the purchase of drugs used in the clinical studies, specifically IL-2, (iii) an increase in total patients in our clinical studies which in turn results in higher study costs, and (iv) an increase in research and development headcount.

We expect our research and development expenses to increase over the next several years as we continue to conduct our clinical trials for our products and as we increase our research and development efforts in other cancer indications. However, it is difficult to determine with certainty the duration and completion costs of our current or future preclinical programs and clinical trials of our product candidates.

The duration, costs and timing of our clinical trials and development of our product candidates will depend on a number of factors that include, but are not limited to, the number of patients that enroll in the trial, per patient trial costs, number of sites included in the trial, discontinuation rates of patients, duration of patient follow-up, efficacy and safety profile of the product candidate, and the length of time required to enroll eligible patients. Additionally, the probability of success for our product candidate will depend on a number of factors, including competition, manufacturing capability and cost efficiency, and commercial viability.

General and Administrative (in thousands)

	Three Months Ended		Increase		Six Months Ended		Increase	
	June 30,		(Decrease)		June 30,		(Decrease)	
	2019	2018	\$	%	2019	2018	\$	%
General and administrative	\$ 10,867	\$ 6,827	4,040	59 %	\$ 19,948	\$ 13,792	6,156	45 %
Stock-based compensation expense included in general and administrative	3,706	2,841	865	30 %	6,851	4,945	1,906	39 %

General and administrative expense for the three months ended June 30, 2019 increased by \$4.0 million, or 59%, compared to the same period in 2018. The increase was primarily attributable to increases in (i) general and administrative headcount and higher stock-based compensation, (ii) legal expenses related to intellectual property, and (iii) market research costs as we prepare for commercialization.

General and administrative expense for the six months ended June 30, 2019 increased by \$6.2 million, or 45%, compared to the same period in 2018. The increase was primarily attributable to increases in (i) general and administrative headcount and higher stock-based compensation, (ii) legal expenses related to intellectual property, and (iii) market research costs.

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General and administrative expenses include personnel costs for our employees engaged in general and administrative activities, legal fees, audit and tax fees, consultants and professional services, commercialization and market preparation and general corporate expenses. We anticipate general and administrative expenses will increase as we continue to support our expanded research and development efforts and prepare for commercialization.

Interest Income (in thousands)

	Three Months Ended		Increase		Six Months Ended		Increase	
	June 30,		(Decrease)		June 30,		(Decrease)	
	2019	2018	\$	%	2019	2018	\$	%
Net interest income	\$ 2,614	\$ 718	1,896	264 %	\$ 5,650	\$ 1,080	4,570	423 %

Interest income results from our interest-bearing cash and short term investment balances. Net interest income increased by \$1.9 million and \$4.6 million for the three and six months ended June 30, 2019 compared to the same periods in 2018, respectively, due to the higher average cash and short-term investment balances as a result of the proceeds received from our equity financings in January 2018 and October 2018.

Net Loss

	Three Months Ended		Increase		Six Months Ended		Increase	
	June 30,		(Decrease)		June 30,		(Decrease)	
	2019	2018	\$	%	2019	2018	\$	%
Net loss	\$ 47,551	\$ 30,660	16,891	55 %	\$ 84,501	\$ 57,175	27,326	48 %

Net loss for the three and six months ended June 30, 2019 increased by \$16.9 million or 55%, and 27.3 million or 48%, compared to the same periods in 2018, respectively. The increase in our net loss was due to the continued expansion of our research and development activities, increased clinical trials and manufacturing activities, and the overall growth of our corporate infrastructure. We anticipate that we will continue to incur net losses in the future as we further invest in our research and development activities, including our clinical development, building our own manufacturing facility and certain pre-commercial activities.

Liquidity and Capital Resources

We have incurred losses and generated negative cash flows from operations since inception. We expect to continue to incur significant losses in 2019 and may incur significant losses and negative cash flows from operations for the foreseeable future. We have funded our operations from various public and private offerings of our equity securities (both common stock and preferred stock), from option and warrant exercises, and from interest income.

As of June 30, 2019, we had outstanding 123,820,508 shares of our \$0.000041666 par value common stock, 194 shares of our \$0.001 par value Series A Convertible Preferred Stock, and 5,854,845 shares of our \$0.001 par value Series B Convertible Preferred Stock. The outstanding shares of Series A Convertible Preferred Stock are currently convertible into 97,000 shares of our common stock, and the outstanding shares of Series B Convertible Preferred Stock are currently convertible into 5,854,845 shares of our common stock. The shares of Series A Convertible Preferred Stock and Series B Convertible Preferred Stock do not have voting rights or accrue dividends.

On December 28, 2017, we filed a shelf registration statement with the SEC for the issuance of common stock, preferred stock, warrants, rights, debt securities and units up to an aggregate amount of \$250 million, which we refer to as the 2017 Shelf Registration Statement. The 2017 Shelf Registration Statement was declared effective on January 19, 2018. On January 29, 2018, we sold 15,000,000 shares of our common stock at a public offering price of \$11.50 per share pursuant to the 2017 Shelf Registration Statement. We received gross proceeds of approximately \$172.5 million and net proceeds of approximately \$162.0 million, after deducting underwriting discounts and offering expenses. The 2017 Shelf Registration Statement was terminated upon effectiveness of the 2018 Shelf Registration Statement (as discussed below).

On September 7, 2018, we filed a shelf registration statement with the SEC for the issuance of common stock, preferred stock, warrants, rights, debt securities and units up to an aggregate amount of \$250 million, which we refer to as the 2018 Shelf Registration Statement. The 2018 Shelf Registration Statement was declared effective on October 3, 2018 and the aggregate amount of securities we could issue thereunder was subsequently increased by \$50 million through a post-effective amendment that we filed on October 11, 2018, pursuant to Rule 462(b) of the Securities Act. On

October 17, 2018, we sold 25,300,000 shares of our common stock at a public offering price of \$9.97 per share pursuant to the 2018 Shelf Registration Statement. We received gross proceeds of approximately \$252.2 million and net proceeds of \$236.7 million, after deducting underwriting discounts and offering expenses. The 2018 Shelf Registration Statement is no longer available for future offerings.

In the future, we may periodically offer one or more of these securities in amounts, prices and terms to be announced when and if the securities are offered. If any of the securities covered by the 2018 Shelf Registration Statement are offered for sale, a prospectus supplement will be prepared and filed with the SEC containing specific information about the terms of such offering at that time.

We are currently engaged in the development of therapeutics to fight cancer. We do not have any commercial products and have not yet generated any revenues from our biopharmaceutical business. We currently do not anticipate that we will generate any revenues during 2019 from the sale or licensing of any products. We have incurred a net loss of \$84.5 million for the six months ended June 30, 2019 and used \$62.9 million of cash in our operating activities the same period ended June 30, 2019. As of June 30, 2019, we had \$76.9 million of cash and cash equivalents, \$327.2 million of short-term investments, \$397.4 million of stockholders' equity and had working capital of \$377.1 million.

We expect to further increase our research and development activities, which will increase the amount of cash we will use during 2019 and beyond. Specifically, we expect increased spending on clinical trials, research and development activities, higher payroll expenses as we increase our professional and scientific staff and continue our expansion of manufacturing activities. Based on the funds we have available as of the date of filing of this Quarterly Report on Form 10-Q, we believe that we have sufficient capital to fund our anticipated operating expenses for at least 12 months from the date of filing this report.

Off-Balance Sheet Arrangements

At June 30, 2019, we had no obligations that would require disclosure as off-balance sheet arrangements.

Significant Accounting Policies and Recent Accounting Standards

See Note 2 of the financial statements for a discussion of our significant accounting policies, including the discussion of recently issued and adopted accounting standards.

Inflation

Inflation and changing prices have had no effect on our continuing operations over our two most recent fiscal years.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

There have been no material changes in our market risk during the six months ended June 30, 2019 compared to the disclosures in Part II, Item 7A of our Annual Report on Form 10-K for the year ended December 31, 2018.

Item 4. Controls and Procedures

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of our disclosure controls and procedures, as such term is defined under Rule 13a-15(e) promulgated under the Exchange Act as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on this evaluation, our principal executive officer and our principal financial officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this Quarterly Report on Form 10-Q.

Changes in Internal Controls Over Financial Reporting

There have not been any changes in our internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended June 30, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

Class Action Lawsuit. On April 10, 2017, the SEC announced settlements with us and with other public companies and unrelated parties in the *In the Matter of Certain Stock Promotion* investigation. Our settlement with the SEC is consistent with our previous disclosures (including in our Annual Report on Form 10-K that we filed with the SEC on March 9, 2017). On April 14, 2017, a purported shareholder filed a complaint seeking class action status in the United States District Court, Northern District of California for violations of the federal securities laws (*Leonard DeSilvio v. Lion Biotechnologies, Inc., et al.*, case no. 3:17cv2086) against our company and three of our former officers and directors. On April 19, 2017, a second class action complaint (*Amra Kuc vs. Lion Biotechnologies, Inc., et al.*, case no. 3:17-cv-2188) was filed in the same court. Both complaints allege, among other things, that the defendants violated the federal securities laws by making materially false and misleading statements, or by failing to make certain disclosures, regarding the actions taken by Manish Singh, our former CEO, and our former investor relations firm that were the subject of the *In the Matter of Certain Stock Promotions* investigation. On July 20, 2017, the plaintiff in the *Kuc* case filed a notice to voluntarily dismiss that case. The court entered an order dismissing the *Kuc* complaint on July 21, 2017. On July 26, 2017, the court appointed a movant as lead plaintiff. On September 8, 2017, the lead plaintiff filed an amended complaint (*Jay Rabkin v. Lion Biotechnologies, Inc., et al.*, case no. 3:17-cv-2086) seeking class action status that alleges, among other things, that the defendants violated federal securities laws by making materially false and misleading statements, or by failing to make certain disclosures, regarding the actions taken by Manish Singh and our former investor relations firm that were the subject of the *In the Matter of Certain Stock Promotions* SEC investigation. On February 5, 2018, the court entered an order dismissing two of plaintiff's six claims. As the result of mediation, on September 28, 2018, lead plaintiff filed an unopposed motion for settlement, the cost of which was expected to be borne by our insurance carrier and would result in no loss to us. The court gave preliminary approval to the proposed settlement on November 30, 2018. A final hearing was held on April 12, 2019 to determine whether the proposed settlement was fair, reasonable, and adequate, and whether the claims should be dismissed. On April 17, 2019, the court approved the final settlement, involving a payment of \$3,250,000 by our insurance carrier to a settlement fund, awarded attorney's fees and costs to be paid to plaintiff's counsel from the settlement fund, approved the plan of allocation for settlement class members, and ordered that the claims against us should be dismissed with prejudice. We do not expect to incur any costs or expenses in connection with this settlement.

Derivative Lawsuits. On December 15, 2017, a purported stockholder derivative complaint was filed by plaintiff Kevin Fong against us, as nominal defendant, and certain of our current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:17-cv-1806). The complaint alleges breaches of fiduciary duties, unjust enrichment, and violations of Section 14(a) of the Securities Exchange Act of 1934 and Rule 14a-9 promulgated thereunder arising from the SEC's investigation in the *In the Matter of Certain Stock Promotions* investigation and our April 10, 2017 settlement thereof, and seeks unspecified damages on behalf of our company and injunctive relief. On March 28, 2018, a purported stockholder derivative complaint was filed by plaintiff Nazeer Khaleeluddin on behalf of the Company, against the Company, as nominal defendant, and certain of the Company's current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:18-cv-00469). The complaint alleges, among other things, violations of securities law, breach of fiduciary duty, aiding and abetting, waste of corporate assets, and unjust enrichment. The complaint is based on claims arising from the SEC's investigation in the *In the Matter of Certain Stock Promotions* investigation and our April 10, 2017 settlement thereof and seeks unspecified damages on behalf of our company and injunctive relief. On May 1, 2018, the court consolidated this case with the aforementioned purported stockholder derivative case filed by plaintiff Kevin Fong. We intend to vigorously defend against the foregoing complaints. Based on the early stage of the litigation, it is not possible to estimate the amount or range of possible loss that might result from an adverse judgment or a settlement of these matters.

Solomon Capital, LLC. On April 8, 2016, a lawsuit titled *Solomon Capital, LLC, Solomon Capital 401(K) Trust, Solomon Sharbat and Shelhav Raff v. Lion Biotechnologies, Inc.* was filed by Solomon Capital, LLC, Solomon Capital 401(k) Trust, Solomon Sharbat and Shelhav Raff against us in the Supreme Court of the State of New York, County of New York (index no. 651881/2016). The plaintiffs allege that, between June and November 2012 they provided to us \$0.1 million and that they advanced and paid on our behalf an additional \$0.2 million. The complaint further alleges that we agreed to (i) provide them with promissory notes totaling \$0.2 million, plus interest, (ii) issue a total of 111,425 shares to the plaintiffs (before the 1-for-100 reverse split of our common stock effected in March 2013), and (iii) allow the plaintiffs to convert the foregoing funds into our securities in the next transaction. The plaintiffs allege that they

should have been able to convert their advances and payments into shares of our common stock in the restructuring that was affected in May 2013. Based on the foregoing, the plaintiffs allege causes for breach of contract and unjust enrichment and demand judgment against us in an unspecified amount exceeding \$1.5 million, plus interest and attorneys' fees. On June 3, 2016, we filed an answer and counterclaims in the lawsuit. In its counterclaims, we allege that the plaintiffs misrepresented their qualifications to assist us in fundraising and that they failed to disclose that they were under investigation for securities laws violations. We are seeking damages in an amount exceeding \$0.5 million and an order rescinding any and all agreements that the plaintiffs contend entitled them to obtain stock in our company. On April 19, 2017, the court granted plaintiffs' counsel's motion to withdraw from the case. On May 25, 2017, plaintiffs filed a notice that they had hired new counsel. On June 7, 2017, the judge presiding over the case recused herself because of a conflict of interest arising from her relationship with plaintiffs' new attorneys and the case was subsequently assigned to a new judge. On April 20, 2018, the court held a hearing regarding plaintiff's motion to dismiss our amended counterclaims and affirmative defense for fraudulent inducement. On August 15, 2018, the court entered an order granting the plaintiff's motion and dismissed the Company's amended counterclaims and eleventh affirmative defense for fraudulent inducement without leave to amend. On September 14, 2018, we filed a notice of appeal related to this order, and on November 5, 2018, we filed our memorandum of law in support of our appeal of the order dismissing our amended counterclaims and affirmative defense for fraudulent inducement. On January 2, 2019, plaintiffs filed their memorandum of law in opposition to the appeal. On January 18, 2019, we filed our reply brief in support of our appeal of the order dismissing our amended counterclaims and affirmative defense for fraudulent inducement. On April 4, 2019, the appellate court ordered that our amended counterclaims and our affirmative defense for fraudulent inducement be reinstated.

We intend to vigorously defend the complaint and pursue our counterclaims. At the current stage of the litigation, it is not possible to estimate the amount or range of possible loss that might result from an adverse judgment or a settlement of these matters.

Litigation Involving Dr. Steven Fischkoff. On June 13, 2017, in an action titled *Steven Fischkoff v. Lion Biotechnologies, Inc. and Maria Fardis*, Dr. Steven Fischkoff, our former Vice President and Chief Medical Officer, filed a lawsuit against us in the Supreme Court of the State of New York, County of New York. Dr. Fischkoff was dismissed by us on March 28, 2017. Dr. Fischkoff was terminated "for cause" as that term is defined in his employment agreement. In his complaint, Dr. Fischkoff alleges breaches of his employment agreement and violation of New York Labor Law for failure to pay monies purportedly owed to him, and seeks to recover amounts including severance pay and retention bonus (totaling \$300,000), a prorated incentive bonus, and amounts relating to unvested options to 150,000 shares of our common stock, together with prejudgment interest, costs, expenses and attorneys' fees. On July 5, 2017, we filed a removal petition and removed the lawsuit to the United States District Court for the Southern District of New York, where the case has been assigned case no. 1:17-cv-05041. On July 14, 2017, we filed a partial answer and counterclaims against Dr. Fischkoff, denying his allegations, and alleging breach of contract and related claims, breach of fiduciary duty, and state and federal trade secret misappropriation and related claims, and sought a temporary restraining order and preliminary injunction against Dr. Fischkoff. On July 18, 2017, the court issued a temporary restraining order against Dr. Fischkoff requiring him to return our materials, prohibiting him from disclosing or using our company materials, and granting expedited discovery. On June 25, 2018, pursuant to a stipulation between the parties, the court entered a permanent injunction prohibiting Dr. Fischkoff from disclosing, possessing, or using any of the Company's proprietary materials or trade secrets. On July 5, 2018, the court entered an order dismissing two of Dr. Fischkoff's claims against us and Dr. Fardis. On October 18, 2018, Dr. Fischkoff amended his complaint to assert a new claim for defamation arising from SEC filings in which we provided the information about this litigation.

We intend to vigorously defend against Dr. Fischkoff's lawsuit and pursue our counterclaims. Based on the current stage of the litigation, it is not possible to estimate the amount or range of (i) a possible loss that might result from an adverse judgment or settlement of this action, or (ii) the potential recovery that might result from a favorable judgment or a settlement of this action.

Other Matters. During the second quarter of 2016, warrants representing 128,500 shares were exercised. The 128,500 shares of common stock had previously been registered for re-sale. However, we believe that these 128,500 warrant shares were sold by the holders in open market transactions in May 2016 at a time when the registration statement was ineffective. Accordingly, those sales were not made in accordance with Sections 5 and 10(a)(3) of the Securities Act of 1933, as amended, and the purchasers of those shares may have rescission rights (if they still own the shares) or claims for damages (if they no longer own the shares). The amount of any such liability is uncertain and as such, an accrual for any potential loss has not been made. We believe that any claims brought against it would not result

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in a material impact to our financial position or results of operations. We have not accrued a loss for a potential claim associated with this matter as we are unable to estimate any at this time.

In connection with our reincorporation from Nevada to Delaware in 2017, we (as a Delaware corporation) untimely filed a post-effective amendment to adopt a Form S-8 registration statement that the Company filed (as a Nevada corporation) to register the shares underlying our 2011 Equity Incentive Plan. Before we filed the required post-effective amendment, options to purchase 200,000 shares were exercised under the 2011 Equity Incentive Plan. The effect of the delayed post-effective amendment filing on the 200,000 option shares is uncertain, but the issuance and sale of the shares may not have been in compliance with the Form S-8 registration statement. The existence of any liability to us, and the amount of any such liability as a result of the issuance of the 200,000 shares is uncertain. Accordingly, we have not made any accrual for a potential claim in our consolidated financial statements.

We may be involved, from time to time, in legal proceedings and claims arising in the ordinary course of our business. Such matters are subject to many uncertainties and outcomes are not predictable with assurance. We accrue amounts, to the extent they can be reasonably estimated, that we believe are adequate to address any liabilities related to legal proceedings and other loss contingencies that we believe will result in a probable loss. While there can be no assurances as to the ultimate outcome of any legal proceeding or other loss contingency involving us, management does not believe any pending matter will be resolved in a manner that would have a material adverse effect on our financial position, results of operations or cash flows.

Item 1A. Risk Factors

The risks described below may not be the only ones relating to our company. Additional risks that we currently believe are immaterial may also impair our business operations. Our business, financial conditions and future prospects and the trading price of our common stock could be harmed as a result of any of these risks. Investors should also refer to the other information contained or incorporated by reference in our [Annual Report on Form 10-K for the year ended December 31, 2018 filed on February 28, 2019](#), including our financial statements and related notes, and our other filings from time to time with the Securities and Exchange Commission or SEC.

We have marked with an asterisk () those risk factors below that reflect a substantive change from the risk factors included in our Annual Report on Form 10-K filed with the SEC on February 28, 2019.*

Risks Related to Our Business

We have a history of operating losses; we expect to continue to incur losses and we may never be profitable. *

We are a clinical-stage biotechnology company focused on the development and commercialization of novel cancer immunotherapy products designed to harness the power of a patient's own immune system to eradicate cancer. We do not have products approved for commercial sale and have not generated revenue from operations. As of June 30, 2019, we had an accumulated deficit of \$457.6 million. In addition, during the six months ended June 30, 2019, we incurred a net loss of \$84.5 million. Since our inception we have not generated any revenues from operations. We do not expect to generate any meaningful product sales or royalty revenues for the foreseeable future. We expect to incur significant additional operating losses in the future as we expand our development and clinical trial activities in support of demonstrating the effectiveness of our products.

Our ability to achieve long-term profitability is dependent upon obtaining regulatory approvals for our products and successfully commercializing our products alone or with third parties. However, our operations may not be profitable even if any of our products under development are successfully developed and produced and thereafter commercialized.

We have limited experience in operating our current business, which makes it difficult to evaluate our business plan and our prospects.

We have only a limited operating history in our current line of business on which a decision to invest in our company can be based. The future of our company currently is dependent upon our ability to implement our business plan, as that business plan may be modified from time to time by our management and Board of Directors. While we believe that we have a reasonable business plan and research and development strategy, we have only a limited operating history against which we can test our plans and assumptions, and investors therefore cannot evaluate the likelihood of our success.

We face the problems, expenses, difficulties, complications and delays normally associated with a pre-commercial biotechnology company, many of which are beyond our control. Accordingly, our prospects should be considered in light of the risks, expenses and difficulties frequently encountered in the establishment of a new business developing technologies in an industry that is characterized by a number of market entrants and intense competition. Because of our size and limited resources, we may not possess the ability to successfully overcome many of the risks and uncertainties frequently encountered by pre-commercial companies involved in the rapidly evolving field of immunotherapy. If our research and development efforts are successful, we may also face the risks associated with the shift from development to commercialization of new products based on innovative technologies. There can be no assurance that we will be successful in developing our business.

We are substantially dependent on the success of our product candidates and cannot guarantee that these product candidates will successfully complete development, receive regulatory approval, or be successfully commercialized.*

We currently have no products approved for commercial sale. We have invested a significant portion of our efforts and financial resources in the development of our current product candidates, lifileucel and LN-145 and expect that we will continue to invest heavily in our current product candidates, as well as in any future product candidates we

may develop. Our business depends entirely on the successful development and commercialization of our product candidates, which may never occur. Our ability to generate revenues in the future is substantially dependent on our ability to develop, obtain regulatory approval for, and then successfully commercialize our product candidates. We currently generate no revenue from the sale of any products, and we may never be able to develop or commercialize a marketable product.

Our product candidates will require additional clinical and non-clinical development, regulatory approval, commercial manufacturing arrangements, establishment of a commercial organization, significant marketing efforts, and further investment before we generate any revenue from product sales. We cannot assure you that we will meet our timelines for our current or future clinical trials, which may be delayed or not completed for a number of reasons.

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 or regulatory approval that will allow us to successfully commercialize our product candidates. If we do not receive FDA approval with the necessary conditions to allow successful commercialization, and then successfully commercialize our product candidates, we will not be able to generate revenue from those product candidates in the United States in the foreseeable future, or at all. Any significant delays in obtaining approval for and commercializing our product candidates will have a material adverse impact on our business and financial condition.

We have not previously submitted a biologics license application, or BLA, to the FDA, or similar marketing application to comparable foreign authorities, for any product candidate, and we cannot be certain that our current or any future product candidates will be successful in clinical trials or receive regulatory approval.

Our product candidates are susceptible to the risks of failure inherent at any stage of product development, including the appearance of unexpected adverse events or failure to achieve primary endpoints in clinical trials. Further, our product candidates may not receive regulatory approval even if they are successful in clinical trials.

If approved for marketing by applicable regulatory authorities, our ability to generate revenues from our product candidates will depend on our ability to:

- price our product candidates competitively such that third-party and government reimbursement leads to broad product adoption;
- prepare a broad network of clinical sites for administration of our product;
- create market demand for our product candidates through our own marketing and sales activities, and any other arrangements to promote these product candidates that we may otherwise establish;
- receive regulatory approval for claims that are necessary or desirable for successful marketing;
- hire, train, and deploy a commercial team including a sales force to commercialize product candidates in the United States and abroad;
- manufacture product candidates through CMOs or in our own manufacturing facility in sufficient quantities and at acceptable quality and manufacturing cost to meet commercial demand at launch and thereafter;
- establish and maintain agreements with wholesalers, distributors, pharmacies, and group purchasing organizations on commercially reasonable terms;
- maintain patent and trade secret protection and regulatory exclusivity for our product candidates;
- launch commercial sales of our product candidates;
- achieve market acceptance of our product candidates by patients, the medical community, and third-party payors;
- achieve appropriate reimbursement for our product candidates;
- maintain a distribution and logistics network capable of product storage within our specifications and regulatory guidelines, and further capable of timely product delivery to clinical sites;
- effectively compete with other therapies or competitors; and
- maintain a continued acceptable safety profile of our product candidates following launch.

We have limited experience as a company conducting clinical trials and face risks due to the need to rely on third parties.*

We have limited experience conducting pre-clinical and clinical trials and have no experience as a company in filing and supporting the applications necessary to gain marketing approvals. Securing marketing approval requires the submission of extensive preclinical and clinical data and supporting information to regulatory authorities for each therapeutic indication to establish the product candidate's safety, purity, and potency for that indication. Securing marketing approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities and clinical trial sites by, applicable regulatory authorities. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. We have limited experience in designing clinical trials and may be unable to design and execute a clinical trial to support marketing approval.

Prior to 2015, all the preclinical and clinical trials relating to TIL had been conducted by the NCI. We have recruited a team that has experience with clinical trials; however, we as a company have limited experience in conducting clinical trials. In part because of this lack of experience, we cannot be certain that our ongoing clinical trials will be completed on time, if at all, will progress according to our plans or expectations, or that our planned clinical trials will be initiated, progress according to our plans or expectations, or be completed on time, if they are completed at all.

Large-scale clinical trials require significant financial and management resources, and reliance on third-party clinical investigators, contract research organizations or CROs, contract manufacturing organizations or CMOs, or consultants. Relying on third-party clinical investigators, CROs or CMOs may force us to encounter delays and challenges that are outside of our control. We rely on CMOs in the United States and Europe to manufacture TIL for use in our trials. We may not be able to demonstrate sufficient comparability between products manufactured at different facilities to allow for inclusion of the clinical results from patients treated with products from these different facilities, in our product registrations. Further, our CMOs may not be able to manufacture TIL or otherwise fulfill their obligations to us because of interruptions to their business, including the loss of their key staff or interruptions to their raw material supply.

We rely on third party CROs and clinical trial sites to conduct, supervise, and monitor our clinical trials for our product candidates. We expect to continue to rely on third parties, such as CROs, clinical data management organizations, medical institutions, independent review organizations and clinical investigators, to conduct our clinical trials. While we have agreements governing their activities, we have limited influence over their actual performance and control only certain aspects of their activities. The failure of these third parties to successfully carry out their contractual duties or meet expected deadlines could substantially harm our business because we may be delayed in completing or unable to complete the clinical trials required to support future approval of our product candidates, or we may not obtain marketing approval for or commercialize our product candidates in a timely manner or at all. Moreover, these agreements might terminate for a variety of reasons, including a failure to perform by the third parties. If we need to enter into alternative arrangements, that could delay our product development activities and adversely affect our business.

Our reliance on these third parties for development activities will reduce our control over these activities. Nevertheless, we are responsible for ensuring that each of our studies is conducted in accordance with the applicable protocol, legal, regulatory, and scientific standards and our reliance on the CROs, clinical trial sites, and other third parties does not relieve us of our regulatory responsibilities. For example, we will remain responsible for ensuring that each of our clinical trials is conducted in accordance with the general investigational plan and protocols for the trial and for ensuring that our preclinical trials are conducted in accordance with Good Laboratory Practices, or GLPs, as appropriate. Moreover, the FDA and comparable foreign regulatory authorities require us to comply with GCPs for conducting, recording, and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity, and confidentiality of trial participants are protected. Regulatory authorities enforce these requirements through periodic inspections of trial sponsors, clinical investigators, and trial sites. If we, our CROs, clinical trial sites, or other third parties fail to comply with applicable GCPs or other regulatory requirements, we or they may be subject to enforcement or other legal actions, the clinical data generated in our clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials. We cannot assure you that upon inspection by a given regulatory authority, such regulatory authority will determine that any of our clinical trials complies with GCP regulations.

In addition, we will be required to report certain financial interests of our third-party investigators if these relationships exceed certain financial thresholds or meet other criteria. The FDA or comparable foreign regulatory authorities may question the integrity of the data from those clinical trials conducted by investigators that are determined to have conflicts of interest.

In addition, our clinical trials must be conducted with product candidates that were produced under cGMP regulations. Our failure to comply or our CMOs' failure to comply with these regulations may require us to repeat clinical trials, which would delay the regulatory approval process. We also are required to register certain clinical trials and post the results of certain completed clinical trials on a government sponsored database, ClinicalTrials.gov, within specified timeframes. Failure to do so can result in enforcement actions and adverse publicity.

Our CROs, clinical trial sites, and other third parties may also have relationships with other entities, some of which may be our competitors, for whom they may also be conducting clinical trials or other therapeutic development activities that could harm our competitive position. In addition, these third parties are not our employees, and except for remedies available to us under our agreements with them, we cannot control whether or not they devote sufficient time and resources to our ongoing clinical, non-clinical, and preclinical programs. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our clinical trials in accordance with regulatory requirements or our stated protocols, if they need to be replaced or if the quality or accuracy of the data they obtain is compromised due to the failure to adhere to our protocols, regulatory requirements or for other reasons, our trials may be repeated, extended, delayed, or terminated and we may not be able to obtain, or may be delayed in obtaining, marketing approvals for our product candidates and will not be able to, or may be delayed in our efforts to, successfully commercialize our product candidates, or we or they may be subject to regulatory enforcement actions. As a result, our results of operations and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenues could be delayed. To the extent we are unable to successfully identify and manage the performance of third party service providers in the future, our business may be materially and adversely affected.

If any of our relationships with these third parties terminate, we may not be able to enter into arrangements or do so on commercially reasonable terms. Switching or adding additional contractors involves additional cost and requires management time and focus. In addition, there is a natural transition period when a new third party commences work. As a result, delays could occur, which could compromise our ability to meet our desired development timelines. Though we carefully manage our relationships with our third-party service providers, there can be no assurance that we will not encounter similar challenges or delays in the future or that these delays or challenges will not have a material adverse impact on our business, financial condition and prospects or results of operations.

We also rely on other third parties to manufacture and ship our products for the clinical trials that we conduct. Any performance failure on the part of these third parties could delay clinical development or marketing approval of our product candidates or any additional product candidates or commercialization of our product candidates, if approved, producing additional losses and depriving us of potential product revenue.

We may encounter substantial delays in our clinical trials or may not be able to conduct our trials on the timelines we expect and we may be required to conduct additional clinical trials or modify current or future clinical trials based on feedback we receive from the FDA.*

Clinical testing is expensive, time consuming, and subject to uncertainty. We cannot guarantee that any current or future clinical studies will be conducted as planned or completed on schedule, if at all, or that any of our product candidates will receive regulatory approval. We initiated clinical trials in patients with metastatic melanoma, cervical, head and neck and non-small cell lung cancers, and in other indications in collaboration with third parties. We plan to initiate trials in new indications, and new cohorts in existing trials. Even as these trials progress, issues may arise that could require us to suspend or terminate such clinical trials or could cause the results of one cohort to differ from a prior cohort. A failure of one or more clinical studies can occur at any stage of testing, and our future clinical studies may not be successful. Events that may prevent successful or timely initiation or completion of clinical development, or product approval include:

- inability to generate sufficient preclinical data to support the initiation of clinical studies;
- regulators or Institutional Review Boards, or IRBs may not authorize us or our investigators to commence a clinical trial, conduct a clinical trial at a prospective trial site, or amend trial protocols, or regulators or IRBs may require that we modify or amend our clinical trial protocols;

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- delays in reaching a consensus or inability to obtain agreement with regulatory agencies on study design;
- the FDA or comparable foreign regulatory authorities may disagree with our intended indications, study design or our interpretation of data from preclinical studies and clinical trials or find that a product candidate's benefits do not outweigh its safety risks;
- the FDA or comparable foreign regulatory authorities may not accept data from studies with clinical trial sites in foreign countries;
- the FDA may not allow us to use the clinical trial data from a research institution to support an IND if we cannot demonstrate the comparability of our product candidates with the product candidate used by the relevant research institution in its clinical studies;
- delays in or failure to reach an agreement on acceptable terms with prospective CROs and clinical study sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and clinical study sites;
- delays in obtaining required IRB approval at each clinical study site;
- imposition of a temporary or permanent clinical hold, suspensions or terminations by regulatory agencies, IRBs, or us for various reasons, including noncompliance with regulatory requirements or a finding that the participants are being exposed to unacceptable health risks, undesirable side effects, or other unexpected characteristics of the product candidate, or due to findings of undesirable effects caused by a biologically or mechanistically similar therapeutic or therapeutic candidate;
- delays in recruiting suitable patients to participate in our clinical studies;
- delay in adding new investigators or clinical trial sites, or withdrawal of clinical trial sites from a study;
- delay or change in strategic direction for an indication resulting from differences in results between cohorts in a clinical trial, such as Cohort 2 and Cohort 4 of the C-144-01 clinical trial or the previously disclosed interim results for the C-145-04 trial and the final patient population and results, including differences in patient population, or from different interpretations of the results using a BIRC;
- failure by our CROs, clinical trial sites, patients, or other third parties, or us to adhere to clinical study requirements, including regulatory, contractual or protocol requirements;
- failure to perform in accordance with the FDA's cGCP requirements, or applicable regulatory guidelines in other countries;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate or enrollment in these clinical trials may be slower than we anticipate;
- patients that enroll in our studies may misrepresent their eligibility or may otherwise not comply with the clinical trial protocol, resulting in the need to drop such patients from the study or clinical trial, increase the needed enrollment size for the study or clinical trial or extend the study's or clinical trial's duration;
- patients dropping out of a study;
- occurrence of adverse events associated with the product candidate that are viewed to outweigh its potential benefits;
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols to regulatory authorities and IRBs, and which may cause delays in our development programs, or changes to regulatory review times;
- there may be regulatory questions or disagreements regarding interpretations of data and results, or new information may emerge regarding our product candidates;
- changes in the standard of care on which a clinical development plan was based, which may require new or additional trials;
- the cost of clinical studies of our product candidates being greater than we anticipate, or we may have insufficient funds for a clinical trial or to pay the substantial user fees required by the FDA upon the filing of a BLA;
- clinical studies of our product candidates producing negative or inconclusive results may fail to provide sufficient data and information to support product approval, or our studies may fail to reach the necessary level of statistical or clinical significance, which may result in our deciding, or regulators requiring us, to conduct additional clinical studies, or preclinical studies, or abandon product development programs;
- early results from our clinical studies of our product candidates may be negatively affected by changes in efficacy measures such as overall response rate and duration of response as more patients are enrolled in our clinical trials or as new cohorts of our clinical trials are tested, and overall response rate and duration of response may be negatively affected by the inclusion of unconfirmed responses in preliminary results that we report if such responses are not later confirmed;

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- we may not be able to demonstrate that a product candidate provides an advantage over current standards of care or current or future competitive therapies in development;
- there may be changes to the therapeutics or their regulatory status which we are administering in combination with our product candidates;
- the FDA or comparable foreign regulatory authorities may fail to approve or subsequently find fault with the manufacturing processes or our manufacturing facilities for clinical and future commercial supplies;
- the FDA or comparable regulatory authorities may take longer than we anticipate making a decision on our product candidates;
- transfer of our manufacturing processes to our contract manufacturers or other larger-scale facilities operated by a CMO and delays or failure by our CMOs or us to make any necessary changes to such manufacturing process;
- our use of different manufacturing processes within our clinical trials, including our Gen 1 and Gen 2 manufacturing processes, and any effects that may result from the use of different processes on the clinical data that we have reported and will report in the future; and
- delays in manufacturing, testing, releasing, validating, or importing/exporting sufficient stable quantities of our product candidates for use in clinical studies or the inability to do any of the foregoing, including as a result of any quality issues associated with the contract manufacturer.

We also may conduct clinical and preclinical research in collaboration with other academic, pharmaceutical, biotechnology and biologics entities in which we combine our technologies with those of our collaborators. Such collaborations may be subject to additional delays because of the management of the trials, contract negotiations, the need to obtain agreement from multiple parties, and the necessity of obtaining additional approvals for therapeutics used in the combination trials. These combination therapies will require additional testing and clinical trials will require additional FDA regulatory approval and will increase our future cost of expenses.

Any inability to successfully complete preclinical and clinical development could result in additional costs to us or impair our ability to generate revenue. In addition, if we make manufacturing changes to our product candidates, we may be required to, or we may elect to, conduct additional studies to bridge our modified product candidates to earlier versions. These changes may require the FDA approval or notification, may not have their desired effect and the FDA may not accept data from prior versions of the product to support an application, delaying our clinical trials or programs or necessitating additional clinical or preclinical studies. For example, we changed our manufacturing process from our first generation, or Gen 1 to our second generation, or Gen 2 to decrease the production time and allow for the cryopreservation of the product. We may find that this update has unintended consequences that necessitates additional development and manufacturing work, additional clinical and preclinical studies, or that results in refusal to file or non-approval of a BLA.

Clinical study delays could shorten any periods during which our products have patent protection and may allow our competitors to 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.

Regulatory authorities have substantial discretion in the approval process and may refuse to accept any application or may decide that our data are insufficient for approval and require additional preclinical, clinical or other studies. The number and types of preclinical studies and clinical trials that will be required for regulatory approval also varies depending on the product candidate, the disease or condition that the product candidate is designed to address, and the regulations applicable to any particular product candidate. Approval policies, regulations or the type and amount of clinical data necessary to gain approval may change during the course of a product candidate's clinical development and may vary among jurisdictions. It is possible that any product candidates we may seek to develop in the future will ever obtain the appropriate regulatory approvals necessary for us or any future collaborators to commence product sales. Any delay in completing development, obtaining or failure to obtain required approvals could also materially adversely affect our ability or that of any of our collaborators to generate revenue from any such product candidate, which likely would result in significant harm to our financial position and adversely impact our stock price.

It may take longer and cost more to complete our clinical trials than we project, or we may not be able to complete them at all.*

For budgeting and planning purposes, we have projected the date for the commencement of future trials, and continuation and completion of our ongoing clinical trials. However, a number of factors, including scheduling conflicts

with participating clinicians and clinical institutions, and difficulties in identifying and enrolling patients who meet trial eligibility criteria, may cause significant delays. We may not commence or complete clinical trials involving any of our products as projected or may not conduct them successfully.

We have opened enrollment of our company-sponsored, Phase 2 clinical trials to establish the feasibility of our product, and to assess its overall safety in patients with metastatic melanoma, cervical, head and neck and lung cancers. However, we may experience difficulties in patient enrollment in our clinical trials for a variety of reasons. Our ability to enroll or treat patients in our other studies, or the duration or costs of those studies, could be affected by multiple factors. Furthermore, the timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who remain in the study until its conclusion. In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Accordingly, we cannot guarantee that the trial will progress as planned or as scheduled. Delays in patient enrollment may result in increased costs or may affect the timing or outcome of our ongoing clinical trial and planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates.

We expect to rely on medical institutions, academic institutions or CROs to conduct, supervise or monitor some or all aspects of clinical trials involving our products. We will have less control over the timing and other aspects of these clinical trials than if we conducted them entirely on our own. If we fail to commence or complete, or experience delays in, any of our planned clinical trials, our stock price and our ability to conduct our business as currently planned could be harmed.

We currently anticipate that we will have to rely on our CMOs to manufacture our adoptive cell therapy products for clinical trials. If they fail to commence or complete, or experience delays in, manufacturing our adoptive cell therapy products, our planned clinical trials will be delayed, which will adversely affect our stock price and our ability to conduct our business as currently planned.

Clinical trials are expensive, time-consuming and difficult to design and implement, and our clinical trial costs may be higher than for more conventional therapeutic technologies or drug products.

Clinical trials are expensive and difficult to design and implement, in part because they are subject to rigorous regulatory requirements. Because our product candidates are based on new cell therapy technologies and manufactured on a patient-by-patient basis, we expect that they will require extensive research and development and have substantial manufacturing costs. In addition, costs to treat patients with relapsed/refractory cancer and to treat potential side effects that may result from our product candidates can be significant. Some clinical trial sites may not bill, or obtain coverage from, Medicare, Medicaid, or other third-party payors for some or all of these costs for patients enrolled in our clinical trials, and we may be required by those trial sites to pay such costs. Accordingly, our clinical trial costs are likely to be significantly higher per patient than those of more conventional therapeutic technologies or drug products. In addition, our proposed personalized product candidates involve several complex and costly manufacturing and processing steps, the costs of which will be borne by us. We are also responsible for the manufacturing costs of products for patients that may have a tumor resection but ultimately do not receive an infusion. Depending on the number of patients that we ultimately screen and enroll in our trials, and the number of trials that we may need to conduct, our overall clinical trial costs may be higher than for more conventional treatments.

Our clinical trials may fail to demonstrate adequately the safety and efficacy of our product candidates, which would prevent or delay regulatory approval and commercialization.

The clinical trials of our product candidates are, and the manufacturing and marketing of our products will be, subject to extensive and rigorous review and regulation by numerous government authorities in the United States and in other countries where we intend to test and market our product candidates. Before obtaining regulatory approvals for the commercial sale of any of our product candidates, we must demonstrate through lengthy, complex and expensive preclinical testing and clinical trials that our product candidates are both safe and effective for use in each target indication. Because our product candidates are subject to regulation as biological drug products, we will need to demonstrate that they are safe, pure, and potent for use in their target indications. Each product candidate must demonstrate an adequate risk versus benefit profile in its intended patient population and for its intended use. The

risk/benefit profile required for product licensure will vary depending on these factors and may include not only the ability to show tumor shrinkage, but also adequate duration of response, a delay in the progression of the disease, and/or an improvement in survival. For example, response rates from the use of our product candidates may not be sufficient to obtain regulatory approval unless we can also show an adequate duration of response. Regulatory authorities may ultimately disagree with our chosen endpoints or may find that our studies or study results do not support product approval. Clinical testing is expensive and can take many years to complete, and its outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. The results of preclinical studies and early clinical trials of our product candidates with small patient populations may not be predictive of the results of later-stage clinical trials or the results once the applicable clinical trials are completed. Preliminary, single cohort, or top-line results from clinical studies may not be representative of the final study results. The results of studies in one set of patients or line of treatment may not be predictive of those obtained in another and the results in various human clinical trials reported in scientific and medical literature may not be indicative of results we obtain in our clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical studies and initial clinical trials. Preclinical studies may also reveal unfavorable product candidate characteristics, including safety concerns.

We expect there may be greater variability in results for products processed and administered on a patient-by-patient basis, as anticipated for our product candidates, than for “off-the-shelf” products, like many other drugs. There is typically an extremely high rate of attrition from the failure of product candidates proceeding through clinical trials. Product candidates in later stages of clinical trials may fail to show the desired safety and efficacy profile despite having progressed through preclinical studies and initial clinical trials. Many companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or unacceptable safety issues, notwithstanding promising results in earlier trials. Most product candidates that begin clinical trials are never approved by regulatory authorities for commercialization.

In some instances, there can be significant variability in safety or efficacy results between different clinical trials of the same product candidate due to numerous factors, including changes in trial procedures set forth in protocols, differences in the size and type of the patient populations, changes in and adherence to the clinical trial protocols and the rate of dropout among clinical trial participants. Our current and future clinical trial results may not be successful. Moreover, should there be a flaw in a clinical trial, it may not become apparent until the clinical trial is well advanced. Further, because we currently plan to develop our product candidates for use with other oncology products, the design, implementation, and interpretation of the clinical trials necessary for marketing approval may be more complex than if we were developing our product candidates alone.

In addition, even if such trials are successfully completed, we cannot guarantee that the FDA or foreign regulatory authorities will interpret the results as we do, and more trials could be required before we submit our product candidates for approval. To the extent that the results of the trials are not satisfactory to the FDA or foreign regulatory authorities for support of a marketing application, we may be required to expend significant resources, which may not be available to us, to conduct additional trials in support of potential approval of our product candidates.

We have reported preliminary results for clinical trials of our product candidates, including TIL for the treatment of metastatic melanoma, cervical cancer, and head and neck cancers. These preliminary results, which include assessments of efficacy such as ORR, are subject to substantial risk of change due to small sample sizes, and may change as patients are evaluated or as additional patients are enrolled in these clinical trials. These outcomes may be unfavorable, deviate from our earlier reports, and/or delay or prevent regulatory approval or commercialization of our product candidates, including candidates for which we have reported preliminary efficacy results. In clinical studies where a staged expansion is expected, such as studies using a Simon’s two stage design, these outcomes may result in the failure to meet an initial efficacy threshold for the first stage. Furthermore, other measures of efficacy for these clinical trials and product candidates may not be as favorable.

If we encounter difficulties enrolling patients in our clinical trials, our clinical development activities could be delayed or otherwise adversely affected.

The timely completion of clinical trials in accordance with their protocols depends, among other things, on our ability to enroll a sufficient number of patients who remain in the trial until its conclusion. We may experience difficulties or delays in patient enrollment in our clinical trials for a variety of reasons, including:

- the size and nature of the patient population;
- the severity of the disease under investigation;
- the patient eligibility criteria defined in the protocol;
- the size of the study population required for analysis of the trial's primary endpoints;
- the proximity of patients to trial sites;
- the design of the trial;
- our ability to recruit clinical trial investigators with the appropriate competencies and experience;
- the efforts to facilitate timely enrollment in clinical trials and the effectiveness of recruiting publicity;
- the patient referral practices of physicians;
- competing clinical trials for similar therapies or other new therapeutics not involving cell-based immunotherapy;
- clinicians' and patients' perceptions as to the potential advantages and side effects of the product candidate being studied in relation to other available therapies, including any new drugs or treatments that may be approved for the indications we are investigating;
- clinical investigators enrolling patients who do not meet the enrollment criteria, requiring the inclusion of additional patients in the clinical trial;
- approval of new indications for existing therapies or approval of new therapies in general;
- our ability to obtain and maintain patient consents; and
- the risk that patients enrolled in clinical trials will not complete a clinical trial, return for post-treatment follow-up, or follow the required study procedures. For instance, patients, including patients in any control groups, may withdraw from the clinical trial if they are not experiencing improvement in their underlying disease or condition. Withdrawal of patients from our clinical trials may compromise the quality of our data.

In addition, our clinical trials will compete with other clinical trials for product candidates that are in the same therapeutic areas as our product candidates, and this competition will reduce the number and types of patients available to us, because some patients who might have opted to enroll in our trials may instead opt to enroll in a trial being conducted by one of our competitors. Because the number of qualified clinical investigators is limited, we expect to conduct some of our clinical trials at the same clinical trial sites that some of our competitor's use, which will reduce the number of patients who are available for our clinical trials at such clinical trial sites. Moreover, because our product candidates represent a departure from more commonly used methods for cancer treatment, potential patients and their doctors may be inclined to use conventional therapies, such as chemotherapy and approved immunotherapies, rather than enroll patients in any future clinical trial. In addition, potential enrollees may opt to participate in other clinical trials because of the length of time between the time that their tumor is excised and the TIL is infused back into the patient. Amendments to our clinical protocols may affect enrollment in, or results of, our trials, including amendments we have made to further define the patient population to be studied.

Even if we are able to enroll a sufficient number of patients in our clinical trials, delays in patient enrollment or small population size may result in increased costs or may affect the timing or outcome of the planned clinical trials, which could prevent completion of these trials and adversely affect our ability to advance the development of our product candidates.

Our product candidates may cause undesirable side effects or have other properties that could halt their clinical development, prevent their regulatory approval, limit their commercial potential or result in significant negative consequences.*

Results of our trials could reveal a high and unacceptable severity and prevalence of side effects or unexpected characteristics. Undesirable side effects caused by our product candidates could cause us, IRBs, Drug Safety Monitoring Boards or DSMBs, or regulatory authorities to interrupt, delay or halt clinical trials and could result in a more restrictive label or the delay or denial of regulatory approval by the FDA or other comparable foreign regulatory authorities. Even

if we were to receive product approval, such approval could be contingent on inclusion of unfavorable information in our product labeling, such as limitations on the indicated uses for which the products may be marketed or distributed, a label with significant safety warnings, including boxed warnings, contraindications, and precautions, a label without statements necessary or desirable for successful commercialization, or requirements for costly post marketing testing and surveillance, or other requirements, including REMS, to monitor the safety or efficacy of the products, and in turn prevent us from commercializing and generating revenues from the sale of our current or future product candidates.

If unacceptable toxicities or side effects arise in the development of our product candidates, we, an IRB, DSMB or the FDA or comparable foreign regulatory authorities could order us to cease clinical trials, order our clinical trials to be placed on clinical hold, or deny approval of our product candidates for any or all targeted indications. The FDA or comparable foreign regulatory authorities may also require additional data, clinical, or pre-clinical studies should unacceptable toxicities arise. We may need to abandon development or limit development of that product candidate to certain uses or subpopulations in which the undesirable side effects or other characteristics are less prevalent, less severe or more acceptable from a risk/benefit perspective. Toxicities associated with our trials and products may also negatively impact our ability to conduct clinical trials using TIL therapy in larger patient populations, such as in patients that have not yet been treated with other therapies or have not yet progressed on other therapies.

Treatment-related side effects could also affect patient recruitment or the ability of enrolled subjects to complete our trials or result in potential product liability claims. Such toxicities, which may arise from TIL therapy in general, including co-therapies, may include, for example, thrombocytopenia, chills, anemia, pyrexia, febrile neutropenia, diarrhea, neutropenia, vomiting, hypotension, and dyspnea. For example, the update in October 2018 from the C-144-01 trial included two grade 5 treatment emergent adverse events. In addition, these side effects and deaths may not be appropriately recognized or managed by the treating medical staff, as toxicities resulting from personalized cell therapy are not normally encountered in the general patient population and by medical personnel. Any of these occurrences may harm our business, financial condition and prospects significantly.

The manufacture of our product candidates is complex, and we may encounter difficulties in production, particularly with respect to process development, quality control, or scaling-out of our manufacturing capabilities. If we, or any of our third-party manufacturers encounter such difficulties, our ability to provide supply of our product candidates for clinical trials or our products for patients, if approved, could be delayed or stopped, or we may be unable to maintain a commercially viable cost structure. *

Our product candidates are biologics and the process of manufacturing our products is complex, highly-regulated and subject to multiple risks. The manufacture of our product candidates involves complex processes, including harvesting tumor fragments from patients, multiplying the T cells to obtain the desired dose, and ultimately infusing the T cells back into a patient. As a result of the complexities, the cost to manufacture biologics is generally higher than traditional small molecule chemical compounds, and the manufacturing process is less reliable and is more difficult to reproduce. Our manufacturing process will be susceptible to product loss or failure due to logistical issues associated with the collection of tumor fragments, or starting material, from the patient, shipping such material to the manufacturing site, shipping the final product back to the patient, and infusing the patient with the product, manufacturing issues associated with the differences in patient starting material, interruptions in the manufacturing process, contamination, equipment failure, assay failures, improper installation or operation of equipment, vendor or operator error, inconsistency in cell growth, and variability in product characteristics. Even minor deviations from normal manufacturing processes could result in reduced production yields, product defects, and other supply disruptions. If for any reason we lose a patient's starting material, or later-developed product at any point in the process, or if any product does not meet the applicable specifications, the manufacturing process for that patient will need to be restarted, including resection of the proper amount of tumor fragment and the resulting delay may adversely affect that patient's outcome. If microbial, viral, environmental or other contaminations are discovered in our product candidates or in the manufacturing facilities in which our product candidates are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination.

Because our product candidates are manufactured specifically for each individual patient, we will be required to maintain a chain of identity with respect to the patient's tumor as it moves from the patient to the manufacturing facility, through the manufacturing process, and back to the patient. Maintaining such a chain of identity is difficult and complex, and failure to do so could result in adverse patient outcomes, loss of product, or regulatory action including withdrawal of our products from the market. Further, as product candidates are developed through preclinical to late stage clinical trials towards approval and commercialization, it is common that various aspects of the development program, such as

manufacturing methods, are altered along the way to optimize processes and results. Such changes carry the risk that they will not achieve these intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of planned clinical trials or other future clinical trials or otherwise necessitate the conduct of additional studies.

Currently, our product candidates are manufactured using processes developed or modified by us or by our third-party research institution collaborators that we may not intend to use for more advanced clinical trials or commercialization. We have selected Gen 2 as the manufacturing process for product registration, and all ongoing and future company-sponsored clinical trials. Although we believe Gen 2 is a commercially viable process, there are risks associated with scaling to the level required for advanced clinical trials or commercialization, including, among others, cost overruns, potential problems with process scale-out, process reproducibility, stability issues, lot consistency, and timely availability of raw materials. This includes potential risks associated with FDA not agreeing with all of the details of our validation data or our potency assay for Cohort 4 of our C-144-01 clinical trial. Furthermore, some of our CMOs may not be able to establish comparability of their products with TIL product used in Cohort 2 or may not be fully validated prior to starting Cohort 4. As a result of these challenges, we may experience delays in our clinical development and/or commercialization plans. We may ultimately be unable to reduce the cost of goods for our product candidates to levels that will allow for an attractive return on investment if and when those product candidates are commercialized.

Our current manufacturing strategy involves the use of CMOs. Currently our product candidates are manufactured by WuXi, Lonza Netherlands, MasTHerCell, and Moffitt. Should we continue to use CMOs, we may not succeed in maintaining our relationships with our current CMOs or establishing relationships with additional or alternative CMOs. Our product candidates may compete with other products and product candidates for access to manufacturing facilities. There are a limited number of manufacturers that operate under cGMP regulations and that are both capable of manufacturing for us and willing to do so. If our CMOs should cease manufacturing for us, we would experience delays in obtaining sufficient quantities of our product candidates for clinical trials and, if approved, commercial supply. Further, our CMOs may breach, terminate, or not renew these agreements. If we were to need to find alternative manufacturing facilities it would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved. The commercial terms of any new arrangement could be less favorable than our existing arrangements and the expenses relating to the transfer of necessary technology and processes could be significant.

Reliance on third-party manufacturers entails exposure to risks to which we would not be subject if we manufactured the product candidate ourselves, including:

- inability to negotiate manufacturing agreements with third parties under commercially reasonable terms;
- reduced day-to-day control over the manufacturing process for our product candidates as a result of using third-party manufacturers for all aspects of manufacturing activities;
- reduced control over the protection of our trade secrets and know-how from misappropriation or inadvertent disclosure;
- termination or nonrenewal of manufacturing agreements with third parties in a manner or at a time that may be costly or damaging to us or result in delays in the development or commercialization of our product candidates; and
- disruptions to the operations of our third-party manufacturers or suppliers caused by conditions unrelated to our business or operations, including the bankruptcy of the manufacturer or supplier.

In the future, we plan to establish our own manufacturing capabilities and infrastructure, including a manufacturing facility. We would expect that development of our own manufacturing facility would provide us with enhanced control of material supply for both clinical trials and the commercial market, enable the more rapid implementation of process changes, and allow for better long-term margins. However, we have no experience as a company in developing a manufacturing facility and may never be successful in developing our own manufacturing facility or capability. We may establish multiple manufacturing facilities as we expand our commercial footprint to multiple geographies, which may lead to regulatory delays or prove costly. Even if we are successful, our manufacturing capabilities could be affected by cost-overruns, unexpected delays, equipment failures, labor shortages, natural disasters, power failures, and numerous other factors that could prevent us from realizing the intended benefits of our manufacturing strategy and have a material adverse effect on our business.

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The manufacture of cell therapy products requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers of cell therapy products often encounter difficulties in production, particularly in scaling up initial production. These problems include difficulties with production costs and yields, quality control, including stability of the product candidate and quality assurance testing, shortages of qualified personnel, and compliance with strictly enforced federal, state, local and foreign regulations.

Moreover, any problems or delays we or our CMOs experience in preparing for commercial scale manufacturing of a product candidate or component may result in a delay in the FDA approval of the product candidate or may impair our ability to manufacture commercial quantities or such quantities at an acceptable cost, which could result in the delay, prevention, or impairment of clinical development and commercialization of our product candidates and could adversely affect our business. Furthermore, if we or our commercial manufacturers fail to deliver the required commercial quantities of our product candidates on a timely basis and at reasonable costs, we would likely be unable to meet demand for our products and we would lose potential revenues.

In addition, the manufacturing process and facilities for any products that we may develop is subject to FDA and foreign regulatory authority approval processes, and we or our CMOs will need to meet all applicable FDA and foreign regulatory authority requirements, including cGMPs, on an ongoing basis. The cGMP requirements include quality control, quality assurance, and the maintenance of records and documentation. The FDA and other regulatory authorities enforce these requirements through facility inspections. Manufacturing facilities must be approved by the FDA pursuant to inspections that will be conducted after we submit our marketing applications to the agency. Manufacturers are also subject to continuing FDA and other regulatory authority inspections following marketing approval. Further, we, in cooperation with our CMOs, must supply all necessary chemistry, manufacturing, and control documentation in support of a BLA on a timely basis.

Our, or our CMOs' manufacturing facilities may be unable to comply with our specifications, cGMPs, and with other FDA, state, and foreign regulatory requirements. Poor control of production processes can lead to the introduction of adventitious agents or other contaminants, or to inadvertent changes in the properties or stability of product candidate that may not be detectable in final product testing. If we or our CMOs are unable to reliably produce products to specifications acceptable to the FDA or other regulatory authorities, or in accordance with the strict regulatory requirements, we may not obtain or maintain the approvals we need to commercialize such products. Even if we obtain regulatory approval for any of our product candidates, there is no assurance that either we or our CMOs will be able to manufacture the approved product to specifications acceptable to the FDA or other regulatory authorities, to produce it in sufficient quantities to meet the requirements for the potential launch of the product, or to meet potential future demand. Deviations from manufacturing requirements may further require remedial measures that may be costly and/or time-consuming for us or a third party to implement and may include the temporary or permanent suspension of a clinical trial or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

Even to the extent we use and continue to use CMOs, we are ultimately responsible for the manufacture of our products and product candidates. A failure to comply with these requirements may result in regulatory enforcement actions against our manufacturers or us, including fines and civil and criminal penalties, which could result in imprisonment, suspension or restrictions of production, suspension, injunctions, delay or denial of product approval or supplements to approved products, clinical holds or termination of clinical studies, warning or untitled letters, regulatory authority communications warning the public about safety issues with the biologic, refusal to permit the import or export of the products, product seizure, detention, or recall, operating restrictions, suits under the civil False Claims Act, corporate integrity agreements, consent decrees, or withdrawal of product approval.

Any of these challenges could delay completion of clinical trials, require bridging clinical trials or the repetition of one or more clinical trials, increase clinical trial costs, delay approval of our product candidate, impair commercialization efforts, increase our cost of goods, and have an adverse effect on our business, financial condition, results of operations and growth prospects.

Cell-based therapies rely on the availability of reagents, specialized equipment, and other specialty materials, which may not be available to us on acceptable terms or at all. For some of these reagents, equipment, and materials, we rely or may rely on sole source vendors or a limited number of vendors, which could impair our ability to manufacture and supply our products.

Manufacturing our product candidates requires many reagents, which are substances used in our manufacturing processes to bring about chemical or biological reactions, and other specialty materials and equipment, some of which are manufactured or supplied by small companies with limited resources and experience to support commercial biologics production. We currently depend on a limited number of vendors for certain materials and equipment used in the manufacture of our product candidates. Some of these suppliers may not have the capacity to support clinical trials and commercial products manufactured under cGMP by biopharmaceutical firms or may otherwise be ill-equipped to support our needs. We also do not have supply contracts with many of these suppliers and may not be able to obtain supply contracts with them on acceptable terms or at all. Accordingly, we may experience delays in receiving key materials and equipment to support clinical or commercial manufacturing.

For some of these reagents, equipment, and materials, we rely and may in the future rely on sole source vendors or a limited number of vendors. An inability to continue to source product from any of these suppliers, which could be due to a number of issues, including regulatory actions or requirements affecting the supplier, adverse financial or other strategic developments experienced by a supplier, labor disputes or shortages, unexpected demands, or quality issues, could adversely affect our ability to satisfy demand for our product candidates, which could adversely and materially affect our product sales and operating results or our ability to conduct clinical trials, either of which could significantly harm our business.

As we continue to develop and scale our manufacturing process, we expect that we will need to obtain rights to and supplies of certain materials and equipment to be used as part of that process. We may not be able to obtain rights to such materials on commercially reasonable terms, or at all, and if we are unable to alter our process in a commercially viable manner to avoid the use of such materials or find a suitable substitute, it would have a material adverse effect on our business. Even if we are able to alter our process so as to use other materials or equipment, such a change may lead to a delay in our clinical development and/or commercialization plans. If such a change occurs for product candidate that is already in clinical testing, the change may require us to perform both *ex vivo* comparability studies and to collect additional data from patients prior to undertaking more advanced clinical trials.

The deviations in our proposed new products from existing products may require us to perform additional testing, which will increase the cost, and extend the time for obtaining approval.

Our TIL based therapy is based on the adoptive cell therapy technology that we licensed from the NIH and that is presently in use as a physician-sponsored investigational therapy for the treatment of Stage IV metastatic melanoma in the United States at the NCI, MDACC Cancer Center, and Moffit. These current methods of treatment are very labor intensive and expensive, which has limited its widespread application. We have developed new processes that we anticipate will enable more efficient manufacturing of TIL. We may have difficulty demonstrating that the products produced from our new processes are comparable to the existing products. The FDA may require additional clinical testing before permitting a larger clinical trial with the new processes, and the product may not be as efficacious in the new clinical trials. Cellular products are not considered as well characterized products because there are hundreds of markers present on these cells, and even small changes in manufacturing processes could alter the cell types. It is unclear at this time which of those markers are critical for success of these cells to combat cancer, so our ability to predict the outcomes with newer manufacturing processes is limited. The changes that we have made to the historical manufacturing process may require additional testing, which may increase costs and timelines associated with these developments.

In addition to developing a TIL based therapy on existing ACT technology, we are currently conducting clinical trials of our products in combination with other existing drugs. These combination therapies will require additional testing and clinical trials will require additional FDA regulatory approval and will increase our future cost of development.

We will be unable to commercialize our products if our trials are not successful.

Our research and development programs are at an early stage. We must demonstrate our products' safety and efficacy in humans through extensive clinical testing. We may experience numerous unforeseen events during, or as a

result of, the testing process that could delay or prevent commercialization of our products, including but not limited to the following:

- safety and efficacy results in various human clinical trials reported in scientific and medical literature may not be indicative of results we obtain in our clinical trials;
- after reviewing test results, we or our collaborators may abandon projects that we might previously have believed to be promising;
- we, our collaborators or regulators, may suspend or terminate clinical trials if the participating subjects or patients are being exposed to unacceptable health risks;
- the effects our potential products have may not be the desired effects or may include undesirable side effects or other characteristics that preclude regulatory approval or limit their commercial use if approved;
- manufacturers may not meet the necessary standards for the production of the product candidates or may not be able to supply the product candidates in a sufficient quantity; and
- regulatory authorities may find that our clinical trial design or conduct does not meet the applicable approval requirements.

Clinical testing is very expensive, can take many years, and the outcome is uncertain. It can take as much as 12 months or more before we learn the results from any clinical trial using our adoptive cell therapy with TIL. The data collected from our clinical trials may not be sufficient to support approval by the FDA of our TIL-based product candidates for the treatment of solid tumors. The clinical trials for our products under development may not be completed on schedule and the FDA may not ultimately approve any of our product candidates for commercial sale. If we fail to adequately demonstrate the safety and efficacy of any product candidate under development, we may not receive regulatory approval for those products, which would prevent us from generating revenues or achieving profitability.

Even if our lead products, lifileucel and LN-145, are approved and commercialized, we may not become profitable.

Our lead products, lifileucel and LN-145, are initially targeting a small population of refractory patients that suffer from metastatic melanoma and advanced cervical cancer. Even if the FDA approves these new therapies, and even if we obtain significant market share for each product candidate, because the potential target population for lifileucel and LN-145 in refractory patients may be small, we may never achieve profitability without obtaining regulatory approval for additional indications. The FDA often approves new therapies initially only for use in patients with relapsed or refractory metastatic disease. We expect to initially seek approval of our product candidates in this setting and are currently studying these patient populations.

We collaborate with governmental, academic and corporate partners to improve and develop TIL therapies for new indications for use in combination with other therapies and to evaluate new TIL manufacturing methods, the results of which, because the manufacturing processes are not within our control, may be incorrect or unreliable.

In addition to our own research and process development efforts, we seek to collaborate with government, academic research institutions and corporate partners to improve TIL manufacturing and to develop TIL therapies for new indications. In 2017, we announced collaborations with Moffitt, MDACC, Roswell Park Cancer Institute, and Ohio State University to evaluate several new solid tumor and hematologic indications for TIL therapy in clinical and preclinical studies as well as, in some cases, new TIL manufacturing approaches. The results of these collaborations may be used to support our filing with the FDA of INDs to conduct more advanced clinical trials of our product candidates, or to otherwise analyze or make predictions or decisions with respect to our current or future product candidates. However, because the majority of our collaborations are conducted at outside laboratories and we do not have complete control over how the studies are conducted or reported or over the manufacturing methods used to manufacture TIL product, the results of such studies, which we may use as the basis for our conclusions, projections or decisions with respect to our current or future product candidates, may be incorrect or unreliable, or may have a negative impact on us if the results of such studies are imputed to our products or proposed indications, even if such imputation is improper. For example, we have entered into collaborations with Moffitt and MDACC to perform clinical trials using TIL products that differ from our products, but the results of these clinical trials, if negative, may adversely impact our stock price and our development plans for our products. Additionally, we may use third party data to analyze, reach conclusions or make predictions or decisions with respect to our product candidates that may be incomplete, inaccurate or otherwise unreliable.

We will need additional financing to fund our operations and complete the development and commercialization of our various product candidates, and if we are unable to obtain such financing, we may be unable to complete the development and commercialization of our product candidates. Raising additional capital may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies or product candidates.*

Our operations have consumed substantial amounts of cash since inception. From our inception to June 30, 2019, we have an accumulated deficit of \$457.6 million. In addition, our research and development and our operating costs have also been substantial and are expected to increase. In January 2018, we closed an underwritten public offering of our common stock. The net proceeds from the offering, after deducting the underwriting discounts and commissions and other offering expenses payable by us, were \$162.0 million. In October 2018, we closed an underwritten public offering of our common stock. The net proceeds from the offering, after deducting the underwriting discounts and commissions and other estimated offering expenses payable by the Company, were of \$236.7 million. We expect to continue to spend substantial amounts to continue the clinical development of our product candidates. As of June 30, 2019, we had \$404.1 million in cash, cash equivalents and short-term investments.

Accordingly, we believe that our existing cash, cash equivalents and short-term investments will be sufficient to fund our operations for at least the next twelve months from the date this Quarterly Report on Form 10-Q is issued. However, in order to complete the development of our current product candidates, and in order to affect our business plan, including establishing our own manufacturing facility, we anticipate that we will have to spend more than the funds currently available to us. Furthermore, changing circumstances may cause us to increase our spending significantly faster than we currently anticipate, and we may require additional capital for the further development and commercialization of our product candidates and may need to raise additional funds sooner if we choose to expand more rapidly than we presently anticipate. Moreover, our fixed expenses such as rent, minimum payments to our contract manufacturers, and other contractual commitments, including those for our research collaborations, are substantial and are expected to increase in the future.

We will need to obtain additional financing to fund our future operations, including completing the development and commercialization of our product candidates. Our future funding requirements will depend on many factors, including, but not limited to:

- Progress, timing, scope and costs of our clinical trials, including the ability to timely initiate clinical sites, enroll subjects and manufacture TIL for treatment for patients in our ongoing, planned and potential future clinical trials;
- Time and cost necessary to obtain regulatory approvals that may be required by regulatory authorities to execute clinical trials or commercialize our product;
- Our ability to successfully commercialize our product candidates, if approved;
- Our ability to have clinical and commercial product successfully manufactured consistent with FDA and European Medicines Agency, or EMA, regulations;
- Amount of sales and other revenues from product candidates that we may commercialize, if any, including the selling prices for such potential products and the availability of adequate third-party coverage and reimbursement for patients;
- Sales and marketing costs associated with commercializing our products, if approved, including the cost and timing of building our marketing and sales capabilities;
- Cost of building, staffing and validating our own manufacturing facility in the United States;
- Terms and timing of our current and any potential future collaborations, licensing or other arrangements that we have established or may establish;
- Cash requirements of any future acquisitions or the development of other product candidates;
- Costs of operating as a public company;
- Time and cost necessary to respond to technological, regulatory, political and market developments;
- Costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; and
- Costs associated with any potential business or product acquisitions, strategic collaborations, licensing agreements or other arrangements that we may establish.

Unless and until we can generate a sufficient amount of revenue, we may finance future cash needs through public or private equity offerings, license agreements, debt financings, collaborations, strategic alliances and marketing or distribution arrangements. Additional funds may not be available when we need them on terms that are acceptable to us, or at all. We have no committed source of additional capital and if we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may be required to delay or reduce the scope of or eliminate one or more of our research or development programs or our commercialization efforts. Our current license and collaboration agreements may also be terminated if we are unable to meet the payment obligations under those agreements. As a result, we may seek to access the public or private capital markets whenever conditions are favorable, even if we do not have an immediate need for additional capital at that time.

To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms may include liquidation or other preferences that adversely affect your rights as a stockholder. The incurrence of indebtedness would result in increased fixed payment obligations and could involve certain restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we raise additional funds through strategic partnerships and alliances and licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies or product candidates, or grant licenses on terms unfavorable to us.

Subject to various spending levels approved by our Board of Directors, our management will have broad discretion in the use of the net proceeds from our capital raises, including our October 2018, January 2018, and September 2017 public offerings, and may not use them effectively.

Our management will have discretion in the application of the net proceeds from our capital raises, including our October 2018, January 2018 and September 2017 public offerings, and our stockholders will not have the opportunity as part of their investment decision to assess whether the net proceeds from those capital raises are being used appropriately. You may not agree with our decisions, and our use of the proceeds from our capital raises may not yield any return to stockholders. Because of the number and variability of factors that will determine our use of the net proceeds from our capital raises, including our October 2018, January 2018 and September 2017 public offerings, their ultimate use may vary substantially from their currently intended use. Our failure to apply the net proceeds of our capital raises, including our October 2018, January 2018 and September 2017 public offerings, effectively could compromise our ability to pursue our growth strategy and we might not be able to yield a significant return, if any, on our investment of those net proceeds. Stockholders will not have the opportunity to influence our decisions on how to use our net proceeds from capital raises, including our October 2018, January 2018 and September 2017 public offerings. Pending their use, we may invest the net proceeds from our capital raises, including our October 2018, January 2018 and September 2017 public offerings, in interest and non-interest bearing cash accounts, short-term, investment-grade, interest-bearing instruments and U.S. government securities. These temporary investments are not likely to yield a significant return.

The use of our net operating loss carryforwards and research tax credits may be limited. *

Our net operating loss carryforwards and any future research and development tax credits may expire and not be used. As of December 31, 2018, we had U.S. federal net operating loss carryforwards of approximately \$251.5 million. Our net operating loss carryforwards arising in taxable years ending on or prior to December 31, 2018 will begin expiring in 2027 if we have not used them prior to that time. Net operating loss carryforwards arising in taxable years ending after December 31, 2018 are no longer subject to expiration under the Internal Revenue Code of 1986, as amended, or the Code. Additionally, our ability to use any net operating loss and credit carryforwards to offset taxable income or tax, respectively, in the future will be limited under Sections 382 and 383 of the Code, respectively, if we have a cumulative change in ownership of more than 50% within a three-year period.

We have performed an IRC Section 382 analysis as of December 31, 2017. Per the analysis, the May 2013 recapitalization, private placements in 2014 and 2016 may have already triggered such an ownership change. As a result, the federal and state carryforwards associated with the net operating loss and credit deferred tax assets were reduced by the amount of tax attributes estimated to expire during their respective carryforward periods. In addition, since we will need to raise substantial additional funding to finance our operations, we may undergo further ownership changes in the future. Any such annual limitation may significantly reduce the utilization of the net operating loss carryforwards and research tax credits before they expire. Depending on our future tax position, limitation of our ability to use net operating

loss carryforwards in states in which we are subject to income tax could have an adverse impact on our results of operations and financial condition.

Recently enacted tax reform legislation in the U.S. could adversely affect our business and financial condition.

On December 22, 2017, the Tax Cuts and Jobs Act of 2017, or the Tax Act, was signed into law, making significant changes to the Internal Revenue Code. Changes under the Tax Act include, but are not limited to, a corporate tax rate decrease from 35% to 21% effective for tax years beginning after December 31, 2017, a one-time transition tax on the mandatory deemed repatriation of cumulative foreign earnings, limitation of the tax deduction for interest expense to 30% of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reducing the business tax credit for certain clinical testing expenses incurred in the testing of orphan drugs). The overall impact of the new federal tax law is uncertain, and our business and financial condition could be adversely affected. For example, because of the tax rate decrease, our deferred tax assets and our corresponding valuation allowance against these deferred tax assets have been reduced and may continue to be adversely impacted. In addition, it is uncertain if and to what extent various states will conform to Tax Act and what effect that legal challenges will have on the Tax Act, including litigation in the U.S. and international challenges brought at organizations such as the World Trade Organization. The impact of the Tax Act on holders of our common stock is also uncertain and could be adverse. Investors should consult with their legal and tax advisors with respect to this legislation and the potential tax consequences of investing in or holding our common stock.

We are subject to extensive regulation, which can be costly, time consuming and can subject us to unanticipated delays; even if we obtain regulatory approval for some of our products, those products may still face regulatory difficulties.

Our potential products, cell processing and manufacturing activities, are subject to comprehensive regulation by the FDA in the United States and by comparable authorities in other countries. The process of obtaining FDA and other required regulatory approvals, including foreign approvals, is expensive and often takes many years and can vary substantially based upon the type, complexity and novelty of the products involved. In addition, regulatory agencies may lack experience with our technologies and products, which may lengthen the regulatory review process, increase our development costs and delay or prevent their commercialization.

No adoptive cell therapy using TIL has been approved for marketing in the FDA. Consequently, there is no precedent for the successful commercialization of products based on our technologies. In addition, we have had only limited experience in filing and pursuing applications necessary to gain regulatory approvals, which may impede our ability to obtain timely FDA approvals, if at all. We have not yet sought FDA approval for any adoptive cell therapy product. We will not be able to commercialize any of our potential products until we obtain FDA approval, and so any delay in obtaining, or inability to obtain, FDA approval would harm our business.

If we violate regulatory requirements at any stage, whether before or after marketing approval is obtained, we may face a number of regulatory consequences, including refusal to approve pending applications, license suspension or revocation, withdrawal of an approval, imposition of a clinical hold or termination of clinical trials, warning letters, untitled letters, cyber letters, modification of promotional materials or labeling, provision of corrective information, imposition of post-market requirements including the need for additional testing, imposition of distribution or other restrictions under a REMS, product recalls, product seizures or detentions, refusal to allow imports or exports, total or partial suspension of production or distribution, FDA debarment, injunctions, fines, consent decrees, corporate integrity agreements, debarment from receiving government contracts, and new orders under existing contracts, exclusion from participation in federal and state healthcare programs, restitution, disgorgement, or civil or criminal penalties, including fines and imprisonment, and adverse publicity, among other adverse consequences. Additionally, we may not be able to obtain the labeling claims necessary or desirable for the promotion of our products. We may also be required to undertake post-marketing trials. In addition, if we or others identify side effects after any of our adoptive cell therapies are on the market, or if manufacturing problems occur, regulatory approval may be withdrawn, and reformulation of our products may be required.

We may not be able to license new TIL technology from the NIH and others.

An element of our intellectual property portfolio is to license additional rights and technologies from the NIH. Our inability to license the rights and technologies that we have identified, or that we may in the future identify, could have a material adverse impact on our ability to complete the development of our products or to develop additional products. No assurance can be given that we will be successful in licensing any additional rights or technologies from the NIH and others. Failure to obtain additional rights and licenses may detrimentally affect our planned development of additional product candidates and could increase the cost, and extend the timelines associated with our development of such other products.

Our projections regarding the market opportunities for our product candidates may not be accurate, and the actual market for our products may be smaller than we estimate.

Our projections of both the number of people who have the cancers we are targeting, as well as the subset of people with these cancers who are in a position to receive second or third line therapy, and who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, patient foundations, or market research by third parties, and may prove to be incorrect. Further, new studies or approvals of new therapeutics may change the estimated incidence or prevalence of these cancers. The number of patients may turn out to be lower than expected. Additionally, the potentially addressable patient population for our product candidates may be limited or may not be amenable to treatment with our product candidates and may also be limited by the cost of our treatments and the reimbursement of those treatment costs by third-party payors. For instance, we expect lifileucel to initially target a small patient population that suffers from metastatic melanoma. Even if we obtain significant market share for our product candidates, because the potential target populations are small, we may never achieve profitability without obtaining regulatory approval for additional indications.

We are required to pay substantial royalties and lump sum benchmark payments under our license agreements with the NIH and Moffitt, and we must meet certain milestones to maintain our license rights.

Under our license agreements with the NIH for our adoptive cell therapy technologies, we are currently required to pay both substantial benchmark payments and royalties to that institution based on our revenues from sales of our products utilizing the licensed technologies. These payments could adversely affect the overall profitability for us of any products that we may seek to commercialize under the NIH license agreements. In order to maintain our license rights under the NIH and Moffitt license agreements, we will need to meet certain specified milestones, subject to certain cure provisions, in the development of our product candidates. There is no assurance that we will be successful in meeting these milestones on a timely basis, or at all.

Because our current products represent, and our other potential product candidates will represent novel approaches to the treatment of disease, there are many uncertainties regarding the development, the market acceptance, third-party reimbursement coverage and the commercial potential of our product candidates.

Human immunotherapy products are a new category of therapeutics. Because this is a relatively new and expanding area of novel therapeutic interventions, there are many uncertainties related to development, marketing, reimbursement, and the commercial potential for our product candidates. There can be no assurance as to the length of the trial period, the number of patients the FDA will require to be enrolled in the trials in order to establish the safety, efficacy, purity and potency of immunotherapy products, or that the data generated in these trials will be acceptable to the FDA to support marketing approval. The FDA may take longer than usual to come to a decision on any BLA that we submit and may ultimately determine that there is not enough data, information, or experience with our product candidates to support an approval decision. The FDA may also require that we conduct additional post-marketing studies or implement risk management programs, such as REMS until more experience with our product candidates is obtained. Finally, after increased usage, we may find that our product candidates do not have the intended effect or have unanticipated side effects, potentially jeopardizing initial or continuing regulatory approval and commercial prospects.

We may also find that the manufacture of our product candidates is more difficult than anticipated, resulting in an inability to produce a sufficient amount of our product candidates for our clinical trials or, if approved, commercial supply. Moreover, because of the complexity and novelty of our manufacturing process, there are only a limited number of manufacturers who have the capability of producing our product candidates. Should any of our contract manufacturers

no longer produce our product candidates, it may take us significant time to find a replacement, if we are able to find a replacement at all.

There is no assurance that the approaches offered by our products will gain broad acceptance among doctors or patients or that governmental agencies or third-party medical insurers will be willing to provide reimbursement coverage for proposed product candidates. Moreover, we do not have verifiable internal marketing data regarding the potential size of the commercial market for our product candidates, nor have we obtained current independent marketing surveys to verify the potential size of the commercial markets for our current product candidates or any future product candidates. Since our current product candidates and any future product candidates will represent novel approaches to treating various conditions, it may be difficult, in any event, to accurately estimate the potential revenues from these product candidates. Accordingly, we may spend significant capital trying to obtain approval for product candidates that have an uncertain commercial market. The market for any products that we successfully develop will also depend on the cost of the product. We do not yet have sufficient information to reliably estimate what it will cost to commercially manufacture our current product candidates, and the actual cost to manufacture these products could materially and adversely affect the commercial viability of these products. Our goal is to reduce the cost of manufacturing and providing our therapies. However, unless we can reduce those costs to an acceptable amount, we may never be able to develop a commercially viable product. If we do not successfully develop and commercialize products based upon our approach or find suitable and economical sources for materials used in the production of our products, we will not become profitable, which would materially and adversely affect the value of our common stock.

Our TIL therapy may be provided to patients in combination with other agents provided by third parties. The cost of such combination therapy may increase the overall cost of TIL therapy and may result in issues regarding the allocation of reimbursements between our therapy and the other agents, all of which may affect our ability to obtain reimbursement coverage for the combination therapy from third party medical insurers.

No assurance can be given that the Gen 2 manufacturing process we have selected will be FDA-compliant, more efficient and lower the cost to manufacture TIL products.

Pursuant to the CRADA, and in cooperation with our contract manufacturers and potentially other manufacturers, we have developed and are developing improved methods for the generating and selecting autologous TILs, and methods for large-scale production of autologous TILs that are in accord with current cGMP procedures. We have developed a new and more efficient TIL manufacturing process that we believe can be more efficient and cost effective, and in a more automated manner than previous processes. The production and control of the physical and/or chemical attributes of our products in a cGMP facility is subject to many uncertainties and difficulties. We have never manufactured our adoptive cell therapy product candidate on a commercial scale, nor have our partners. As a result, we cannot give any assurance that the Gen 2 process or any future process that we select will be a manufacturing process that can produce our products in compliance with the applicable regulatory requirements, at a cost or in quantities necessary to make them commercially viable. Moreover, our third-party manufacturers will have to continually adhere to current cGMP regulations enforced by the FDA through its facilities inspection program. If the facilities of these manufacturers cannot pass a pre-approval plant inspection, the FDA pre-market approval of our products will not be granted. In complying with cGMP and foreign regulatory requirements, we and any of our third-party manufacturers will be obligated to expend time, money and effort in production, record-keeping and quality control to assure that our products meet applicable specifications and other requirements. If we or any of our third-party manufacturers fail to comply with these requirements, we may be subject to regulatory action. No assurance can be given that we will be able to develop such a manufacturing process, or that our partners will thereafter be able to establish and operate such a production facility.

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

We face an inherent risk of product liability as a result of the clinical testing of our product candidates and will face an even greater risk if we commercialize any products. For example, we may be sued if our product candidates cause or are perceived to cause injury or are found to be otherwise unsuitable during clinical testing, manufacturing, marketing or sale. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability or a breach of warranties. Claims could also be asserted under state consumer protection acts. Large judgements have also been awarded in class action lawsuits based on therapeutics that had unanticipated side effects. If we cannot successfully defend ourselves against product liability claims, we may incur substantial liabilities or be required to limit commercialization of our product

candidates. Even successful defense would require significant financial and management resources. Regardless of the merits or eventual outcome, liability claims may result in:

- decreased demand for our product candidates;
- injury to our reputation;
- withdrawal of clinical trial participants or sites and potential termination of clinical trial sites or entire clinical programs;
- initiation of investigations by regulators, refusal to approve marketing applications or supplements, and withdrawal or limitation of product approvals;
- costs to defend the related litigation;
- a diversion of management's time and our resources;
- substantial monetary awards to trial participants or patients;
- product recalls, withdrawals or labeling, marketing or promotional restrictions;
- loss of revenue;
- significant negative media attention;
- decrease in the price of our stock and overall value of our company;
- exhaustion of our available insurance coverage and our capital resources; or
- the inability to commercialize our product candidates.

Our inability to obtain sufficient product liability insurance at an acceptable cost to protect against potential product liability claims could prevent or inhibit the commercialization of products we develop, alone or with corporate collaborators. Our insurance policies may also have various exclusions, and we may be subject to a product liability claim for which we have no coverage. While we have obtained clinical trial insurance for our Phase 2 clinical trials, we may have to pay amounts awarded by a court or negotiated in a settlement that exceed our coverage limitations or that are not covered by our insurance, and we may not have, or be able to obtain, sufficient capital to pay such amounts. Even if our agreements with any future corporate collaborators entitle us to indemnification against losses, such indemnification may not be available or adequate should any claim arise.

We face significant competition from other biotechnology and pharmaceutical companies and from non-profit institutions.

Competition in the field of cancer therapy is intense and is accentuated by the rapid pace of technological development. Research and discoveries by others may result in breakthroughs which may render our products obsolete even before they generate any revenue. There are products that are approved and currently under development by others that could compete with the products that we are developing. Many of our potential competitors have substantially greater research and development capabilities and approval, manufacturing, marketing, financial and managerial resources and experience than we do. Our competitors may:

- develop safer, more convenient or more effective immunotherapies and other therapeutic products;
- develop therapies that are less expensive or have better reimbursement from private or public payors;
- reach the market more rapidly, reducing the potential sales of our products; or
- establish superior proprietary positions.

Due to the promising clinical therapeutic effect of competitor therapies in clinical exploratory trials, we anticipate substantial direct competition from other organizations developing advanced T cell therapies targeting patients who have received prior anti-PD-1/PD-L1 therapies. In particular, we expect to compete with other new therapies for our lead indications developed by companies such as Bristol-Myers Squibb, Merck, Nektar Therapeutics, Idera Pharmaceuticals, Dynavax Technologies, Oncosec Medical, Immetacyte, WindMIL Therapeutics, and others. We also may compete with therapies based on genetically engineered T cells rendered reactive against tumor-associated antigens prior to their administration to patients. Genetically engineered T cells are being pursued by several companies, including Adaptimmune, Celgene (in collaboration with bluebird bio as well as through Celgene's subsidiary Juno Therapeutics), Gilead Sciences, Novartis and others. To date, these technologies have been primarily applicable to hematologic malignancies, but their application in solid tumor indications may create competition with us. Many of these companies and our other current and potential competitors have substantially greater research and development capabilities and financial, scientific, regulatory, manufacturing, marketing, sales, human resources, and experience than we do. Many of our competitors have several therapeutic products that have already been developed, approved and successfully

commercialized, or are in the process of obtaining regulatory approval for their therapeutic products in the United States and internationally. Our competitors may obtain regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in competitors establishing a strong market position before we are able to enter the market.

Universities and public and private research institutions in the U.S. and Europe are also potential competitors. For example, a Phase 3 trial comparing TIL to standard ipilimumab in patients with metastatic melanoma is currently being conducted in Europe by the Netherlands Cancer Institute, the Copenhagen County Herlev University Hospital, and the University of Manchester. While these universities and public and private research institutions primarily have educational objectives, they may develop proprietary technologies that lead to other FDA approved therapies or that secure patent protection that we may need for the development of our technologies and products.

Our lead product candidates, lifileucel and LN-145, are therapies for the treatment of metastatic melanoma and advanced cervical. Currently, there are numerous companies that are developing various alternate treatments for melanoma and cervical cancer, including patients that have progressed after prior treatment with checkpoint inhibitors and chemotherapy. Accordingly, lifileucel and LN-145 face significant competition in the melanoma and cervical cancer treatment space from multiple companies. Even if we obtain regulatory approval for lifileucel, the availability and price of our competitors' products could limit the demand and the price we are able to charge for our therapies. We may not be able to implement our business plan if the acceptance of our products is inhibited by price competition or the reluctance of physicians to switch from other methods of treatment to our product, or if physicians switch to other new therapies, drugs or biologic products or choose to reserve our product for use in limited circumstances.

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

We are dependent on third parties to support our research, development and manufacturing activities and, therefore, are subject to the efforts of these parties and our ability to successfully collaborate with these third parties.*

As a result of our current strategy to outsource most of our manufacturing, we rely very heavily on third parties to perform for us the manufacturing of our products for our clinical trials. We also license a portion of our technology from others. We intend to rely upon our contract manufacturers to produce large quantities of materials needed for clinical trials and potentially product commercialization. Third party manufacturers may not be able to meet our needs with respect to timing, quantity or quality. If we are unable to contract for a sufficient supply of needed materials on acceptable terms, or if we should encounter delays or difficulties in our relationships with manufacturers, our clinical testing may be delayed, thereby delaying the submission of products for regulatory approval or the market introduction and subsequent sales of our products. Any such delay may lower our revenues and potential profitability.

In addition, in order to supplement our own efforts to improve TIL manufacturing and develop TIL therapies in new indications in clinical trials, we currently work and collaborate with government and academic research institutions, medical institutions and corporate partners such as the NCI, Moffitt, Ohio State University, Roswell Park Cancer Institute, Phio Pharmaceuticals, Collectis, Genocera and Centre hospitalier de l'Université de Montreal. We also intend to continue to enter into additional third-party collaborative agreements in the future. However, we may not be able to successfully negotiate any additional collaborative arrangements. If established, these relationships may not be scientifically or commercially successful. The success of these and future collaborations and joint development arrangements may be subject to numerous risks and uncertainties, including the inability or unwillingness of our partners to perform in the manner, or to the extent anticipated, and may also be subject to disagreements regarding the rights, interests, and performance of the counterparties under our licenses and development agreements. Disagreements between parties to a collaboration arrangement regarding clinical development and commercialization matters can lead to delays in the development process or commercialization of the applicable product candidate and, in some cases, termination of the collaboration arrangement. These disagreements can be difficult to resolve if neither of the parties has final decision-making authority under the collaboration agreement.

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With regard to future collaboration efforts, we face significant competition in seeking appropriate collaborators. Our ability to reach a definitive agreement for collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and, an evaluation by the proposed collaborator of a number of similar or unique factors.

Collaborations with biopharmaceutical companies and other third parties often are terminated or allowed to expire by the other party. Any such termination or expiration would adversely affect us financially and could harm our business reputation. Any collaboration may pose a number of risks, including the following:

- collaborators may not perform their obligations as expected;
- collaborators may not pursue development and commercialization of any product candidates that achieve regulatory approval or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition, that divert resources or create competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could fail to make timely regulatory submissions for a product candidate;
- collaborators may not comply with all applicable regulatory requirements or may fail to report safety data in accordance with all applicable regulatory requirements;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products or product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products, which may cause collaborators to cease to devote resources to the commercialization of our product candidates;
- a collaborator with marketing and distribution rights to one or more of our product candidates that achieve regulatory approval may not commit sufficient resources to the marketing and distribution of such product candidate or product;
- disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the preferred course of development, might cause delays or termination of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time consuming and expensive;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- collaborators may infringe the intellectual property rights of third parties, which may expose us to litigation and potential liability;
- collaborators may be involved in a business combination, resulting in the decreased emphasis or termination of development or commercialization of any product candidate subject to the collaboration agreement; and
- termination of a collaboration agreement may make it more difficult to attract new collaborators and our and our products' or product candidates' reputation in the medical, business, and financial communities could be adversely affected.

If any third-party collaborator breaches or terminates its agreement with us or fails to conduct its activities in a timely manner, the commercialization of our products under development could be slowed down or blocked completely. It is possible that our collaborators will change their strategic focus, pursue alternative technologies or develop alternative products, either on their own or in collaboration with others, as a means for developing treatments for the diseases targeted by our collaborative programs. The effectiveness of our collaborators in marketing our products will also affect our revenues and earnings.

Our collaborators will also be required to comply with the applicable regulatory requirements, and, as such, are subject to the same risks as we are. If they do not or are not able to comply with these requirements, we may not be able to use the data generated through their studies to support our future investigational or marketing applications. Collaborator noncompliance may also expose them and us to regulatory enforcement actions.

No assurance can be given that we will be able to successfully collaborate with our partners as anticipated and that our current or future collaborations and clinical trials will be completed as contemplated, support the regulatory approval of our current product candidates, or result in any viable additional product candidates. For instance, to the extent that these collaborators conduct their studies with manufacturing processes that are different than ours or product that is different than ours, the results generated from their studies may not be seen in our current or future studies that employ our manufacturing processes and the results generated from their studies may not support approval of our product candidates.

If we are unable to obtain or maintain suitable collaborators on a timely basis, on acceptable terms, or at all, we may have to curtail the development of a product candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense.

Development of a product candidate intended for use in combination with an already approved product may present more or different challenges than development of a product candidate for use as a single agent.

We are currently developing lifileucel and LN-145 for use along with IL-2. We and our collaborators are also studying TIL therapy along with other products, such as pembrolizumab, ipilimumab and nivolumab. The development of product candidates for use in combination with another product may present challenges. For example, the FDA may require us to use more complex clinical trial designs, in order to evaluate the contribution of each product and product candidate to any observed effects. It is possible that the results of these trials could show that any positive results are attributable to the already approved product. Moreover, following product approval, the FDA may require that products used in conjunction with each other be cross labeled for combined use. To the extent that we do not have rights to already approved products, this may require us to work with another company to satisfy such a requirement. Moreover, developments related to the already approved products may impact our clinical trials for the combination as well as our commercial prospects should we receive marketing approval. Such developments may include changes to the approved product's safety or efficacy profile, changes to the availability of the approved product, and changes to the standard of care.

A Fast Track product designation, Breakthrough Therapy designation or other designation to facilitate product candidate development may not lead to faster development or a faster regulatory review or approval process, and it does not increase the likelihood that our product candidates will receive marketing approval.*

We were granted Fast Track designation by the FDA for lifileucel in advanced melanoma and LN-145 for cervical cancer. We were granted Breakthrough Therapy designation, or BT, for LN-145 for advanced cervical cancer and Regenerative Medicine Advanced Therapy, or RMAT, designation for lifileucel in advanced melanoma. We may seek Fast Track or Breakthrough designation for other of our current or future product candidates. Receipt of a designation to facilitate product candidate development is within the discretion of the FDA. Accordingly, even if we believe one of our product candidates meets the criteria for a designation, the FDA may disagree. In any event, the receipt of such a designation for a product candidate may not result in a faster development process, review, or approval compared to product candidates considered for approval under conventional the FDA procedures and does not assure ultimate marketing approval by the FDA. In addition, the FDA may later decide that the products no longer meet the designation conditions.

While lifileucel has received orphan drug designation for melanoma stages IIB-IV and LN-145 has received orphan drug designation for cervical cancer patients with tumors greater than 2 cm, there is no guarantee that we will be able to maintain this designation, receive these designations for any of our other product candidates, or receive or maintain any corresponding benefits, including periods of exclusivity.

We received orphan drug designation in the United States for lifileucel to treat malignant melanoma stages IIB-IV and LN-145 for cervical cancer patients with tumors greater than 2 cm. We may also seek orphan drug designation for our other product candidates, as appropriate. Orphan designation, however, may be lost if the indication for which we develop our designated product candidates do not meet the orphan criteria. Moreover, following product approval, orphan exclusivity may be lost if the FDA determines, among other reasons, that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the product to meet the needs of patients with the rare disease or condition. Even if we obtain orphan exclusivity, that exclusivity may not effectively

protect the product from competition because different products can be approved for the same condition and the same product can be approved for different conditions. Even after an orphan product is approved, the FDA can subsequently approve a product containing the same principal molecular features for the same condition if the FDA concludes that the later product is clinically superior in that it is shown to be safer or more effective or makes a major contribution to patient care.

Moreover, the FDA may grant orphan drug designations to multiple of the same products for the same indication. If another sponsor receives FDA approval for an orphan drug designated product that is the same as our product candidates and intended for the same indication before we do, we would be prevented from launching our product in the United States for this indication for a period of at least 7 years.

In response to a court decision regarding the plain meaning of the exclusivity provision of the Orphan Drug Act, the FDA may undertake a reevaluation of aspects of its orphan drug regulations and policies. We do not know if, when, or how the FDA may change the orphan drug regulations and policies, and it is uncertain how any changes might affect our business. Depending on what changes the FDA may make to its orphan drug regulations and policies, our business, financial condition, results of operations, and prospects could be harmed.

As a condition of approval, the FDA may require that we implement various post-marketing requirements and conduct post-marketing studies, any of which would require a substantial investment of time, effort, and money, and which may limit our commercial prospects.

As a condition of biologic licensing, the FDA is authorized to require that sponsors of approved BLAs implement various post-market requirements, including REMS and Phase 4 studies. For example, when the FDA approved Novartis' Kymriah in August 2017, a CAR-T cell therapy for the treatment of patients up to 25 years of age with B-cell precursor acute lymphoblastic leukemia (ALL) that is refractory or in second or later relapse, the FDA required significant post-marketing commitments, including a Phase 4 trial, revalidation of a test method, and a substantial REMS program that included, among other requirements, the certification of hospitals and their associated clinics that dispense Kymriah, which certification includes a number of requirements, the implementation of a Kymriah training program, and limited distribution only to certified hospitals and their associated clinics. If we receive approval of our product candidates, the FDA may determine that similar or additional post-approval requirements are necessary to ensure that our product candidates are safe, pure, and potent. To the extent that we are required to establish and implement any post-approval requirements, we will likely need to invest a significant amount of time, effort, and money. Such post-approval requirements may also limit the commercial prospects of our product candidates.

We may be unable to establish effective marketing and sales capabilities or enter into agreements with third parties to market and sell our product candidates, if they are approved, and as a result, we may be unable to generate product revenues.*

We currently have a small commercial team focused on our commercial strategy, but we do not have commercial infrastructure for the marketing, sale, and distribution of biopharmaceutical products. If approved, in order to commercialize our products, we must build our marketing, sales, and distribution capabilities or make arrangements with third parties to perform these services, which will take time and require significant financial expenditures and we may not be successful in doing so. Even if we are able to effectively establish a sales force and develop a marketing and sales infrastructure, our sales force and marketing teams may not be successful in commercializing our current or future product candidates. To the extent we rely on third parties to commercialize any products for which we obtain regulatory approval, we would have less control over their sales efforts, and could be held liable if they failed to comply with applicable legal or regulatory requirements.

We have no prior experience in the marketing, sale, and distribution of biopharmaceutical products, and there are significant risks involved in the building and managing of a commercial infrastructure. The establishment and development of commercial capabilities, including compliance plans, to market any products we may develop will be expensive and time consuming and could delay any product launch, and we may not be able to successfully develop this capability. We, or our collaborators, will have to compete with other pharmaceutical and biotechnology companies to recruit, hire, train, manage, and retain marketing and sales personnel. In the event we are unable to develop a marketing and sales infrastructure, we may not be able to commercialize our current or future product candidates, which would

limit our ability to generate product revenues. Factors that may inhibit our efforts to commercialize our current or future product candidates and generate product revenues include:

- the inability to recruit, train, manage, and retain adequate numbers of effective sales and marketing personnel;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe our current or future product candidates;
- our inability to effectively oversee a geographically dispersed sales and marketing team;
- the costs associated with training sales and marketing personnel on legal and regulatory compliance matters and monitoring their actions;
- an inability to secure adequate coverage and reimbursement by government and private health plans;
- the clinical indications for which the products are approved and the claims that we may make for the products;
- limitations or warnings, including distribution or use restrictions, contained in the products' approved labeling;
- any distribution and use restrictions imposed by the FDA or to which we agree as part of a mandatory REMS or voluntary risk management plan;
- liability for sales or marketing personnel who fail to comply with the applicable legal and regulatory requirements;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization or engaging a contract sales organization.

If our product candidates do not achieve broad market acceptance, the revenues that we generate from their sales will be limited.

We have never commercialized a product candidate for any indication. Even if our product candidates are approved by the appropriate regulatory authorities for marketing and sale, they may not gain acceptance among physicians, patients, third-party payors, and others in the medical community. If any product candidate for which we obtain regulatory approval does not gain an adequate level of market acceptance, we may not generate significant product revenues or become profitable. Market acceptance of our product candidates by the medical community, patients, and third-party payors will depend on a number of factors, some of which are beyond our control. For example, physicians are often reluctant to switch their patients and patients may be reluctant to switch from existing therapies even when new and potentially more effective or safer treatments enter the market.

Efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may not be successful. If any of our product candidates is approved but does not achieve an adequate level of market acceptance, we may not generate significant revenues and we may not become profitable. The degree of market acceptance of any of our product candidates will depend on a number of factors, including:

- the efficacy of our product candidates;
- the prevalence and severity of adverse events associated with such product candidates;
- the clinical indications for which the products are approved and the approved claims that we may make for the products;
- limitations or warnings contained in the Product's FDA-approved labeling, including potential limitations or warnings for such products that may be more restrictive than other competitive products;
- changes in the standard of care for the targeted indications for such product candidates;
- the relative difficulty of administration of such product candidates;
- cost of treatment versus economic and clinical benefit in relation to alternative treatments or therapies;
- the availability of adequate coverage or reimbursement by third parties, such as insurance companies and other healthcare payors, and by government healthcare programs, including Medicare and Medicaid;
- the extent and strength of our marketing and distribution of such product candidates;
- the safety, efficacy, and other potential advantages over, and availability of, alternative treatments already used or that may later be approved for any of our intended indications;

- distribution and use restrictions imposed by the FDA with respect to such product candidates or to which we agree as part of a mandatory risk evaluation and mitigation strategy or voluntary risk management plan;
- the timing of market introduction of such product candidates, as well as competitive products;
- our ability to offer such product candidates for sale at competitive prices;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the extent and strength of our third-party manufacturer and supplier support;
- the approval of other new products for the same indications;
- adverse publicity about the product or favorable publicity about competitive products; and
- potential product liability claims.

Our efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may never be successful. Even if the medical community accepts that our product candidates are safe and effective for their approved indications, physicians and patients may not immediately be receptive to such product candidates and may be slow to adopt them as an accepted treatment of the approved indications. If our current or future product candidates are approved but do not achieve an adequate level of acceptance among physicians, patients, and third-party payors, we may not generate meaningful revenues from our product candidates, and we may not become profitable.

Our product candidates may face competition sooner than anticipated.

The enactment of the Biologics Price Competition and Innovation Act of 2009, or BPCIA, created an abbreviated pathway for the approval of biosimilar and interchangeable biological products. The abbreviated regulatory pathway establishes legal authority for the FDA to review and approve biosimilar biologics, including the possible designation of a biosimilar as “interchangeable” based on its similarity to an existing brand product. Under the BPCIA, the FDA cannot make an approval of an application for a biosimilar product effective until 12 years after the original branded product was approved under a BLA. Certain changes, however, and supplements to an approved BLA, and subsequent applications filed by the same sponsor, manufacturer, licensor, predecessor in interest, or other related entity do not qualify for the 12-year exclusivity period.

Our product candidates may qualify for the BPCIA’s 12-year period of exclusivity. However, there is a risk that the FDA will not consider our product candidates to be reference products for competing products, potentially creating the opportunity for biosimilar competition sooner than anticipated. Additionally, this period of regulatory exclusivity does not block companies pursuing regulatory approval via their own traditional BLA, rather than via the abbreviated pathway. Changes may also be made to this exclusivity period as a result of future legislation as there has been ongoing efforts to reduce the period of exclusivity. Even if we receive a period of BPCIA exclusivity for our first licensed product, if subsequent products do not include a modification to the structure of the product that impacts safety, purity, or potency, we may not receive additional periods of exclusivity for those products. Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing. Medicare Part B encourages use of biosimilars by paying the provider the same percentage of the reference product, average sale price, or ASP as a mark-up, regardless of which product is reimbursed. It is also possible that payors will give reimbursement preference to biosimilars even over reference biologics absent a determination of interchangeability.

We will need to obtain FDA approval of any proposed branded product names, and any failure or delay associated with such approval may adversely affect our business.

Any name we intend to use for our product candidates will require approval from the FDA regardless of whether we have secured a formal trademark registration from the U.S. Patent and Trademark Office, or USPTO. The FDA typically conducts a review of proposed product names, including an evaluation of the potential for confusion with other product names. The FDA may also object to a product name if it believes the name inappropriately implies medical claims or contributes to an overstatement of efficacy. If the FDA objects to any of our proposed product names, we may be required to adopt alternative names for our product candidates. If we adopt alternative names, we would lose the benefit of any existing trademark applications for such product candidate and may be required to expend significant additional resources in an effort to identify a suitable product name that would qualify under applicable trademark laws, not infringe the existing rights of third parties, and be acceptable to the FDA. We may be unable to build a successful

brand identity for a new trademark in a timely manner or at all, which would limit our ability to commercialize our product candidates.

Our internal computer systems, or those used by our contract research organizations or other contractors or consultants, may fail or suffer security breaches.

Despite the implementation of security measures, our internal computer systems and those of our contract research organizations and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. If such an event was to occur and cause interruptions in our operations, it could result in a disruption of our drug development programs. For example, the loss of clinical trial data from completed or ongoing clinical trials for a product candidate could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of or damage to our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the further development of any product candidates could be delayed.

We are dependent on information technology, systems, infrastructure and data.

We are dependent upon information technology systems, infrastructure and data. The multitude and complexity of our computer systems make them inherently vulnerable to service interruption or destruction, malicious intrusion and random attack. Likewise, data privacy or security breaches by third parties, employees, contractors or others may pose a risk that sensitive data, including our intellectual property, trade secrets or personal information of our employees, patients, or other business partners may be exposed to unauthorized persons or to the public. Cyberattacks are increasing in their frequency, sophistication and intensity. Cyberattacks could include the deployment of harmful malware, denial-of-service, social engineering and other means to affect service reliability and threaten data confidentiality, integrity and availability. Our business and technology partners face similar risks and any security breach of their systems could adversely affect our security posture. While we have invested, and continue to invest, in the protection of our data and information technology infrastructure, there can be no assurance that our efforts, or the efforts of our partners and vendors, will prevent service interruptions, or identify breaches in our systems, that could adversely affect our business and operations and/or result in the loss of critical or sensitive information, which could result in financial, legal, business or reputational harm to us. In addition, our liability insurance may not be sufficient in type or amount to cover us against claims related to security breaches, cyberattacks and other related breaches.

Our failure to comply with international data protection laws and regulations could lead to government enforcement actions and significant penalties against us, and adversely impact our operating results.

European Union, or EU, member states and other foreign jurisdictions, including Switzerland, have adopted data protection laws and regulations which impose significant compliance obligations on us. Moreover, the collection and use of personal health data in the EU, which was formerly governed by the provisions of the EU Data Protection Directive, was replaced with the EU General Data Protection Regulation, or the GDPR, in May 2018. The GDPR, which is wide-ranging in scope, imposes several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, the security and confidentiality of the personal data, data breach notification and the use of third-party processors in connection with the processing of personal data. The GDPR also imposes strict rules on the transfer of personal data out of the EU to the U.S., provides an enforcement authority and imposes large penalties for noncompliance, including the potential for fines of up to €20 million or 4% of the annual global revenues of the noncompliant company, whichever is greater. The GDPR requirements apply not only to third-party transactions, but also to transfers of information between us and our subsidiaries, including employee information. The recent implementation of the GDPR has increased our responsibility and liability in relation to personal data that we process, including in clinical trials, and we may in the future be required to put in place additional mechanisms to ensure compliance with the GDPR, which could divert management's attention and increase our cost of doing business. In addition, new regulation or legislative actions regarding data privacy and security (together with applicable industry standards) may increase our costs of doing business. In this regard, we expect that there will continue to be new proposed laws, regulations and industry standards relating to privacy and data protection in the United States, the EU and other jurisdictions, and we cannot determine the impact such future laws, regulations and standards may have on our business.

Our failure to comply with state and/or national data protection laws and regulations could lead to government enforcement actions and significant penalties against us, and adversely impact our operating results.*

There are numerous other laws and legislative and regulatory initiatives at the federal and state levels addressing privacy and security concerns, and some state privacy laws apply more broadly than the Health Insurance Portability and Accountability Act (HIPAA) and associated regulations. For example, California recently enacted legislation – the California Consumer Privacy Act, or CCPA – which goes into effect January 1, 2020. The CCPA, among other things, creates new data privacy obligations for covered companies and provides new privacy rights to California residents, including the right to opt out of certain disclosures of their information. The CCPA also creates a private right of action with statutory damages for certain data breaches, thereby potentially increasing risks associated with a data breach. Legislators have stated that they intend to propose amendments to the CCPA before it goes into effect, and the California Attorney General will issue clarifying regulations. Although the law includes limited exceptions, including for certain information collected as part of clinical trials as specified in the law, it may regulate or impact our processing of personal information depending on the context. It remains unclear what, if any, modifications will be made to this legislation or how it will be interpreted.

We will need to grow the size and capabilities of our organization, and we may experience difficulties in managing this growth.

Our operations are dependent upon the services of our executives and our employees who are engaged in research and development. The loss of the services of our executive officers or senior research personnel could delay our product development programs and our research and development efforts. In order to develop our business in accordance with our business plan, we will have to hire additional qualified personnel, including in the areas of research, manufacturing, clinical trials management, regulatory affairs, and sales and marketing. We are continuing our efforts to recruit and hire the necessary employees to support our planned operations in the near term. However, competition for qualified employees among companies in the biotechnology and biopharmaceutical industry is intense, and no assurance can be given that we will be able to attract, hire, retain and motivate the highly skilled employees that we need. Future growth will impose significant added responsibilities on members of management, including:

- identifying, recruiting, integrating, maintaining, and motivating additional employees;
- managing our internal development efforts effectively, including the clinical and FDA review process for our product candidates, while complying with our contractual obligations to contractors and other third parties; and
- improving our operational, financial and management controls, reporting systems, and procedures.

Our future financial performance and our ability to commercialize our product candidates will depend, in part, on our ability to effectively manage any future growth, and our management may also have to divert a disproportionate amount of its attention away from day-to-day activities in order to devote a substantial amount of time to managing these growth activities. Our efforts to manage our growth are complicated by the fact that nearly all of our executive officers have joined us since June 2016. This lack of long-term experience working together may adversely impact our senior management team's ability to effectively manage our business and growth.

We currently rely, and for the foreseeable future will continue to rely, in substantial part on certain independent organizations, advisors and consultants to provide certain services. There can be no assurance that the services of these independent organizations, advisors and consultants will continue to be available to us on a timely basis when needed, or that we can find qualified replacements. In addition, if we are unable to effectively manage our outsourced activities or if the quality, compliance or accuracy of the services provided by consultants is compromised for any reason, our clinical trials may be extended, delayed, or terminated, and we may not be able to obtain regulatory approval of our product candidates or otherwise advance our business. There can be no assurance that we will be able to manage our existing consultants or find other competent outside contractors and consultants on economically reasonable terms, if at all.

If we are not able to effectively expand our organization by hiring new employees and expanding our groups of consultants and contractors, we may not be able to successfully implement the tasks necessary to further develop and commercialize our product candidates and, accordingly, may not achieve our research, development, and commercialization goals on a timely basis, or at all.

If we engage in future acquisitions or strategic partnerships, this may increase our capital requirements, dilute our stockholders, cause us to incur debt or assume contingent liabilities, and subject us to other risks.

We may evaluate various acquisitions and strategic partnerships, including licensing or acquiring complementary products, intellectual property rights, technologies, or businesses. Any potential acquisition or strategic partnership may entail numerous risks, including:

- increased operating expenses and cash requirements;
- the assumption of additional indebtedness or contingent liabilities;
- the issuance of our equity securities;
- assimilation of operations, intellectual property and products of an acquired company or product, including difficulties associated with integrating new personnel;
- the diversion of our management's attention from our existing product programs and initiatives in pursuing such a strategic merger or acquisition;
- retention of key employees, the loss of key personnel, and uncertainties in our ability to maintain key business relationships;
- risks and uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing products or product candidates and regulatory approvals; and
- our inability to generate revenue from acquired technology and/or products sufficient to meet our objectives in undertaking the acquisition or even to offset the associated acquisition and maintenance costs.

Depending on the size and nature of future strategic acquisitions, we may acquire assets or businesses that require us to raise additional capital or to operate or manage businesses in which we have limited experience. Making larger acquisitions that require us to raise additional capital to fund the acquisition will expose us to the risks associated with capital raising activities. Acquiring and thereafter operating larger new businesses will also increase our management, operating and reporting costs and burdens. In addition, if we undertake acquisitions, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

We may rely on third parties to perform many essential services for any products that we commercialize, including services related to distribution, government price reporting, customer service, accounts receivable management, cash collection, and adverse event reporting. If these third parties fail to perform as expected or to comply with legal and regulatory requirements, our ability to commercialize our current or future product candidates will be significantly impacted and we may be subject to regulatory sanctions.

We may retain third-party service providers to perform a variety of functions related to the sale and distribution of our current or future product candidates, key aspects of which will be out of our direct control. These service providers may provide key services related to distribution, customer service, accounts receivable management, and cash collection. If we retain a service provider, we would substantially rely on it as well as other third-party providers that perform services for us, including entrusting our inventories of products to their care and handling. If these third-party service providers fail to comply with applicable laws and regulations, fail to meet expected deadlines, or otherwise do not carry out their contractual duties to us, or encounter physical or natural damage at their facilities, our ability to deliver product to meet commercial demand would be significantly impaired and we may be subject to regulatory enforcement action.

In addition, we may engage third parties to perform various other services for us relating to adverse event reporting, safety database management, fulfillment of requests for medical information regarding our product candidates and related services. If the quality or accuracy of the data maintained by these service providers is insufficient, or these third parties otherwise fail to comply with regulatory requirements related to adverse event reporting, we could be subject to regulatory sanctions.

Additionally, we may contract with a third-party to calculate and report pricing information mandated by various government programs. If a third party fails to timely report or adjust prices as required or errs in calculating government pricing information from transactional data in our financial records, it could impact our discount and rebate liability, and potentially subject us to regulatory sanctions or False Claims Act lawsuits.

The SEC has issued an administrative order against us that may make it more difficult for us to raise capital in the future.*

On April 10, 2017, the SEC issued an administrative order that requires us to cease and desist from committing or causing any violations and any future violations of Sections 5(b), 17(a), and 17(b) of the Securities Act of 1933, as amended, or the Securities Act, and of Section 10(b) of the Securities Exchange Act of 1934 and Rule 10b-5 thereunder. The order was entered into as part of our settlement with the SEC in the investigation titled *In the Matter of Certain Stock Promotions*. The SEC's investigation, in part, involved the conduct of our former Chief Executive Officer and director, Manish Singh, during the period between September 2013 and April 2014, and the failure by authors of certain articles about our company to disclose that they were compensated by one of our former investor relations firms. The foregoing order may negatively impact our reputation with current and future investors, will disqualify us from effecting private placement transactions in reliance upon any of the exemptions from Securities Act registration afforded by Regulation D, and will limit our ability to make certain communications in future public offerings. As a result, the SEC's order will make it more difficult for us to raise capital in future private and public offerings. We currently anticipate that we will have to raise additional capital in the future to fund our future research, development and commercialization efforts. Some of the limitations placed on us as a result of the SEC administrative order relating to ineligibility for statutory safe harbors, including under the Private Securities Litigation Reform Act, and limitations on our communications and status as an ineligible issuer under Rule 405 of the Securities Act, are expected to end in 2020.

We are, and in the future may be, subject to Federal or state securities or related legal actions that could adversely affect our results of operations and our business.*

Shortly after the SEC announced settlements with us, with other public companies, and with unrelated parties in the *In the Matter of Certain Stock Promotions* investigation, two securities class action complaints were filed in the U.S. District Court for the Northern District of California against our company, Manish Singh, and two of our other former officers. On July 20, 2017, the plaintiff in one of the cases filed a notice to voluntarily dismiss that case, and the court entered an order dismissing the complaint on July 21, 2017. On July 26, 2017, the court appointed a movant as lead plaintiff. On September 8, 2017, the lead plaintiff, individually and on behalf of all others similarly situated, filed an amended complaint seeking class action status in the United States District Court for the Northern District of California (*Jay Rabkin v. Lion Biotechnologies, Inc., et al.*, case no. 3:17-cv-0286) against us, two of our former officers, and the managing member of our former investor relations firm. The amended complaint alleges, among other things, that the defendants violated various provisions of the Securities Exchange Act of 1934 by making materially false and misleading statements, or by failing to make certain disclosures, regarding the actions taken by Manish Singh, our former Chief Executive Officer and a former director, and our former investor relations firm that were the subject of the *In the Matter of Certain Stock Promotions* SEC investigation. On February 5, 2018, the court entered an order dismissing two of plaintiff's six claims. As the result of mediation, on September 28, 2018, lead plaintiff filed an unopposed motion for settlement, the cost of which, was expected to be borne by our insurance carrier and would result in no loss to us. The court gave preliminary approval to the proposed settlement on November 30, 2018. A hearing was held on April 12, 2019 to determine whether the proposed settlement was fair, reasonable, and adequate, and whether the claims should be dismissed. On April 17, 2019, the court approved the final settlement, involving a payment of \$3,250,000 by our insurance carrier to a settlement fund, awarded attorney's fees and costs to be paid to plaintiff's counsel from the settlement fund, approved the plan of allocation for settlement class members, and ordered that the claims against us should be dismissed with prejudice. The court retains jurisdiction over the parties and class members in the case for the purposes of administration, interpretation, implementation, and enforcement of the settlement, and related matters.

On December 15, 2017, a purported stockholder derivative complaint was filed by plaintiff Kevin Fong was filed against us, as nominal defendant, and certain of our current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:17-cv-1806). The complaint alleges breaches of fiduciary duties, unjust enrichment, and violations of Section 14(a) of the Securities Exchange Act of 1934 and Rule 14a-9 promulgated thereunder arising from the SEC's investigation in the *In the Matter of Certain Stock Promotions* matter and our April 10, 2017 settlement thereof, and seeks unspecified damages on behalf of our company and injunctive relief. On March 28, 2018, a purported stockholder derivative complaint was filed by plaintiff Nazeer Khaleeluddin on behalf of our company, against us, as nominal defendant, and certain of our current and former officers and directors, and others, as defendants, in the U.S. District Court for the District of Delaware (case no. 1:18-cv-00469). The complaint alleges, among other things, violations of securities law, breach of fiduciary duty, aiding and abetting, waste of corporate assets, and unjust enrichment. The complaint is based on claims arising from the SEC's investigation

in the *In the Matter of Certain Stock Promotions* investigation and our April 10, 2017 settlement thereof, and seeks unspecified damages on behalf of our company and injunctive relief. We intend to vigorously defend against these complaints. However, based on the very early stage of the litigation matters, it is not possible to estimate the amount or range of possible loss that might result from an adverse judgment or a settlement of these matters. Furthermore, litigation is inherently uncertain, and there is no assurance as to the outcome of these, or other future cases. We could incur substantial unreimbursed legal fees, settlements, judgments and other expenses in connection with these, or other legal and regulatory proceedings that may not qualify for coverage under, or may exceed the limits of, our applicable directors' and officers' liability insurance policies and could have a material adverse effect on our financial condition, liquidity and results of operations. The currently pending cases also may distract the time and attention of our officers and directors or divert our other resources away from our ongoing commercial and development programs. An unfavorable outcome in these matters could damage our business and reputation or result in additional claims or proceedings against us.

Risks Related to Government Regulation

The FDA regulatory approval process is lengthy and time-consuming, and we may experience significant delays in the clinical development and regulatory approval of our product candidates.*

We have not previously submitted a BLA to the FDA, or similar approval filings to comparable foreign authorities. A BLA must include extensive preclinical and clinical data and supporting information to establish the product candidate's safety and effectiveness for each desired indication. For example, following our End of Phase 2 meeting with the FDA, we plan to increase enrollment in our ongoing C-145-04 clinical trial of TIL therapy LN-145 has been expanded to at least 75 patients of the appropriate patient population to address the expected sample size in anticipation of a BLA submission in 2020. Additionally, the patient population is defined per the discussion with FDA as patients who have progressed following initial systemic therapy for recurrent or metastatic disease which include many of the of the more advanced patients enrolled to date. Based on feedback we received from the FDA following our End of Phase 2 meeting, we believe that the study may be sufficient to support a BLA submission in the second half of 2020. However, our current beliefs regarding the registration pathway for the LN-145 product candidate are based on our interpretation of communications with the FDA to date and our efforts to address such communications, which may be incorrect. Our statements that the study may support a BLA submission also assume that our as-adjusted study has addressed the additional requests by the FDA that were raised at our End of Phase 2 meeting. Further, enrollment in this study may need to be further adjusted based on future feedback from the FDA or other regulatory agency input. The new version of the protocol which further defines the patient population to include more advanced patients in the study, may have an adverse effect on the results reported to date, changes to implement a blinded independent review committee and assay validation and implementation, and the data within this study may not ultimately be supportive of product approval, all of which could result in significant delays to our currently anticipated timeline for development and approval of our product candidate or prevent its approval entirely. Similarly, our current beliefs for our lifileucel product candidate for the treatment of melanoma are based on our interpretation of communications received from the FDA to date regarding this product candidate and our ongoing C-144-01 clinical trial, and may also be incorrect.

A BLA must also include significant information regarding the chemistry, manufacturing and controls for the product. Additionally, we expect the novel nature of our product candidates to create further challenges in obtaining regulatory approval. For example, the FDA has limited experience with commercial development of cell therapies for cancer. We may also not be able to successfully utilize the BTD or RMAT designations we have received for advanced cervical cancer and advanced melanoma, respectively, to successfully complete the development and commercialization of lifileucel. We may not be able to reach agreement with FDA on an interpretation of outcomes from our meetings, including meetings we have held with FDA in relation to our C-145-04 and C-144-01 clinical trials and future meetings. Accordingly, the regulatory approval pathway for our product candidates may be uncertain, complex, expensive and lengthy, and approval may not be obtained.

We may also experience delays, including delays arising from the need to increase enrollment, in completing planned clinical trials for a variety of reasons, including delays related to:

- the availability of financial resources to commence and complete the planned trials;
- reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;

- obtaining approval at each clinical trial site by an independent institutional review board, or IRB, or central IRB;
- recruiting suitable patients to participate in a trial;
- having patients complete a trial or return for post-treatment follow-up;
- clinical trial sites deviating from trial protocol or dropping out of a trial;
- adding new clinical trial sites;
- manufacturing sufficient quantities of qualified materials under cGMPs and applying them on a subject by subject basis for use in clinical trials; or
- timely implementing or validating changes to our manufacturing or quality control processes and methods needed to address FDA feedback.

We could also encounter delays if physicians encounter unresolved ethical issues associated with enrolling patients in clinical trials of our product candidates in lieu of prescribing existing treatments that have established safety and efficacy profiles. Further, a clinical trial may be suspended or terminated by us, the IRBs for the institutions in which such trials are being conducted by the FDA or other regulatory authorities, or recommended for suspension or termination by DSMBs due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA or other regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, failure to demonstrate a benefit from using a product candidate, changes in governmental regulations or administrative actions or lack of adequate funding to continue the clinical trial. If we experience termination of, or delays in the completion of, any clinical trial of our product candidates, the commercial prospects for our product candidates will be harmed, and our ability to generate product revenue will be delayed. In addition, any delays in completing our clinical trials will increase our costs, slow down our product development and approval process and jeopardize our ability to commence product sales and generate revenue.

Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not mean that we will be successful in obtaining regulatory approval of our product candidates in other jurisdictions.

In order to market and sell our products outside the United States, we or our third-party collaborators may be required to obtain separate marketing approvals and comply with numerous and varying regulatory requirements. Obtaining and maintaining regulatory approval of our product candidates in one jurisdiction does not guarantee that we will be able to obtain or maintain regulatory approval in any other jurisdiction, while a failure or delay in obtaining regulatory approval in one jurisdiction may have a negative effect on the regulatory approval process in others. Approval policies and requirements may vary among jurisdictions. For example, even if the FDA grants marketing approval of a product candidate, comparable regulatory authorities in foreign jurisdictions must also approve the manufacturing, marketing and promotion of the product candidate in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and greater than, those in the United States, including additional preclinical studies or clinical trials as clinical studies conducted in one jurisdiction may not be accepted by regulatory authorities in other jurisdictions. In many jurisdictions outside the United States, a product candidate must be approved for reimbursement before it can be approved for sale in that jurisdiction. In some cases, the price that we intend to charge for our products is also subject to approval. We or our collaborators may not be able to file for regulatory approval of our product candidates in international jurisdictions or obtain approvals from regulatory authorities outside the United States on a timely basis, if at all.

We may also submit marketing applications in other countries. Regulatory authorities in jurisdictions outside of the United States have requirements for approval of product candidates with which we must comply prior to marketing in those jurisdictions. Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our products in certain countries. If we fail to comply with the regulatory requirements in international markets and/or receive applicable marketing approvals, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed.

We are, and if we receive regulatory approval of our product candidates, will continue to be subject to ongoing regulatory obligations and continued regulatory review, which may result in significant additional expense and we may be subject to penalties if we fail to comply with regulatory requirements or experience unanticipated problems with our product candidates.

Any regulatory approvals that we receive for our product candidates will require surveillance to monitor the safety and efficacy of the product candidate. The FDA may also require a REMS to approve our product candidates, which could entail requirements for a medication guide, physician communication plans or additional elements to ensure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. The FDA may also require post-approval Phase 4 studies. Moreover, the FDA and comparable foreign regulatory authorities will continue to closely monitor the safety profile of any product even after approval. If the FDA or comparable foreign regulatory authorities become aware of new safety information after approval of any of our product candidates, they may withdraw approval, require labeling changes or establishment of a REMS or similar strategy, impose significant restrictions on a product's indicated uses or marketing, or impose ongoing requirements for potentially costly post-approval studies or post-market surveillance. Any such restrictions could limit sales of the product.

In addition, we, our contractors, and our collaborators are and will remain responsible for FDA compliance, including requirements related to product design, testing, clinical and pre-clinical trials approval, manufacturing processes and quality, labeling, packaging, distribution, adverse event and deviation reporting, storage, advertising, marketing, promotion, sale, import, export, submissions of safety and other post-marketing information and reports such as deviation reports, registration, product listing, annual user fees, and recordkeeping for our product candidates. We and any of our collaborators, including our contract manufacturers, could be subject to periodic unannounced inspections by the FDA to monitor and ensure compliance with regulatory requirements. Application holders must further notify the FDA, and depending on the nature of the change, obtain FDA pre-approval for product and manufacturing changes. The cost of compliance with post-approval regulations may have a negative effect on our operating results and financial condition.

Later discovery of previously unknown problems with our product candidates, including adverse events of unanticipated severity or frequency, that the product is less effective than previously thought, problems with our third-party manufacturers or manufacturing processes, or failure to comply with regulatory requirements, may result in, among other things:

- restrictions on the marketing, distribution, or manufacturing of our product candidates, withdrawal of the product from the market, or voluntary or mandatory product recalls;
- restrictions on the labeling of our product candidates, including required additional warnings, such as black box warnings, contraindications, precautions, and restrictions on the approved indication or use;
- modifications to promotional pieces;
- changes to product labeling or the way the product is administered;
- liability for harm caused to patients or subjects;
- fines, restitution, disgorgement, warning letters, untitled letters, cyber letters, or holds on or termination of clinical trials;
- refusal by the FDA to approve pending applications or supplements to approved applications filed by us or suspension or revocation of license approvals;
- product seizure or detention, or refusal to permit the import or export of our product candidates;
- injunctions or the imposition of civil or criminal penalties, including imprisonment;
- FDA debarment, debarment from government contracts, and refusal of future orders under existing contracts, exclusion from federal healthcare programs, consent decrees, or corporate integrity agreements;
- regulatory authority issuance of safety alerts, Dear Healthcare Provider letters, press releases, or other communications containing warnings or other safety information about the biologic;
- reputational harm; or
- the product becoming less competitive.

Any of these events could further have other material and adverse effects on our operations and business and could adversely impact our stock price and could significantly harm our business, financial condition, results of operations, and prospects.

The FDA's and other regulatory authorities' policies may change, and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the United States or abroad. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained, be subject to other regulatory enforcement action, and we may not achieve or sustain profitability.

If we fail to comply with federal and state healthcare and promotional laws, including fraud and abuse and information privacy and security laws, we could face substantial penalties and our business, financial condition, results of operations, and prospects could be adversely affected.

As a biopharmaceutical company, we are subject to many federal and state healthcare laws, including the federal AKS, the federal civil and criminal FCA, the civil monetary penalties statute, the Medicaid Drug Rebate statute and other price reporting requirements, the Veterans Health Care Act of 1992, the federal Health Insurance Portability and Accountability Act of 1996 (as amended by the Health Information Technology for Economics and Clinical Health Act), the Foreign Corrupt Practices Act of 1977, the Patient Protection and Affordable Care Act of 2010, and similar state laws. Even though we do not and will not control referrals of healthcare services or bill directly to Medicare, Medicaid, or other third-party payors, certain federal and state healthcare laws and regulations pertaining to fraud and abuse and patients' rights are and will be applicable to our business. If we do not comply with all applicable fraud and abuse laws, we may be subject to healthcare fraud and abuse enforcement by both the federal government and the states in which we conduct our business.

Laws and regulations require calculation and reporting of complex pricing information for prescription drugs, and compliance will require us to invest in significant resources and develop a price reporting infrastructure, or depend on third parties to compute and report our drug pricing. Pricing reported to CMS must be certified. Non-compliant activities expose us to FCA risk if they result in overcharging agencies, underpaying rebates to agencies, or causing agencies to overpay providers.

If we or our operations are found to be in violation of any federal or state healthcare law, or any other governmental regulations that apply to us, we may be subject to penalties, including civil, criminal, and administrative penalties, damages, fines, disgorgement, debarment from government contracts, refusal of orders under existing contracts, exclusion from participation in U.S. federal or state health care programs, corporate integrity agreements, and the curtailment or restructuring of our operations, any of which could materially adversely affect our ability to operate our business and our financial results. If any of the physicians or other healthcare providers or entities with whom we expect to do business, including our collaborators, is found not to be in compliance with applicable laws, they may be subject to criminal, civil, or administrative sanctions, including but not limited to, exclusions from participation in government healthcare programs, which could also materially affect our business.

In particular, if we are found to have impermissibly promoted any of our product candidates, we may become subject to significant liability and government fines. We, and any of our collaborators, must comply with requirements concerning advertising and promotion for any of our product candidates for which we or they obtain marketing approval. Promotional communications with respect to therapeutics are subject to a variety of legal and regulatory restrictions and continuing review by the FDA, Department of Justice, Department of Health and Human Services' Office of Inspector General, state attorneys general, members of Congress, and the public. When the FDA or comparable foreign regulatory authorities issue regulatory approval for a product candidate, the regulatory approval is limited to those specific uses and indications for which a product is approved. If we are not able to obtain FDA approval for desired uses or indications for our products and product candidates, we may not market or promote our products for those indications and uses, referred to as off-label uses, and our business may be adversely affected. We further must be able to sufficiently substantiate any claims that we make for our products including claims comparing our products to other companies' products and must abide by the FDA's strict requirements regarding the content of promotion and advertising.

While physicians may choose to prescribe products for uses that are not described in the product's labeling and for uses that differ from those tested in clinical studies and approved by the regulatory authorities, we are prohibited from marketing and promoting the products for indications and uses that are not specifically approved by the FDA. These off-label uses are common across medical specialties and may constitute an appropriate treatment for some patients in varied circumstances. Regulatory authorities in the United States generally do not restrict or regulate the

behavior of physicians in their choice of treatment within the practice of medicine. Regulatory authorities do, however, restrict communications by biopharmaceutical companies concerning off-label use.

The FDA and other agencies actively enforce the laws and regulations regarding product promotion, particularly those prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted a product may be subject to significant sanctions. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. The FDA has also requested that companies enter into consent decrees of permanent injunctions under which specified promotional conduct is changed or curtailed. Thus, we and any of our collaborators will not be able to promote any products we develop for indications or uses for which they are not approved.

In the United States, engaging in the impermissible promotion of our products, following approval, for off-label uses can also subject us to false claims and other litigation under federal and state statutes, including fraud and abuse and consumer protection laws, which can lead to civil and criminal penalties and fines, agreements with governmental authorities that materially restrict the manner in which we promote or distribute therapeutic products and do business through, for example, corporate integrity agreements, suspension or exclusion from participation in federal and state healthcare programs, and debarment from government contracts and refusal of future orders under existing contracts. These false claims statutes include the federal civil False Claims Act, which allows any individual to bring a lawsuit against a biopharmaceutical company on behalf of the federal government alleging submission of false or fraudulent claims or causing others to present such false or fraudulent claims, for payment by a federal program such as Medicare or Medicaid. If the government decides to intervene and prevails in the lawsuit, the individual will share in the proceeds from any fines or settlement funds. If the government declines to intervene, the individual may pursue the case alone. These False Claims Act lawsuits against manufacturers of drugs and biologics have increased significantly in volume and breadth, leading to several substantial civil and criminal settlements, up to \$3.0 billion, pertaining to certain sales practices and promoting off-label uses. In addition, False Claims Act lawsuits may expose manufacturers to follow-on claims by private payors based on fraudulent marketing practices. This growth in litigation has increased the risk that a biopharmaceutical company will have to defend a false claim action, pay settlement fines or restitution, as well as criminal and civil penalties, agree to comply with burdensome reporting and compliance obligations, and be excluded from Medicare, Medicaid, or other federal and state healthcare programs. If we or our future collaborators do not lawfully promote our approved products, if any, we may become subject to such litigation and, if we do not successfully defend against such actions, those actions may have a material adverse effect on our business, financial condition, results of operations and prospects.

Although an effective compliance program can mitigate the risk of investigation and prosecution for violations of these laws, the risks cannot be entirely eliminated. Moreover, achieving and sustaining compliance with applicable federal and state fraud laws may prove costly. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business.

Coverage and reimbursement may be limited or unavailable in certain market segments for our product candidates, which could make it difficult for us to sell our product candidates profitably.

In both domestic and foreign markets, sales of our product candidates, if approved, depend on the availability of coverage and adequate reimbursement from third-party payors. Such third-party payors include government health programs such as Medicare and Medicaid, managed care providers, private health insurers, and other organizations. In addition, because our product candidates represent new approaches to the treatment of cancer, we cannot accurately estimate the potential revenue from our product candidates.

Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Obtaining coverage and adequate reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors is critical to new product acceptance.

Government authorities and third-party payors decide which drugs and treatments they will cover and the amount of reimbursement. Coverage decisions may depend upon clinical and economic standards that disfavor new drug products when more established or lower cost therapeutic alternatives are already available or subsequently become available. If reimbursement is not available, or is available only to limited levels, our product candidates may be

competitively disadvantaged, and we, or our collaborators, may not be able to successfully commercialize our product candidates. Even if coverage is provided, the approved reimbursement amount may not be high enough to allow us, or our collaborators, to establish or maintain a market share sufficient to realize a sufficient return on our or their investments. Alternatively, securing favorable reimbursement terms may require us to compromise pricing and prevent us from realizing an adequate margin over cost. Reimbursement by a third-party payor may depend upon a number of factors, including, but not limited to, the third-party payor's determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

Obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to the payor supporting scientific, clinical and cost-effectiveness data for the use of our products. Even if we obtain coverage for a given product, the resulting reimbursement payment rates might not be adequate for us to achieve or sustain profitability or may require co-payments that patients find unacceptably high. Moreover, the factors noted above have continued to be the focus of policy and regulatory debate that has, thus far, shown the potential for movement towards permanent policy changes; this trend is apt to continue, and may result in more or less favorable impacts on pricing. Patients are unlikely to use our product candidates unless coverage is provided, and reimbursement is adequate to cover a significant portion of the cost of our product candidates.

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors. Therefore, coverage and reimbursement for products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our product candidates to each payor separately, with no assurance that coverage and adequate reimbursement will be obtained.

Prices paid for a drug also vary depending on the class of trade. Prices charged to government customers are subject to price controls, including ceilings, and private institutions obtain discounts through group purchasing organizations. Net prices for drugs may be further reduced by mandatory discounts or rebates required by government healthcare programs and demanded by private payors. It is also not uncommon for market conditions to warrant multiple discounts to different customers on the same unit, such as purchase discounts to institutional care providers and rebates to the health plans that pay them, which reduces the net realization on the original sale. On January 31, 2019, the U.S. Department of Health and Human Services issued a proposed rule aimed at eliminating certain AKS safe harbor protections for drug rebates.

In addition, federal programs impose penalties on manufacturers of drugs marketed under an NDA or BLA, in the form of mandatory additional rebates and/or discounts if commercial prices increase at a rate greater than the Consumer Price Index-Urban, and these rebates and/or discounts, which can be substantial, may impact our ability to raise commercial prices. Regulatory authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications, which could affect our ability or that of our collaborators to sell our product candidates profitably. These payors may not view our products, if any, as cost-effective, and coverage and reimbursement may not be available to our customers, or those of our collaborators, or may not be sufficient to allow our products, if any, to be marketed on a competitive basis. Cost control initiatives could cause us, or our collaborators, to decrease, discount, or rebate a portion of the price we, or they, might establish for products, which could result in lower than anticipated product revenues. If the realized prices for our products, if any, decrease or if governmental and other third-party payors do not provide adequate coverage or reimbursement, our prospects for revenue and profitability will suffer. Moreover, the recent and ongoing series of congressional hearings relating to drug pricing has presented heightened attention to the biopharmaceutical industry, creating the potential for political and public pressure, while the potential for resulting legislative or policy changes presents uncertainty.

Assuming coverage is approved, the resulting reimbursement payment rates might not be adequate. If payors subject our product candidates to maximum payment amounts or impose limitations that make it difficult to obtain reimbursement, providers may choose to use therapies which are less expensive when compared to our product candidates. Additionally, if payors require high copayments, beneficiaries may decline prescriptions and seek alternative

therapies. We may need to conduct post-marketing studies in order to demonstrate the cost-effectiveness of any future products to the satisfaction of hospitals and other target customers and their third-party payors. Such studies might require us to commit a significant amount of management time and financial and other resources. Our future products might not ultimately be considered cost-effective. Adequate third-party coverage and reimbursement might not be available to enable us to maintain price levels sufficient to realize an appropriate return on investment in product development.

Third-party payors, whether domestic or foreign, or governmental or commercial, are developing increasingly sophisticated methods of controlling healthcare costs. In addition, third-party payors are requiring higher levels of evidence of the benefits and clinical outcomes of new technologies and are challenging the prices charged. We, and our collaborators, cannot be sure that coverage will be available for any product candidate that we, or they, commercialize and, if available, that the reimbursement rates will be adequate. Further, the net reimbursement for drug products may be subject to additional reductions if there are changes to laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. An inability to promptly obtain coverage and adequate payment rates from both government-funded and private payors for any our product candidates for which we obtain marketing approval could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products, and our overall financial condition.

There have been, and likely will continue to be, legislative and regulatory proposals at the federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our product candidates, if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability;
- the level of taxes that we are required to pay; and
- the availability of capital.

Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors, which may adversely affect our future profitability. A particular challenge for our product candidates arises from the fact that they will primarily be used in an inpatient setting. Inpatient reimbursement generally relies on stringent packaging rules that may mean that there is no separate payment for our product candidates. Additionally, data used to set the payment rates for inpatient admissions is usually several years old and would not take into account all of the additional therapy costs associated with the administration of our product candidates. If special rules are not created for reimbursement for immunotherapy treatments such as our product candidates, hospitals might not receive enough reimbursement to cover their costs of treatment, which will have a negative effect on their adoption of our product candidates.

We are subject to new legislation, regulatory proposals, and healthcare payor initiatives that may increase our costs of compliance, and adversely affect our ability to market our products, obtain collaborators, and raise capital.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities, and affect our ability, or the ability of our collaborators, to profitably sell any products for which we obtain marketing approval. We expect that current laws, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we, or our collaborators, may receive for any approved products.

Since enactment of the ACA in 2010, in both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the health care system that could impact our ability to sell our products profitably. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least \$1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers up to 2% per fiscal year, which went into effect on April 1, 2013 and were to remain in effect

until 2024. The Bipartisan Budget Act of 2015 extended the 2% sequestration to 2025. In January 2013, the American Taxpayer Relief Act of 2012, or ATRA, was approved which, among other things, reduced Medicare payments to several providers, with primary focus on the hospital outpatient setting and ancillary services, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. On January 20, 2017, the new administration signed an Executive Order directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices, and, for that reason, some final regulations have yet to take effect. In December 2017, Congress repealed the individual mandate for health insurance required by the ACA and could consider further legislation to repeal other elements of the ACA. At the end of 2017, CMS promulgated regulations that reduce the amount paid to hospitals for outpatient drugs purchased under the 340B program, and some states have enacted transparency laws requiring manufacturers to report information on drug prices and price increases. More recently, the United States District Court for the Northern District of Texas struck down the ACA, deeming it unconstitutional given that Congress repealed the individual mandate in 2017. Although there is no immediate impact on the ACA, we will continue to evaluate the effect that the ACA and its possible repeal and replacement, or potential total revocation by the Supreme Court of the United States, has on our business.

Additional federal and state healthcare reform measures may be adopted in the future that may result in more rigorous coverage criteria, increased regulatory burdens and operating costs, decreased net revenue from our pharmaceutical products, decreased potential returns from our development efforts, and additional downward pressure on the price that we receive for any approved drug. Any reduction in reimbursement from Medicare or other government healthcare programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our products.

Legislative and regulatory proposals may also be made to expand post-approval requirements and restrict sales and promotional activities for drugs. We cannot be sure whether additional legislative changes will be enacted, or whether the FDA regulations, guidance, or interpretations will be changed, or what the impact of such changes on the marketing approvals of our product candidates, if any, may be. In addition, increased scrutiny by Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements.

In addition, there have been a number of other legislative and regulatory proposals aimed at changing the pharmaceutical industry. For instance, Congress recently introduced a number of bipartisan bills, including the CREATES Act that is intended to reduce prices and increase competitiveness in the pharmaceutical industry, and the FLAT Prices Act that would introduce a prohibition on "large scale drug price increases." As a result of these and other new proposals, we may determine to change our current manner of operation, provide additional benefits, or change our contract arrangements, any of which could have a material adverse effect on our business, financial condition, and results of operations.

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

In international markets, reimbursement and health care payment systems vary significantly by country, and many countries have instituted price ceilings on specific products and therapies. In some countries, particularly the countries of the EU, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a product. To obtain coverage and reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. There can be no assurance that our products will be considered cost-effective by third-party payors, that an adequate level of reimbursement will be available, or that the third-party payors' reimbursement policies will not adversely affect our ability to sell our products profitably. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed, possibly materially.

Our employees, independent contractors, consultants, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of employee fraud or other illegal activity by our employees, independent contractors, consultants, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to: comply with the laws of the FDA and other similar foreign regulatory bodies, provide true, complete and accurate information to the FDA and other similar foreign regulatory bodies, comply with manufacturing standards we have established, comply with healthcare fraud and abuse laws in the United States and similar foreign fraudulent misconduct laws, or report financial information or data accurately or to disclose unauthorized activities to us. If we obtain FDA approval of any of our product candidates and begin commercializing those products in the United States, our potential exposure under such laws will increase significantly, and our costs associated with compliance with such laws are also likely to increase. These laws may impact, among other things, our current activities with principal investigators and research patients, as well as proposed and future sales, marketing and education programs. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain business arrangements in the healthcare industry, are subject to extensive laws designed to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, structuring and commission(s), certain customer incentive programs and other business arrangements generally. Activities subject to these laws also involve the improper use of information obtained in the course of patient recruitment for clinical trials.

We have adopted a Code of Conduct and Ethics, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent inappropriate conduct may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to comply with such laws or regulations. Efforts to ensure that our business arrangements will comply with applicable healthcare laws may involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our, or our employees', consultants', collaborators', contractors', or vendors' business practices may not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, compliance agreements, withdrawal of product approvals, and curtailment of our operations, among other things, any of which could adversely affect our ability to operate our business and our results of operations. In addition, the approval and commercialization of any of our product candidates outside the United States will also likely subject us to foreign equivalents of the healthcare laws mentioned above, among other foreign laws.

Risks Related to Our Intellectual Property

We may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, or lawsuits accusing our products of patent infringement, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that one or more of our patents is not valid or is unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated, held unenforceable, or interpreted narrowly and could put our patent applications at risk of not issuing. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may be enjoined from manufacturing, use, and marketing our products, or may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, obtain one or more licenses from third parties, pay royalties or redesign our infringing products, which may be impossible or require substantial time and monetary expenditure.

Periodic maintenance fees on any issued patent are due to be paid to the United States Patent and Trademark Office, or USPTO, and foreign patent agencies in several stages over the lifetime of the patent. The USPTO and various foreign governmental patent agencies require compliance with several procedural, documentary, fee payment and other

similar provisions during the patent application process. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Noncompliance events that could result in abandonment or lapse of a patent or patent application include, but are not limited to, failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In such an event, our competitors might be able to enter the market, which would have a material adverse effect on our business.

We may incur substantial costs as a result of litigation or other proceedings relating to patent and other intellectual property rights.

The cost to us of any litigation or other proceeding relating to intellectual property rights, even if resolved in our favor, could be substantial. Some of our competitors may be better able to sustain the costs of complex patent litigation because they have substantially greater resources. If there is litigation against us, we may not be able to continue our operations.

Should third parties file patent applications or be issued patents claiming technology also used or claimed by us, we may be required to participate in interference proceedings in the USPTO to determine priority of invention. We may be required to participate in interference proceedings involving our issued patents and pending applications. We may be required to cease using the technology or to license rights from prevailing third parties as a result of an unfavorable outcome in an interference proceeding. A prevailing party in that case may not offer us a license on commercially acceptable terms.

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

If we or one of our licensing partners initiate legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate, as applicable, is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace, and there are numerous grounds upon which a third party can assert invalidity or unenforceability of a patent. Third parties may also raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we, our patent counsel and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our product candidates. Such a loss of patent protection could have a material adverse impact on our business.

If we are unable to protect our proprietary rights, we may not be able to compete effectively or operate profitably.

Our success is dependent in part on maintaining and enforcing the patents and other proprietary rights that we have licensed and may develop, and on our ability to avoid infringing the proprietary rights of others. Certain of our intellectual property rights are licensed from another entity, and as such the preparation and prosecution of these patents and patent applications was not performed by us or under our control. Furthermore, patent law relating to the scope of claims in the biotechnology field in which we operate is still evolving and, consequently, patent positions in our industry may not be as strong as in other more well-established fields. The patent positions of biotechnology companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. No consistent policy regarding the breadth of claims allowed in biotechnology patents has emerged to date.

The issuance of a patent is not conclusive as to its validity or enforceability and it is uncertain how much protection, if any, will be given to the patents we have licensed from the NIH, Moffitt, or MDACC if any of these parties, or we, attempt to enforce the patents and/or if they are challenged in court or in other proceedings, such as oppositions, which may be brought in foreign jurisdictions to challenge the validity of a patent. A third party may challenge the validity or enforceability of a patent after its issuance by the Patent Office. It is possible that a competitor

may successfully challenge our patents or that a challenge will result in limiting their coverage. Moreover, the cost of litigation to uphold the validity of patents and to prevent infringement can be substantial. If the outcome of litigation is adverse to us, third parties may be able to use our patented invention without payment to us. Moreover, it is possible that competitors may infringe our patents or successfully avoid the patented technology through design innovation. To stop these activities, we may need to file a lawsuit. These lawsuits are expensive and would consume time and other resources, even if we were successful in stopping the violation of our patent rights. In addition, there is a risk that a court would decide that our patents are not valid and that we do not have the right to stop the other party from using the inventions. There is also the risk that, even if the validity of our patents were upheld, a court would refuse to stop the other party on the grounds that its activities are not covered by, that is, do not infringe, our patents.

Should third parties file patent applications, or be issued patents claiming technology also used or claimed by our licensor(s) or by us in any future patent application, we may be required to participate in interference proceedings in the USPTO to determine priority of invention for those patents or patent applications that are subject to the first-to-invent law in the United States, or may be required to participate in derivation proceedings in the USPTO for those patents or patent applications that are subject to the first-inventor-to-file law in the United States. We may be required to participate in such interference or derivation proceedings involving our issued patents and pending applications. We may be required to cease using the technology or to license rights from prevailing third parties as a result of an unfavorable outcome in an interference proceeding or derivation proceeding. A prevailing party in that case may not offer us a license on commercially acceptable terms.

We cannot prevent other companies from licensing most of the same intellectual properties that we have licensed or from otherwise duplicating our business model and operations.

Certain intellectual properties that we are using to develop TIL-based cancer therapy products were licensed to us by the NIH. The issued or pending patents that the NIH licensed to us are exclusive, and specific with respect to melanoma, breast, HPV-associated, bladder and lung cancers. No assurance can be given that the NIH has not previously licensed, or that the NIH hereafter will not license to other biotechnology companies some or all of the non-exclusive technologies available to us under the NIH License Agreement. In addition, one pending U.S. patent application in the NIH License Agreement is not owned solely by the NIH. No assurance can be given that NIH's co-owner of the certain pending U.S. patent application in the NIH License Agreement has not previously licensed, or that the co-owner thereafter will not license, to other biotechnology companies some or all of the technologies available to us. Co-ownership of these intellectual properties will create issues with respect to our ability to enforce the intellectual property rights in courts, and will create issues with respect to the accountability of one entity with respect to the other.

Since the NCI, Moffitt, MDACC, and others already use TIL therapy for the treatment of metastatic melanoma and other indications, their methods and data are also available to third parties, who may want to enter into our line of business and compete against us. Other than the Gen 2 manufacturing process, we currently do not own any exclusive rights on our entire product portfolio that could be used to prevent third parties from duplicating our business plan or from otherwise directly competing against us. While additional technologies that may be developed under our CRADA may be licensed to us on an exclusive basis, no assurance can be given that our existing exclusive rights and will be sufficient to prevent others from competing with us and developing substantially similar products.

The use of our technologies could potentially conflict with the rights of others.

Our potential competitors or others may have or acquire patent rights that they could enforce against us. If they do so, then we may be required to alter our products, pay licensing fees or cease activities. If our products conflict with patent rights of others, third parties could bring legal actions against us or our collaborators, licensees, suppliers or customers, claiming damages and seeking to enjoin manufacturing, use and marketing of the affected products. If these legal actions are successful, in addition to any potential liability for damages (including treble damages and attorneys' fees for willful infringement), we could be required to obtain a license to continue manufacturing, promoting the use or marketing the affected products. We may not prevail in any legal action and a required license under the patent may not be available on acceptable terms or at all.

We have conducted an extensive freedom-to-operate, or FTO, analyses of the patent landscape with respect to our lead product candidates. Although we continue to undertake FTO analyses of our manufacturing processes, our lead TIL products, and contemplated future processes and products, because patent applications do not publish for 18 months, and because the claims of patent applications can change over time, no FTO analysis can be considered exhaustive.

Furthermore, patent and other intellectual property rights in biotechnology remains an evolving area with many risks and uncertainties. As such, we may not be able to ensure that we can market our product candidates without conflict with the rights of others.

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

As is the case with other biopharmaceutical companies, our success is dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. While we do not believe that any of the patents owned or licensed by us will be found invalid based on this decision, we cannot predict how future decisions by the courts, the U.S. Congress or the USPTO may impact the value of our patents.

We have limited foreign intellectual property rights and may not be able to protect our intellectual property rights throughout the world.

We have limited intellectual property rights outside the United States. Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biopharmaceutical products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

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

We have received confidential and proprietary information from third parties and our employees and contractors. In addition, we employ individuals who were previously employed at other biotechnology or pharmaceutical companies. We may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed confidential information of these third parties or our employees' former employers. Litigation may be necessary to defend against or pursue these claims. For example, we are currently engaged in litigation involving counterclaims that we have brought relating to theft of certain of our trade secrets, breach of confidentiality,

and related counterclaims. Even if we are successful in resolving these claims, litigation could result in substantial cost and be a distraction to our management and employees.

Risks Related to Our Securities

Our existing directors and executive officers hold a substantial amount of our common stock and may be able to influence significant corporate decisions.*

As of June 30, 2019, our officers and directors beneficially owned approximately 9.4% of our outstanding common stock. These stockholders, if they act together, may be able to materially affect the outcome of matters presented to our stockholders, including the election of our directors and other corporate actions such as:

- a merger with or into another company;
- a sale of substantially all of our assets; and
- amendments to our certificate of incorporation.

Additionally, the decisions of these stockholders may conflict with our interests or those of our other stockholders and the market price of our stock may be adversely affected by market volatility.

Our stock price may be volatile, and our stockholders' investment in our stock could decline in value.

The market price of our common stock is likely to be volatile and could fluctuate widely in response to many factors, including but not limited to:

- announcements of the results of clinical trials by us, our collaborators, or our competitors, or negative developments with respect to similar products, including those being developed by our collaborators;
- developments with respect to patents or proprietary rights;
- announcements of technological innovations by us or our competitors;
- announcements of new products or new contracts by us or our competitors;
- actual or anticipated variations in our operating results due to the level of development expenses and other factors;
- changes in financial estimates by securities analysts and whether our earnings meet or exceed such estimates;
- conditions and trends in the pharmaceutical, biotechnology and other industries;
- receipt, or lack of receipt, of funding in support of conducting our business;
- regulatory developments within, and outside of, the United States;
- litigation or arbitration;
- general volatility in the financial markets;
- general economic, political and market conditions and other factors; and
- the occurrence of any of the risks described in this Quarterly Report on Form 10-Q or our Annual Report on Form 10-K filed with the SEC on February 28, 2019.

You may experience future dilution as a result of future equity offerings or other equity issuances.

We will have to raise additional capital in the future. To raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may be lower than the current price per share of our common stock. In addition, investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the price per share paid by investors in prior offerings. Any such issuance could result in substantial dilution to our existing stockholders.

Future sales of our common stock in the public market could cause our stock price to fall.*

Our stock price could decline as a result of sales of a large number of shares of our common stock or the perception that these sales could occur. These sales, or the possibility that these sales may occur, also might make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

As of June 30, 2019, we had 123,820,508 shares of common stock outstanding. In addition, we had 15,203,345 shares of common stock equivalents that would increase the number of common stock outstanding if these instruments were exercised or converted, including stock options and restricted stock units to purchase common stock based on vesting requirements and common stock issuable upon the conversion of preferred stock. The issuance and subsequent sale of the shares underlying these common stock equivalents could depress the trading price of our common stock. On June 10, 2019, our certificate of incorporation was amended to increase the number of authorized shares of our common stock, par value \$0.000041666, from 150,000,000 shares to 300,000,000 shares, which was approved by our stockholders at our 2019 Annual Meeting of Stockholders held on June 10, 2019. However, no additional shares have been issued to date.

In addition, in the future, we may issue additional shares of common stock or other equity or debt securities convertible into common stock in connection with a financing, acquisition, litigation settlement, employee arrangements or otherwise. For example, in January 2018 and October 2018, we issued 15,000,000 shares and 25,300,000 shares of common stock, respectively, in connection with underwritten public offerings. Such issuances could result in substantial dilution to our existing stockholders and could cause our stock price to decline.

If securities or industry analysts do not publish research or reports about our company, or if they issue adverse or misleading opinions regarding us or our stock, our stock price and trading volume could decline.

Although we have research coverage by securities and industry analysts, if coverage is not maintained, the market price for our stock may be adversely affected. Our stock price also may decline if any analyst who covers us issues an adverse or erroneous opinion regarding us, our business model, our intellectual property or our stock performance, or if our clinical trials and operating results fail to meet analysts' expectations. If one or more analysts cease coverage of us or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our stock price or trading volume to decline and possibly adversely affect our ability to engage in future financings.

If we fail to maintain an effective system of internal control over financial reporting, we may not be able to accurately report our financial results. As a result, we could become subject to sanctions or investigations by regulatory authorities and/or stockholder litigation, which could harm our business and have an adverse effect on our stock price.

As a public reporting company, we are subject to various regulatory requirements, including the Sarbanes-Oxley Act of 2002, which requires our management to assess and report on our internal controls over financial reporting. Nevertheless, in future years, our testing, or the subsequent testing by our independent registered public accounting firm, may reveal deficiencies in our internal controls that we would be required to remediate in a timely manner to be able to comply with the requirements of Section 404 of the Sarbanes-Oxley Act each year. If we are not able to comply with the requirements of Section 404 of the Sarbanes-Oxley Act each year, we could be subject to sanctions or investigations by the SEC, Nasdaq or other regulatory authorities which would require additional financial and management resources and could adversely affect the market price of our common stock. In addition, material weaknesses in our internal controls could result in a loss of investor confidence in our financial reports.

Our Board of Directors could issue one or more additional series of preferred stock without stockholder approval with the effect of diluting existing stockholders and impairing their voting and other rights.*

Our certificate of incorporation, as amended, authorizes the issuance of up to 50,000,000 shares of "blank check" preferred stock (of which only 17,000 shares were issued as Series A Convertible Preferred Stock and 11,500,000 shares were issued as Series B Convertible Preferred Stock) with designations, rights and preferences as may be determined from time to time by our Board of Directors. Our Board of Directors is empowered, without stockholder approval, to issue one or more series of preferred stock with dividend, liquidation, conversion, voting or other rights which could dilute the interest of, or impair the voting power of, our common stockholders. The issuance of a series of preferred stock could be used as a method of discouraging, delaying or preventing a change in control. For example, it would be possible for our Board of Directors to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to effect a change in control of our company.

We do not anticipate paying cash dividends for the foreseeable future, and therefore investors should not buy our stock if they wish to receive cash dividends.

We have never declared or paid any cash dividends or distributions on our common stock. We currently intend to retain our future earnings to support operations and to finance expansion and, therefore, we do not anticipate paying any cash dividends on our common stock in the foreseeable future.

Provisions in our corporate charter documents and under Delaware law may prevent or frustrate attempts by our stockholders to change our management and hinder efforts to acquire a controlling interest in us, and the market price of our common stock may be lower as a result.

There are provisions in our certificate of incorporation, as amended, and amended and restated bylaws that may make it difficult for a third party to acquire, or attempt to acquire, control of our company, even if a change in control was considered favorable by you and other stockholders. For example, our Board of Directors will have the authority to issue up to 50,000,000 shares of preferred stock and to fix the price, rights, preferences, privileges, and restrictions of the preferred stock without any further vote or action by our stockholders. The issuance of shares of preferred stock may delay or prevent a change in control transaction. As a result, the market price of our common stock and the voting and other rights of our stockholders may be adversely affected. An issuance of shares of preferred stock may result in the loss of voting control to other stockholders.

In addition, we are subject to the anti-takeover provisions of Section 203 of the Delaware General Corporation Law, which regulates corporate acquisitions by prohibiting Delaware corporations from engaging in specified business combinations with particular stockholders of those companies. These provisions could discourage potential acquisition proposals and could delay or prevent a change in control transaction. They could also have the effect of discouraging others from making tender offers for our common stock, including transactions that may be in your best interests. These provisions may also prevent changes in our management or limit the price that investors are willing to pay for our stock.

Our certificate of incorporation designates the state or federal courts located in the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.*

Our certificate of incorporation, as amended, provides that, subject to limited exceptions, the state and federal courts located in the State of Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our amended bylaws, or (4) any other action asserting a claim against us that is governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our certificate of incorporation described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage such lawsuits against us and our directors, officers, and employees. Alternatively, if a court were to find these provisions of our certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

We may be subject to claims for rescission or damages in connection with certain sales of shares of our common stock in the open market.

In January 2014, the SEC declared effective a registration statement that we filed to cover the resale of shares issued and sold (or to be issued and sold) by certain selling stockholders. On March 11, 2016, that registration statement (and the prospectus contained therein) became ineligible for future use, and selling stockholders could no longer sell any shares of our common stock in open market transactions by means of that prospectus. We believe that certain stockholders did sell up to 128,500 shares of our common stock in open market transactions in May 2016 by means of the ineffective registration statement. Accordingly, those sales were not made in accordance with Sections 5 and 10(a)(3) of the Securities Act, and the purchasers of those shares may have rescission rights (if they still own the shares) or

claims for damages (if they no longer own the shares). In addition, we also may have indemnification obligations to the selling stockholders. The amount of any such liability is uncertain.

In connection with our reincorporation from Nevada to Delaware in 2017, we (as a Delaware corporation) untimely filed a post-effective amendment to adopt a Form S-8 registration statement that we filed (as a Nevada corporation) to register the shares underlying our 2011 Equity Incentive Plan. Before we filed the required post-effective amendment, options to purchase 200,000 shares were exercised under the 2011 Equity Incentive Plan. The effect of the delayed post-effective amendment filing on the 200,000 option shares is uncertain, but the issuance and sale of the shares may not have been in compliance with the Form S-8 registration statement. The existence of any liability to us, and the amount of any such liability to us, as a result of the issuance of the 200,000 shares is uncertain. Accordingly, no accrual for a potential claim has been made in our financial statements.

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

Nothing to report.

Item 3. Defaults Upon Senior Securities.

Nothing to report.

Item 4. Mine Safety Disclosures

Nothing to report.

Item 5. Other Information.

On July 18, 2019, we announced that we hired Friedrich-Reinhard Graf Finckenstein, M.D., as our Chief Medical Officer. A copy of his employment agreement is filed with this Quarterly Report on Form 10-Q as Exhibit 10.1.

Item 6. Exhibits

EXHIBIT INDEX

Exhibit	Description
10.1	Executive Employment Agreement effective as of July 18, 2019, by and between Friedrich-Reinhard Graf Finck von Finckenstein, M.D.#
31.1	Rule 13a-14(a)/15d-14(a) Certification of Chief Executive Officer.
31.2	Rule 13a-14(a)/15d-14(a) Certification of Chief Financial Officer.
32.1	Section 1350 Certification of Chief Executive Officer (furnished herewith).
32.2	Section 1350 Certification of Chief Financial Officer (furnished herewith).
101	The following financial information from the Quarterly Report on Form 10-Q of Iovance Biotherapeutics, Inc. for the quarter ended June 30, 2019, formatted in XBRL (eXtensible Business Reporting Language): (1) Condensed Consolidated Balance Sheets as of June 30, 2019 and 2018; (2) Condensed Consolidated Statements of Operations for the three and six months ended June 30, 2019 and 2018; (3) Condensed Consolidated Statements of Comprehensive Loss for the three and six months ended June 30, 2019 and 2018; (4) Condensed Consolidated Statements of Stockholders' Equity as of June 30, 2019 and December 31, 2018; (5) Condensed Consolidated Statements of Cash Flows for the six months ended June 30, 2019 and 2018; and (6) Notes to Condensed Consolidated Financial Statements.

* Certain portions of the Exhibit have been omitted based upon a request for confidential treatment filed by us with the Commission. The omitted portions of the Exhibit have been separately filed by us with the Commission.

Indicates a management contract or compensatory plan or arrangement.

SIGNATURES

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

Iovance Biotherapeutics, Inc.

August 1, 2019

By: /s/ Maria Fardis
Maria Fardis
Chief Executive Officer (Principal Executive Officer)

August 1, 2019

By: /s/ Timothy E. Morris
Timothy E. Morris
Chief Financial Officer (Principal Financial Officer)

EXECUTIVE EMPLOYMENT AGREEMENT

THIS EXECUTIVE EMPLOYMENT AGREEMENT (the “**Agreement**”) is entered into as of May 18, 2019 (the “**Effective Date**”), by and between Iovance Biotherapeutics, Inc., a Delaware corporation (the “**Company**”), and Friedrich-Reinhard Graf Finck von Finckenstein, M.D. (“**Executive**”) (either party individually, a “**Party**”; collectively, the “**Parties**”).

WHEREAS, the Company desires to employ Executive to serve as the Company’s Chief Medical Officer;

WHEREAS, the Parties desire to enter into this Agreement to set forth the terms and conditions of Executive’s employment by the Company and to address certain matters related to Executive’s employment with the Company;

WHEREAS, both the Company and the Executive have read and understood the terms and provisions set forth in this Agreement, and Executive acknowledges Executive has been afforded a reasonable opportunity to review this Agreement with Executive’s legal counsel to the extent desired;

NOW, THEREFORE, in consideration of the foregoing, the promises and obligations set forth below and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged by the Parties, the Company and Executive agree and intend to be legally bound, as follows:

1 . Effective Date. Commencing July 31, 2019 or such other date as may be mutually agreed between the Parties (the “**Start Date**”), the Company shall employ Executive, and Executive hereby accepts such employment, upon the terms and conditions set forth herein.

2. Position and Duties.

2 . 1 Position. The Company agrees to employ Executive in the position of Chief Medical Officer reporting directly to the Chief Executive Officer. The Executive shall have the duties and responsibilities consistent with the office of a Chief Medical Officer of a publicly traded corporation, and such other duties and responsibilities as determined from time to time by the Company, including but not limited to the Chief Executive Officer. Executive shall perform faithfully and diligently such duties as are reasonable and customary for Executive’s position, as well as such other duties as the Company and/or Chief Executive Officer shall reasonably assign from time to time. Executive shall perform his duties in the Company’s offices in San Carlos, California subject to customary travel as reasonably required.

2.2 Best Efforts/Full-Time.

2.2(a) Executive understands and agrees that Executive will faithfully devote Executive’s best efforts and substantially all of his time during normal business hours to the faithful and loyal performance of his job duties to the Company (except for permitted vacation

periods and reasonable periods of illness or other incapacity). Executive will abide by all policies duly adopted by the Company, as well as all applicable federal, state and local laws, regulations or ordinances. Executive will act in a manner that Executive reasonably believes to be in the best interest of the Company at all times. Executive further understands and agrees that Executive has a fiduciary duty of loyalty to the Company to the extent provided by applicable law and that Executive will take no action which materially harms the business, business interests, or reputation of the Company.

2.2(b) Executive agrees that Executive shall not, directly or indirectly, (i) engage or participate in any outside activity that would, or may be perceived to, conflict with the best interests of the Company or Executive's duties to the Company, or (ii) provide services to or invest in any corporation or entity that competes or intends to compete with the business of the Company.

2.2(c) Notwithstanding the foregoing, nothing herein shall prohibit Executive from (i) serving, with the prior written consent of the Company, as a member of the board of directors of an entity engaged solely in charitable activities or community affairs, provided that, such activity shall be limited by Executive so as not to interfere with the performance of Executive's duties and responsibilities hereunder; (ii) owning, as a passive investment, less than 1% of capital stock of any corporation listed on the national securities exchange or a publicly traded over-the-counter market; or (iii) engaging in any other manner of employment, consulting or other business activity with the written consent of the Company, the Chief Executive Officer, or as approved by the Company's Board of Directors or a committee thereof (collectively, the "**Board**").

3. Employment Eligibility. This Agreement and Executive's employment with the Company is contingent and expressly conditioned on obtaining and maintaining O-1 nonimmigrant visa status ("**O-1 Visa**"), or any other visa or work permits as may be required for Executive to perform the obligations to the Company under this Agreement. The Company's immigration counsel will assist Executive with obtaining the O-1 Visa. Subject to Executive's continued employment with the Company, the Company's immigration counsel will assist Executive with extending the O-1 Visa. Executive shall cooperate with Company and its counsel and shall provide documentation as reasonably requested for the procurement of the O-1 Visa, or any other visa or work permit, at Company's expense, as may be required for Executive to perform the obligations to the Company under this Agreement. In accordance with the Immigration and Control Act of 1986, and notwithstanding anything to the contrary herein, this Agreement is also contingent and expressly conditioned upon verification of Executive's right to work in the United States, as demonstrated by Executive's completion of Form I-9 and submission of acceptable documentation verifying Executive's identity and work authorization within three (3) days of the Start Date. The conditions set forth in this Section 3 are referred herein as the "**Immigration Conditions.**" In the event that the Immigration Conditions are not satisfied as of the Start Date, the Parties shall work in good faith to modify the Start Date to accommodate any reasonable delay, but no later than August 16, 2019; provided, however, that if the Immigration Conditions cannot be satisfied by such modified Start Date, unless otherwise agreed in a written amendment hereto by the Company and Executive, this Agreement shall be null and void. Nothing herein is intended to modify the at-will nature of Executive's employment as described in Section 4.

4 . At-Will Employment. Executive's employment with the Company will be "at-will" and will not be for any specific period of time. As a result, Executive is free to resign at any time, for any or no reason, as Executive deems appropriate. The Company will have a similar right and may terminate Executive's employment at any time, with or without cause. Executive's and the Company's respective rights and obligations at the time of termination are outlined below in Section 7 of this Agreement.

5. Compensation.

5.1 Base Salary. As compensation for the performance of all duties to be performed by Executive hereunder, the Company shall pay to Executive a base salary of \$450,000 per year on an annualized basis, less applicable deductions for state and federal withholding tax, social security and all other employment taxes and authorized payroll deductions, payable on a prorated basis as it is earned, in accordance with the normal payroll practices of the Company (the "**Base Salary**").

5.2 Bonus and Relocation Expenses. As a signing bonus, Executive shall receive a one-time payment of \$160,000 (subject to payroll taxes), which will be paid on the first regular payroll date after the Start Date (the "**Signing Bonus Payment**"). The Signing Bonus Payment shall be considered earned twelve (12) months following the Start Date or, if applicable, the date on which Executive's employment is terminated by the Company without Cause (as defined herein), due to death or Disability (as defined herein), or by Executive for Good Reason (as defined herein) prior to the first anniversary of the Start Date. If Executive's employment is terminated by the Company for Cause or by Executive without Good Reason, prior to the first anniversary of the Start Date, he shall, within ten (10) days after such termination, repay to the Company the entire gross amount of the signing bonus (before the deduction of any applicable taxes) previously paid to him. For avoidance of doubt, the Signing Bonus Payment is an advance only and shall not be deemed earned unless the foregoing requirements for the signing bonus are satisfied. Executive acknowledges that any expenses incurred by Executive in the course of relocation to the vicinity of San Carlos, California shall be solely borne by Executive and that the Company has provided the Signing Bonus Payment in consideration of such expenses.

5.3 Stock Options. Executive shall be issued an award for stock options to purchase an aggregate of 160,000 shares of the Company's common stock under the Company's 2018 Equity Incentive Plan (the "**Option**") as soon as administratively practicable following the Start Date. To the maximum extent legally permitted, the Option shall be an incentive stock option. The Option will have an exercise price equal to the closing trading price of the common stock on the date of grant. Provided that Executive is still employed with the Company on the following dates, the Option will vest in installments as follows: (i) one-third of the Option shall vest on the one year anniversary of the Start Date; and (ii) the remaining portion of the Option shall vest as to one-twelfth of 160,000 shares at the end of each calendar quarter over the next two years, commencing with the first calendar quarter following the first anniversary of the Start Date. Upon the termination of Executive's employment with the Company, except as otherwise provided herein, any then-unvested portion of the Option will be forfeited. For clarity, any forfeiture of Options shall only be made pursuant to the terms of the Plan and Option Agreement. To the extent vested, the Option will become exercisable. In all cases, Executive's vested portion of the Option

shall remain exercisable for at least three (3) months following termination of Executive's employment for any reason. Except as specifically provided herein, the Option shall be subject to the terms and conditions of the 2018 Equity Incentive Plan and your individual stock option agreement.

5 . 4 Incentive Compensation. Executive will be eligible to participate in the Company's annual incentive compensation program ("**Incentive Plan**") applicable to executive employees, as approved by the Board (the year in which the program is implemented, the "**Plan Year**"). The Incentive Compensation shall be paid in accordance with the terms and conditions outlined in the Incentive Plan and based upon the achievement of certain goals, objectives, and other metrics as decided by the Board in its sole discretion. The maximum potential amount payable to Executive under the Incentive Plan, as determined by the Board in its sole discretion, shall be 40% of Executive's Base Salary earned during the applicable calendar year ("**Maximum Target Bonus**"). Compensation under the Incentive Plan ("**Incentive Compensation**") will be conditioned on the satisfaction of individual and Company objectives, as established in writing by the Company. No Incentive Compensation will be payable to Executive to the extent Executive is not employed on the Incentive Compensation payment date. Payment of any Incentive Compensation pursuant to this Section 5.4 is in the sole discretion of the Board, in accordance with the Incentive Plan, and shall be made within two and one-half months of the end of the calendar year to which the Incentive Compensation relates, in accordance with the normal payroll practices of the Company, less required deductions for state and federal withholding tax, social security and all other employment taxes and authorized payroll deductions.

5 . 5 Performance Review. The Company will periodically review Executive's performance on no less than an annual basis and may increase (but not decrease) Executive's salary or other compensation, as it deems appropriate in its sole and absolute discretion and with any necessary Board approval requirements.

5 . 6 Customary Fringe Benefits. Executive understands and agrees that certain employee benefits may be provided to the Executive by the Company incident to the Executive's employment. Executive will be eligible for all customary and usual fringe benefits generally available to executive employees and all other employees of the Company subject to the terms and conditions of the Company's benefit plan documents. Executive understands and agrees that any employee benefits provided to the Executive by the Company incident to the Executive's employment (other than Base Salary, Signing Bonus Payment, Incentive Compensation and any applicable Severance Payment) are provided solely at the discretion of the Company and may be modified, suspended or revoked at any time, without notice or the consent of the Executive, unless otherwise provided by law. Moreover, to the extent that these benefits are provided pursuant to policies or plan documents adopted by the Company, Executive acknowledges and agrees that these benefits shall be governed by the applicable employment policies or plan documents. The benefits to be provided to Executive shall include group health insurances and participation in a 401(k) plan. Executive will be eligible to receive paid time off benefits in the form of vacation, sick time and holidays. The amount, eligibility and extent of these benefits shall be governed by the Company's applicable policy in effect and as amended from time to time and in compliance with applicable law.

5.7 Business Expenses. Executive will be reimbursed for all reasonable and necessary out-of-pocket business expenses incurred in the performance of Executive's duties on behalf of the Company, including travel-related expenses. To obtain reimbursement, Executive shall provide the Company with reasonable documentation and receipts establishing the amount and nature of such expenses within thirty (30) days of the date such expenses are incurred, which if timely substantiated will be reimbursed by the Company within thirty (30) days thereof. Executive shall comply with such reasonable budget limitations and pre-approval, approval, and reporting requirements with respect to expenses as the Company may establish from time to time.

5.8 Indemnification/D&O Insurance. During employment and for so long thereafter as Executive may reasonably be subject to any claim or liability arising from or relating to his employment with the Company or any of its affiliates, the Company shall (a) indemnify, defend and hold Executive harmless to the full extent provided in Article IX of the Company's Bylaws and (b) maintain, at its sole expense, director and officer liability insurance covering Executive in Executive's capacity as an officer or employee of the Company or any of its affiliates.

6 . Confidentiality and Proprietary Agreement. Executive agrees to abide by the Company's Employee Proprietary Information and Inventions Agreement (the "EPIIA"), which Executive has signed and is incorporated herein by reference. Notwithstanding anything to the contrary in the EPIIA, following termination for any reason, Executive may retain personal social media accounts not owned, operated, or controlled by the Company provided that such accounts are not used for business purposes and are not used to transmit or disseminate Company Proprietary Information as defined in the EPIIA. Nothing prohibits Executive from providing truthful testimony, communicating with applicable government or regulatory agencies, or responding accurately and fully to any question, inquiry or request for information or disclosure of documents as necessary in any criminal, civil, or regulatory proceeding or investigation or in any legal dispute with the Company.

7. Termination of Executive's Employment.

7.1 Termination for Cause by the Company. The Company may terminate Executive's employment immediately at any time and without notice for "Cause." For purposes of this Agreement, "Cause" shall mean (i) material breach by Executive of this Agreement or the EPIIA; (ii) Executive's theft, dishonesty, or falsification of any Company documents or records; (iii) Executive's material improper use or disclosure of the Company's confidential or proprietary information; (iv) Executive's conviction (including any plea of guilty or nolo contendere) of any criminal act that impairs Executive's ability to perform his duties hereunder or which a majority of the Board determines may materially damage the business or reputation of the Company; (v) material failure or refusal to comply with reasonable and lawful Company policies and procedures; or (vi) Executive's material failure and/or inability to comply with or meet the requirements of any performance improvement plan reasonably provided to Executive by the Chief Executive Officer and/or the Board; provided, however, that prior to termination for cause arising under any of the above clauses, except clause (iv), Executive shall have a period of at least thirty (30) days after written notice from the Company to cure the event or grounds identified as constituting such cause. Any notice of termination provided by Company to Executive under this Section 7.1 shall identify the events or conduct constituting the grounds for termination with sufficient specificity so as to

enable Executive to take steps to cure, if curable, the same. In the event Executive's employment is terminated in accordance with this Section 7.1, or if Executive's employment is terminated due to death or Disability (i.e., Executive's inability to materially perform his reasonable duties assigned hereunder for a period of 180 days), Executive shall be entitled to receive only the Base Salary, prorated to the date of termination, any then-vested benefits, and payment for all accrued but unused vacation as of the date of termination (collectively, the "**Accrued Amounts**"). All other obligations of the Company to Executive pursuant to this Agreement will be automatically terminated and completely extinguished. Executive shall be required to comply with all surviving provisions of this Agreement and the EPIIA, and Executive shall execute termination certification agreements relating to the return of the Company's confidential or proprietary information, handling of material non-public information and compliance with securities laws, and compliance with the Company's policies, including insider trading, information technology, and human resources policies.

7.2 Termination Without Cause. The Company may terminate Executive's employment under this Agreement without Cause (as defined in Section 7.1 above) at any time on thirty (30) days' advance written notice to Executive. In the event of such termination, Executive will receive the Accrued Amounts. Executive shall be required to comply with all surviving provisions of this Agreement and the EPIIA, and Executive shall execute termination certification agreements relating to the return of the Company's confidential or proprietary information, handling of material non-public information and compliance with securities laws, and compliance with the Company's policies, including insider trading, information technology, and human resources policies. Upon a termination of Executive's employment by the Company other than for death, disability or Cause (a "**Termination Without Cause**") or a resignation by Executive for Good Reason (as defined below), Executive will be eligible to receive, provided that Executive first satisfies the Severance Conditions set forth below, an amount equal to six (6) months of Executive's then-current Base Salary, payable in a lump sum within thirty (30) days after termination. For purposes of this Agreement, the "**Severance Conditions**" are defined as Executive's execution of a full general release (the "**Release**"), and such Release becomes effective and irrevocable in accordance with its terms prior to the sixtieth (60) day following the termination date. Following payment of Accrued Benefits and any severance payments and benefits required to be paid under this Section 7.2, all other obligations of the Company to Executive pursuant to this Agreement (except any continuing obligations for indemnification, etc.) will be automatically terminated and completely extinguished. The Release will not waive any of Executive's rights, or obligations of the Company, regarding: (1) any right to indemnification and/or contribution, advancement or payment of related expenses pursuant to the Company's Bylaws, under any written agreement between the Parties, and/or under applicable law; (2) any rights that Executive may have to insurance coverage under any directors and officers liability insurance, other insurance policies of the Company; (3) any claims for worker's compensation, state disability or unemployment insurance benefits, or any other claims that cannot be released as a matter of applicable law; (4) rights to any vested benefits under any stock, compensation or other employee benefit plan or agreement with the Company, including any right to severance benefits; (5) Executive's rights as a shareholder of the Company, if applicable; and (6) any claims arising after the date Executive signs the Release.

7.3 Termination In Connection With a Change in Control. If, within six (6) months immediately preceding a Change in Control or within twelve (12) months immediately following a Change in Control, the Executive's employment experiences a Termination Without Cause or Executive resigns for Good Reason, then the Executive shall be entitled to receive the following compensation, provided that Executive first satisfies the Severance Conditions: (i) the severance payments and benefits set forth in Section 7.2, and (ii) any then time-based unvested stock options or other equity awards granted to Executive by the Company (including the Option) will immediately fully vest as of the last day of Executive's employment with the Company (the "**Accelerated Vesting**"). For purposes of this Agreement, "**Change in Control**" shall have the meaning set forth in the Company's 2018 Equity Incentive Plan.

7.4 Resignation With or Without Good Reason. Executive shall have the right to terminate this Agreement at any time, for any reason, without Good Reason, by providing the Company with thirty (30) days written notice, provided, however, that subsequent to Executive's resignation, Executive shall be required to comply with all surviving provisions of this Agreement and the EPIIA, and Executive shall execute termination certification agreements relating to the return of the Company's confidential or proprietary information, handling of material non-public information and compliance with securities laws, and compliance with the Company's policies, including insider trading, information technology, and human resources policies. Executive shall not be entitled to any Severance Pay. Executive will only be entitled to receive Executive's Base Salary earned up to the date of termination. Notwithstanding the foregoing or anything to the contrary in this Agreement, Executive also has the right to resign Executive's employment for "**Good Reason**" due to occurrence of any of the following: (i) a material adverse change in Executive's title, duties, or responsibilities; (ii) any material reduction by the Company of Executive's base compensation; (iii) the Company creates a work environment designed to constructively terminate Executive, to unlawfully harass or retaliate against Executive, or directs Executive to engage in any conduct violative of professional medical ethics, any law or regulation applicable to the Company's business; (iv) any material change to the geographic location of Executive's principal place of employment that increases Executive's one-way commute by at least 35 miles as compared to Executive's then-current place of employment prior to such relocation; or (v) any material breach by the Company of this Agreement or any other written agreement between the Parties. No resignation will be treated as a resignation with Good Reason unless (x) the Executive has given written notice to the Company of his intention to terminate employment for Good Reason, describing the grounds for such action, within ninety (90) days after the first occurrence of such circumstances, (y) the Executive has provided the Company with at least thirty (30) days in which to cure the circumstances, and (z) if the Company fails to cure the circumstances, Executive ends his employment within 30 days following the cure period in (y). In the event that Executive terminates his employment for Good Reason, then Executive shall be entitled to receive the Accrued Amounts and Severance Payment, as if Executive were terminated by the Company without Cause under Section 7.2, subject to Executive's compliance with all of the Severance Conditions. For the avoidance of doubt, if Executive's resignation for Good Reason occurs within six (6) months before or twelve (12) months after a Change of Control, in addition to any other applicable benefits, Executive will also be entitled to receive the Accelerated Vesting provided under Section 7.3.

7.5 Application of Section 409A.

7.5(a) Notwithstanding anything set forth in this Agreement to the contrary, no amount payable pursuant to this Agreement which constitutes a “deferral of compensation” within the meaning of Section 409A of the Code (the “Code”) and the Treasury Department regulations thereunder (the “Section 409A”) shall be paid unless and until Executive has incurred a “separation from service” within the meaning of the Section 409A.

7.5(b) The parties intend that income provided to Executive pursuant to this Agreement will not be subject to taxation under Section 409A. The provisions of this Agreement shall be interpreted and construed in favor of satisfying any applicable requirements of Section 409A. However, the Company does not guarantee any particular tax effect for income provided to Executive pursuant to this Agreement. In any event, except for the Company’s responsibility to withhold applicable income and employment taxes from compensation paid or provided to Executive, the Company shall not be responsible for the payment of any applicable taxes on compensation paid or provided to Executive pursuant to this Agreement.

7.5(c) Furthermore, to the extent that Executive is a “specified employee” within the meaning of the Section 409A as of the date of Executive’s separation from service, no amount that constitutes a deferral of compensation that is payable on account of Executive’s separation from service shall be paid to Executive before the date that is first day of the seventh month after the date of Executive’s separation from service (the “**Delayed Payment Date**”) or, if earlier, the date of Executive’s death following such separation from service. All such amounts that would, but for this Section, become payable prior to the Delayed Payment Date will be accumulated and paid on the Delayed Payment Date.

7.5(d) Notwithstanding anything herein to the contrary, the reimbursement of expenses or in-kind benefits provided pursuant to this Agreement shall be subject to the following conditions: (i) the expenses eligible for reimbursement or in-kind benefits in one taxable year shall not affect the expenses eligible for reimbursement or in-kind benefits in any other taxable year; (ii) the reimbursement of eligible expenses or in-kind benefits shall be made promptly, subject to the Company’s applicable policies, but in no event later than the end of the year after the year in which such expense was incurred; and (iii) the right to reimbursement or in-kind benefits shall not be subject to liquidation or exchange for another benefit.

7.5(e) For purposes of Section 409A, the right to a series of installment payments under this Agreement shall be treated as a right to a series of separate payments.

7.5(f) If either Executive or Company reasonably determines that any payment or benefits hereunder will violate Section 409A, Executive and the Company will use best efforts to restructure the payment or benefits in a manner that is either exempt from or compliant with Section 409A. Executive and the Company agree that they will execute any and all amendments to this Agreement as may be necessary to ensure compliance with the distribution provisions of Section 409A in an effort to avoid or minimize, to the extent allowable by law, the tax (and any interest or penalties thereon) associated with Section 409A. If it is determined that a payment or other benefits under this Agreement was (or may be) provided in violation of Section 409A, the

Company will cooperate reasonably with any effort by Executive to mitigate the tax consequences of such violation, including cooperation with Executive's participation in any IRS voluntary compliance program or other correction procedure under Section 409A that may be available to Executive.

7.6 Application of Section 280G.

7.6(a) Notwithstanding anything to the contrary in this Agreement or otherwise, to the extent that any of the payments and benefits provided under this Agreement or any other agreement or arrangement between Executive and the Company (collectively, the "**Payments**") (i) constitute a "excess parachute payment" within the meaning of Section 280G of the Code and (ii) but for the provisions herein, would be subject to the excise tax imposed by Section 4999 of the Code, then the Payments shall be reduced to the extent necessary so that no portion of such Payments retained by Executive shall be subject to excise tax under Section 4999 of the Code; provided, however, such reduction shall only occur if, after taking into account the applicable federal, state and local income taxes and the excise tax imposed by Section 4999, such reduction results in Executive's receipt on an after-tax basis, of the greatest amount of benefits under this Agreement or otherwise, notwithstanding that all or some portion of such benefits may be taxable under Section 4999 of the Code. In the event of a determination that such reduction is to take place, reduction shall occur in the following order: first, reduction of cash payments, which shall occur in reverse chronological order such that the cash payment owed on the latest date following the occurrence of the event triggering such excise tax will be the first cash payment to be reduced; second, cancellation of accelerated vesting of equity awards, which shall occur in the reverse order of the date of grant for such stock awards (i.e., the vesting of the most recently granted stock awards will be reduced first); and third, reduction of other employee benefits, which shall occur in reverse chronological order such that the benefit owed on the latest date following the occurrence of the event triggering such excise tax will be the first benefit to be reduced. If two or more equity awards are granted on the same date, each award will be reduced on a pro-rata basis.

7.6(b) Unless Executive and Company otherwise agree in writing, any determination required under the provisions herein shall be made in writing by Company's independent public accountants or other professional tax or law firm (the "**Accountants**"), whose determination shall be conclusive and binding on Executive and the Company for all purposes. For purposes of making the calculations required by the provisions herein, the Accountants may make reasonable assumptions and approximations concerning applicable taxes and may rely in reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. Executive and Company will furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under the provisions herein. Company will bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by the provisions herein. If the limitation set forth in this and the above paragraph are applied to reduce an amount payable to Executive, and the Internal Revenue Service successfully asserts that, despite the reduction, Executive has nonetheless received payments that are in excess of the maximum amount that could have been paid to Executive without being subjected to any excise tax, then, unless it would be unlawful for Company to make such a loan or similar extension of credit to Executive, Executive may repay such excess amount to Company as though such amount constitutes a loan to Executive made at the date of payment of such excess

amount, bearing interest at 120% of the applicable federal rate (as determined under Section 1274(d) of the Code in respect of such loan).

8. Employment and Post-Employment Covenants.

8.1 Non-Solicitation. Executive agrees that during a period of twelve (12) months following the termination of the Executive's employment (the "**Restrictive Period**"), Executive shall not (a) solicit or in any manner encourage, either directly or indirectly, any existing employee of the Company to leave the Company for any reason; nor will he interfere in any other manner with the employment or business relationships at the time existing between the Company and its current or prospective employees or consultants; or (b) induce or attempt to induce any customer, supplier, distributor, licensee or other business affiliate of the Company to cease doing business with the Company or in any way interfere with the existing business relationship between any customer, supplier, distributor, licensee or other business affiliate and the Company. Notwithstanding anything to the contrary herein, the Parties agree that Executive's social media postings to the general public not directed towards existing Company employees, customers, suppliers, distributors, licensees or other business affiliates would not constitute a breach of this Section 8.1.

8.2 Non-Disparagement. Executive agrees, at all times following the Effective Date, not to, directly or indirectly, on his behalf or on behalf of any other person or entity, (a) take any action which is intended, or could reasonably be expected, to harm, disparage, defame, slander, or lead to unwanted or unfavorable publicity for the Company, its subsidiaries or any of their respective subsidiaries, or its or their respective affiliates, equity holders, directors, officers, members, managers, partners, employees, representatives or agents, heirs, predecessors, successors or assigns, or otherwise take any action which could reasonably be expected to detrimentally affect the reputation, image, relationships or public view of any such person or entity, or (b) attempt to do any of the foregoing, or assist, entice, induce or encourage any other person or entity to do or attempt to do any activity which, were it done by the Executive, would violate any provision of this Section 8.2; provided, however, that Executive shall not be prohibited by this Section 8.2 from making truthful statements (i) when required by subpoena, notice or order of a court or other body of competent jurisdiction or as required by law, (ii) solely within the context of seeking judicial enforcement of legal or contractual rights against a person or entity, or (iii) as otherwise permitted by this Agreement, the EPIIA, or any other agreement between the Parties.

8.3 Remedies. Executive acknowledges that the duration of the Restrictive Period is fair and is reasonably required for the protection of the Company's business interests, including its goodwill. The Executive (a) acknowledges that his failure to comply with any requirement of this Section 8 this Agreement will cause the Company irreparable harm and that a remedy at law for such a failure would be an inadequate remedy; and (b) consents to the Company's obtaining from a court having jurisdiction specific performance, an injunction, a restraining order or any other equitable relief in order to enforce any such provision. The right to obtain such equitable relief shall be in addition to, and not in lieu of, any other remedy to which the Company is entitled under applicable law (including, but not limited to, monetary damages).

9. General Provisions.

9.1 Successors and Assigns. The rights and obligations of the Company under this Agreement shall inure to the benefit of, be enforceable by and shall be binding upon the successors, heirs, administrators and assigns of the Company and Executive; provided, however, that Executive shall not be entitled to assign any of Executive's rights or obligations under this Agreement.

9.2 Waiver. Either party's failure to enforce any provision of this Agreement shall not in any way be construed as a waiver of any such provision, or prevent that party thereafter from enforcing each and every other provision of this Agreement.

9.3 Attorney's Fees. In the event of any dispute or claim relating to or arising out of Executive's employment relationship with Company, this Agreement, or the termination of Executive's employment with Company for any reason, in addition to any other available relief, the prevailing party in any such dispute or claim shall be entitled to recover its reasonable attorney's fees and costs.

9.4 Severability. In the event any provision of this Agreement is found to be unenforceable by an arbitrator or court of competent jurisdiction, such provision shall be deemed modified to the extent necessary to allow enforceability of the provision as so limited, it being intended that the parties shall receive the benefit contemplated herein to the fullest extent permitted by law. If a deemed modification is not satisfactory in the judgment of such arbitrator or court, the unenforceable provision shall be deemed deleted, and the validity and enforceability of the remaining provisions shall not be affected thereby.

9.5 Interpretation; Construction; Counterparts. The headings set forth in this Agreement are for convenience only and shall not be used in interpreting this Agreement. Executive has participated in the negotiation of the terms of this Agreement. Furthermore, Executive acknowledges that Executive has had an opportunity to review and revise the Agreement and have it reviewed by legal counsel, if desired, and, therefore, the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement. This Agreement may be executed in counterparts and by facsimile, pdf/email or other electronic means and, when so executed, shall be considered one and the same instrument, have the same force and effect as an original, and constitute an effective, binding agreement on the part of each of the Parties.

9.6 Governing Law. This Agreement will be governed by and construed in accordance with the laws of the United States and the internal laws of the State of California, without regard to any conflict of law rules. Notwithstanding anything to the contrary in any other agreement between the Parties, the sole and exclusive jurisdiction and venue for any and all disputes of any kind between the Parties and/or any of their respective affiliates, successors, heirs or assigns shall be the state and federal court sitting in San Mateo County, California and the Parties expressly consent and waive any objections to such jurisdiction and venue.

9.7 Notices. Any notice required or permitted by this Agreement shall be in writing and shall be delivered as follows with notice deemed given as indicated: (a) by personal

delivery when delivered personally; (b) by overnight courier upon written verification of receipt; (c) by telecopy, facsimile transmission, or electronic transmission such as e-mail, upon acknowledgment of receipt of electronic transmission; or (d) by certified or registered mail, return receipt requested, upon verification of receipt. Notice shall be sent to the addresses set forth below each party's signature, or such other address as either party may specify in writing.

9.8 Entire Agreement. This Agreement constitutes the entire agreement between the Parties relating to this subject matter and supersedes all prior or contemporaneous representations, discussions, negotiations, and agreements, whether written or oral. This Agreement may be amended or modified only with the written consent of Executive and the Company. No oral waiver, amendment or modification will be effective under any circumstances whatsoever.

THE PARTIES TO THIS AGREEMENT HAVE READ THE FOREGOING AGREEMENT AND FULLY UNDERSTAND EACH AND EVERY PROVISION CONTAINED HEREIN. WHEREFORE, THE PARTIES HAVE EXECUTED THIS AGREEMENT AS SHOWN BELOW.

[Execution Page Follows]

EXECUTIVE:

By: /s/ Friedrich-Reinhard Graf Finck von Finckenstein

Friedrich-Reinhard Graf Finck von Finckenstein, M.D.

COMPANY:

Iovance Biotherapeutics, Inc.

By: /s/ Maria Fardis

Maria Fardis, Ph.D., M.B.A.
President & Chief Executive Officer
999 Skyway Road, Suite 150
San Carlos, CA 94070

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Exhibit 31.1

CERTIFICATION

I, Maria Fardis, Chief Executive Officer of Iovance Biotherapeutics, Inc., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Iovance Biotherapeutics, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. I am responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under my supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under my supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report my conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. I have disclosed, based on my most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting

which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

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

Dated: August 1, 2019

By: /s/ Maria Fardis
Maria Fardis
Chief Executive Officer

Exhibit 31.2

CERTIFICATION

I, Timothy E. Morris, Chief Financial Officer of Iovance Biotherapeutics, Inc., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Iovance Biotherapeutics, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. I am responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under my supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under my supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report my conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. I have disclosed, based on my most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: August 1, 2019

By: /s/ Timothy E. Morris
Timothy E. Morris
Chief Financial Officer (Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO

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

In connection with the Quarterly Report on Form 10-Q of Iovance Biotherapeutics, Inc. (the "Company") for the quarter ended June 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Maria Fardis, Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: August 1, 2019

By: /s/ Maria Fardis
Maria Fardis
Chief Executive Officer

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

Exhibit 32.2

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

In connection with the Quarterly Report on Form 10-Q of Iovance Biotherapeutics, Inc. (the "Company") for the quarter ended June 30, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Timothy E Morris, Chief Financial Officer of the Company, hereby certifies, pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: August 1, 2019

By: /s/ Timothy E. Morris
Timothy E. Morris
Chief Financial Officer (Principal Financial Officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.
