

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549**

FORM 10-Q

(Mark One)

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

For the quarterly period ended **June 30, 2019**

OR

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

For the transition period from _____ to _____

Commission File Number: **001-38957**

ADAPTIVE BIOTECHNOLOGIES CORPORATION

(Exact Name of Registrant as Specified in its Charter)

Washington

(State or other jurisdiction of
incorporation or organization)

1551 Eastlake Avenue East, Suite 200

Seattle, Washington

(Address of principal executive offices)

27-0907024

(I.R.S. Employer
Identification No.)

98102

(Zip Code)

Registrant's telephone number, including area code: (206) 659-0067

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 \$0.0001 per share	ADPT	The NASDAQ Stock Market LLC

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input checked="" type="checkbox"/>

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

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

As of July 31, 2019, the registrant had 124,287,992 shares of common stock, \$0.0001 par value per share, outstanding.

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Adaptive Biotechnologies Corporation

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This report contains forward-looking statements that are based on management's beliefs and assumptions and on information currently available to management. All statements contained in this report other than statements of historical fact are forward-looking statements, including statements regarding our ability to develop, commercialize and achieve market acceptance of our current and planned products and services, our research and development efforts, and other matters regarding our business strategies, use of capital, results of operations and financial position, and plans and objectives for future operations. In some cases, you can identify forward-looking statements by the words "may," "will," "could," "would," "should," "expect," "intend," "plan," "anticipate," "believe," "estimate," "predict," "project," "potential," "continue," "ongoing" or the negative of these terms or other comparable terminology, although not all forward-looking statements contain these words. These statements involve risks, uncertainties and other factors that may cause actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. These risks, uncertainties and other factors are described under "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and elsewhere in this report and in other documents we file with the Securities and Exchange Commission from time to time. We caution you that forward-looking statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. As a result, the forward-looking statements may not prove to be accurate. The forward-looking statements in this report represent our views as of the date of this report. We undertake no obligation to update any forward-looking statements for any reason, except as required by law.

Unless otherwise stated or the context otherwise indicates, references to "we," "us," "our" and similar references refer to Adaptive Biotechnologies Corporation.

Adaptive Biotechnologies Corporation
PART I—FINANCIAL INFORMATION

Item 1. Financial Statements (Unaudited)

Condensed Balance Sheets
(in thousands, except share and per share amounts)

	June 30, 2019	December 31, 2018
	(unaudited)	
Assets		
Current assets		
Cash and cash equivalents	\$ 48,458	\$ 55,030
Short-term marketable securities	374,543	109,988
Accounts receivable, net	7,252	4,807
Inventory	8,004	7,838
Prepaid expenses and other current assets	4,044	3,055
Total current assets	<u>442,301</u>	<u>180,718</u>
Long-term assets		
Property and equipment, net	22,298	19,125
Restricted cash and other assets	5,040	247
Intangible assets, net	12,784	13,626
Goodwill	118,972	118,972
Total assets	<u>\$ 601,395</u>	<u>\$ 332,688</u>
Liabilities, convertible preferred stock and shareholders' deficit		
Current liabilities		
Accounts payable	\$ 2,944	\$ 1,793
Accrued liabilities	5,019	2,562
Accrued compensation and benefits	4,429	4,641
Current portion of deferred rent	1,276	1,109
Current deferred revenue	61,194	12,695
Total current liabilities	<u>74,862</u>	<u>22,800</u>
Long-term liabilities		
Convertible preferred stock warrant liability	2,602	336
Deferred rent liability, less current portion	5,455	6,102
Deferred revenue, less current portion	240,919	704
Total liabilities	<u>323,838</u>	<u>29,942</u>
Commitments and contingencies (Note 8)		
Convertible preferred stock: \$0.0001 par value, 93,762,517 shares authorized at June 30, 2019 and December 31, 2018, respectively; 93,039,737 and 92,790,094 shares issued and outstanding at June 30, 2019 and December 31, 2018, respectively; aggregate liquidation preference of \$574,374 and \$572,866 at June 30, 2019 and December 31, 2018, respectively	561,931	560,858
Shareholders' deficit		
Common stock: \$0.0001 par value, 131,000,000 shares authorized at June 30, 2019 and December 31, 2018, respectively; 13,725,381 and 12,841,536 shares issued and outstanding at June 30, 2019 and December 31, 2018, respectively	1	1
Additional paid-in capital	46,160	37,902
Accumulated other comprehensive gain (loss)	382	(107)
Accumulated deficit	(330,917)	(295,908)
Total shareholders' deficit	<u>(284,374)</u>	<u>(258,112)</u>
Total liabilities, convertible preferred stock and shareholders' deficit	<u>\$ 601,395</u>	<u>\$ 332,688</u>

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

Adaptive Biotechnologies Corporation
Condensed Statements of Operations
(in thousands, except share and per share amounts)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
	(unaudited)			
Revenue				
Sequencing revenue	\$ 11,865	\$ 8,281	\$ 17,948	\$ 14,061
Development revenue	10,273	3,287	16,856	7,222
Total revenue	<u>22,138</u>	<u>11,568</u>	<u>34,804</u>	<u>21,283</u>
Operating expenses				
Cost of revenue	5,734	5,044	10,722	9,033
Research and development	16,527	9,452	29,010	18,307
Sales and marketing	8,897	5,329	16,714	10,376
General and administrative	6,662	4,632	13,666	9,175
Amortization of intangible assets	423	424	842	843
Total operating expenses	<u>38,243</u>	<u>24,881</u>	<u>70,954</u>	<u>47,734</u>
Loss from operations	(16,105)	(13,313)	(36,150)	(26,451)
Interest and other income, net	446	820	2,105	1,567
Net loss	(15,659)	(12,493)	(34,045)	(24,884)
Fair value adjustment to Series E-1 convertible preferred stock options	(710)	(2)	(964)	2
Net loss attributable to common shareholders	<u>\$ (16,369)</u>	<u>\$ (12,495)</u>	<u>\$ (35,009)</u>	<u>\$ (24,882)</u>
Net loss per share attributable to common shareholders, basic and diluted	<u>\$ (1.23)</u>	<u>\$ (1.01)</u>	<u>\$ (2.68)</u>	<u>\$ (2.02)</u>
Weighted-average shares used in computing net loss per share attributable to common shareholders, basic and diluted	<u>13,279,324</u>	<u>12,385,888</u>	<u>13,074,692</u>	<u>12,334,227</u>

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

Adaptive Biotechnologies Corporation
Condensed Statements of Comprehensive Loss
(in thousands)

	<u>Three Months Ended June 30,</u>		<u>Six Months Ended June 30,</u>	
	<u>2019</u>	<u>2018</u>	<u>2019</u>	<u>2018</u>
	(unaudited)			
Net loss	\$ (15,659)	\$ (12,493)	\$ (34,045)	\$ (24,884)
Change in unrealized gain (loss) on investments	290	43	489	(74)
Comprehensive loss	<u>\$ (15,369)</u>	<u>\$ (12,450)</u>	<u>\$ (33,556)</u>	<u>\$ (24,958)</u>

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

Adaptive Biotechnologies Corporation

Condensed Statements of Convertible Preferred Stock and Shareholders' Deficit
(in thousands, except share amounts)

	Convertible preferred stock		Common stock		Additional paid-in capital	Accumulated other comprehensive (loss) income	Accumulated deficit	Total shareholders' deficit
	Shares	Amount	Shares	Amount				
Balance as of March 31, 2018 (unaudited)	92,745,734	\$ 561,396	12,301,844	\$ 1	\$ 28,620	\$ (283)	\$ (261,950)	\$ (233,612)
Issuance of common stock for cash upon exercise of stock options (unaudited)	—	—	245,000	—	415	—	—	415
Issuance of Series E-1 convertible preferred stock for cash upon exercise of Series E-1 convertible preferred stock options at fair value (unaudited)	44,360	35	—	—	—	—	—	—
Vested Series E-1 convertible preferred stock option forfeitures (unaudited)	—	(767)	—	—	476	—	291	767
Series E-1 convertible preferred stock option share-based compensation (unaudited)	—	—	—	—	1	—	—	1
Adjustment to redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	1	—	—	(1)	—	—	(1)
Change in redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	2	—	—	—	—	(2)	(2)
Common stock option share-based compensation (unaudited)	—	—	—	—	2,447	—	—	2,447
Other comprehensive income (unaudited)	—	—	—	—	—	43	—	43
Net loss (unaudited)	—	—	—	—	—	—	(12,493)	(12,493)
Balance as of June 30, 2018 (unaudited)	<u>92,790,094</u>	<u>\$ 560,667</u>	<u>12,546,844</u>	<u>\$ 1</u>	<u>\$ 31,958</u>	<u>\$ (240)</u>	<u>\$ (274,154)</u>	<u>\$ (242,435)</u>
Balance as of March 31, 2019 (unaudited)	93,023,694	\$ 561,210	12,930,536	\$ 1	\$ 40,981	\$ 92	\$ (314,548)	\$ (273,474)
Issuance of common stock for cash upon exercise of stock options (unaudited)	—	—	794,845	—	1,847	—	—	1,847
Issuance of Series E-1 convertible preferred stock for cash upon exercise of Series E-1 convertible preferred stock options at fair value (unaudited)	16,043	11	—	—	—	—	—	—
Change in redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	710	—	—	—	—	(710)	(710)
Common stock option share-based compensation (unaudited)	—	—	—	—	3,332	—	—	3,332
Other comprehensive income (unaudited)	—	—	—	—	—	290	—	290
Net loss (unaudited)	—	—	—	—	—	—	(15,659)	(15,659)
Balance as of June 30, 2019 (unaudited)	<u>93,039,737</u>	<u>\$ 561,931</u>	<u>13,725,381</u>	<u>\$ 1</u>	<u>\$ 46,160</u>	<u>\$ 382</u>	<u>\$ (330,917)</u>	<u>\$ (284,374)</u>

Adaptive Biotechnologies Corporation

Condensed Statements of Convertible Preferred Stock and Shareholders' Deficit (Continued)

(in thousands, except share amounts)

Balance as of December 31, 2017	92,656,029	\$ 561,333	12,208,731	\$ 1	\$ 24,972	\$ (166)	\$ (249,423)	\$ (224,616)
Adjustments to accumulated deficit for adoption of guidance on accounting for share-based payment transactions (unaudited)	—	—	—	—	140	—	(140)	—
Issuance of common stock for cash upon exercise of stock options (unaudited)	—	—	338,113	—	823	—	—	823
Issuance of Series E-1 convertible preferred stock for cash upon exercise of Series E-1 convertible preferred stock options at fair value (unaudited)	134,065	100	—	—	—	—	—	—
Vested Series E-1 convertible preferred stock option forfeitures (unaudited)	—	(767)	—	—	476	—	291	767
Series E-1 convertible preferred stock option share-based compensation (unaudited)	—	—	—	—	3	—	—	3
Adjustment to redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	3	—	—	(3)	—	—	(3)
Change in redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	(2)	—	—	—	—	2	2
Common stock option share-based compensation (unaudited)	—	—	—	—	5,547	—	—	5,547
Other comprehensive loss (unaudited)	—	—	—	—	—	(74)	—	(74)
Net loss (unaudited)	—	—	—	—	—	—	(24,884)	(24,884)
Balance as of June 30, 2018 (unaudited)	<u>92,790,094</u>	<u>\$ 560,667</u>	<u>12,546,844</u>	<u>\$ 1</u>	<u>\$ 31,958</u>	<u>\$ (240)</u>	<u>\$ (274,154)</u>	<u>\$ (242,435)</u>
Balance as of December 31, 2018	92,790,094	\$ 560,858	12,841,536	\$ 1	\$ 37,902	\$ (107)	\$ (295,908)	\$ (258,112)
Issuance of common stock for cash upon exercise of stock options (unaudited)	—	—	883,845	—	1,880	—	—	1,880
Issuance of Series E-1 convertible preferred stock for cash upon exercise of Series E-1 convertible preferred stock options at fair value (unaudited)	249,643	109	—	—	—	—	—	—
Change in redemption value for vested Series E-1 convertible preferred stock options (unaudited)	—	964	—	—	—	—	(964)	(964)
Common stock option share-based compensation (unaudited)	—	—	—	—	6,378	—	—	6,378
Other comprehensive income (unaudited)	—	—	—	—	—	489	—	489
Net loss (unaudited)	—	—	—	—	—	—	(34,045)	(34,045)
Balance as of June 30, 2019 (unaudited)	<u>93,039,737</u>	<u>\$ 561,931</u>	<u>13,725,381</u>	<u>\$ 1</u>	<u>\$ 46,160</u>	<u>\$ 382</u>	<u>\$ (330,917)</u>	<u>\$ (284,374)</u>

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

Adaptive Biotechnologies Corporation

Condensed Statements of Cash Flows
(in thousands)

	Six Months Ended June 30,	
	2019	2018
	(unaudited)	
Operating activities		
Net loss	\$ (34,045)	\$ (24,884)
Adjustments to reconcile net loss to net cash provided by (used in) operating activities:		
Depreciation expense	2,811	2,099
Share-based compensation expense	6,378	5,550
Intangible assets amortization	842	843
Investment amortization	(1,896)	(459)
Gain on equipment disposals	(79)	(41)
Fair value adjustment of convertible preferred stock warrant	2,266	—
Other	1	3
Changes in operating assets and liabilities:		
Accounts receivable, net	(2,445)	1,165
Inventory	(166)	(2,921)
Prepaid expenses and other current assets	(883)	(364)
Accounts payable and accrued liabilities	1,314	(1,013)
Deferred rent	(480)	(359)
Deferred revenue	288,714	5,425
Other	1	(207)
Net cash provided by (used in) operating activities	<u>262,333</u>	<u>(15,163)</u>
Investing activities		
Purchases of property and equipment	(5,354)	(1,614)
Proceeds from sales of equipment	—	19
Purchases of marketable securities	(358,671)	(110,947)
Proceeds from maturities of marketable securities	96,500	80,516
Net cash used in investing activities	<u>(267,525)</u>	<u>(32,026)</u>
Financing activities		
Proceeds from exercise of stock options	1,989	923
Payment of deferred initial public offering costs	(3,360)	—
Other	(9)	(10)
Net cash (used in) provided by financing activities	<u>(1,380)</u>	<u>913</u>
Net decrease in cash, cash equivalents and restricted cash	(6,572)	(46,276)
Cash, cash equivalents and restricted cash at beginning of year	55,091	85,366
Cash, cash equivalents and restricted cash at end of period	<u>\$ 48,519</u>	<u>\$ 39,090</u>
Noncash investing and financing activities		
Purchases of equipment included in accounts payable and accrued liabilities	<u>\$ 1,490</u>	<u>\$ 535</u>
Deferred offering costs included in accounts payable and accrued expenses	<u>\$ 1,433</u>	<u>\$ —</u>

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

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements

1. Organization and Description of Business

Adaptive Biotechnologies Corporation (“we,” “us” or “our”) is a commercial-stage company advancing the field of immune-driven medicine by harnessing the inherent biology of the adaptive immune system to transform the diagnosis and treatment of disease. We believe the adaptive immune system is nature’s most finely tuned diagnostic and therapeutic for most diseases, but the inability to decode it has prevented the medical community from fully leveraging its capabilities. Our immune medicine platform is the foundation for our expanding suite of products and services. The cornerstone of our immune medicine platform and core immunosequencing product, immunoSEQ, serves as our underlying research and development engine and generates revenue from academic and biopharmaceutical customers. Our first clinical diagnostic product, clonoSEQ, is the first test authorized by the Food and Drug Administration (“FDA”) for the detection and monitoring of minimal residual disease (“MRD”) in patients with select blood cancers.

We were incorporated in the State of Washington on September 8, 2009 under the name Adaptive TCR Corporation. On December 21, 2011, we changed our name to Adaptive Biotechnologies Corporation. We are headquartered in Seattle, Washington.

Initial Public Offering

Our registration statement on Form S-1 related to our initial public offering (“IPO”) was declared effective on June 26, 2019, and our common stock began trading on the Nasdaq Global Select Market on June 27, 2019. On July 1, 2019, we completed our IPO in which we issued and sold 17,250,000 shares of common stock, including shares issued upon the exercise in full of the underwriters’ over-allotment option, at a public offering price of \$20.00. We received approximately \$316.0 million in net proceeds, after deducting underwriting discounts and commission of approximately \$24.2 million and offering expenses of approximately \$4.8 million.

Immediately prior to the completion of our IPO on July 1, 2019, 93,039,737 shares of convertible preferred stock then outstanding converted into an equivalent number of shares of common stock. On July 1, 2019, in connection with the closing of our IPO, our amended and restated articles of incorporation, as filed with the Secretary of State of the State of Washington, and our amended and restated bylaws became effective. Also on July 1, 2019, we adopted a new equity incentive plan (“2019 Plan”), establishing an initial reserve of 15,519,170 shares under the 2019 Plan.

The condensed financial statements as of June 30, 2019, including share and per share amounts, do not give effect to our IPO as it closed subsequent to June 30, 2019.

2. Significant Accounting Policies

Basis of Presentation and Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles (“GAAP”) requires management to make certain estimates, judgments and assumptions that affect the reported amounts of assets and liabilities and the related disclosures at the date of the financial statements, as well as the reported amounts of revenues and expenses during the periods presented. We base our estimates on historical experience and other relevant assumptions that we believe to be reasonable under the circumstances. Estimates are used in several areas including, but not limited to, estimates of progress to date for certain performance obligations and the transaction price for certain contracts with customers, share-based compensation including the fair value of stock, and the provision for income taxes, including related reserves, and goodwill, among others. These estimates generally involve complex issues and require judgments, involve the analysis of historical results and prediction of future trends, can require extended periods of time to resolve and are subject to change from period to period. Actual results may differ materially from management’s estimates.

Unaudited Interim Condensed Financial Statements

In our opinion, the accompanying unaudited condensed financial statements have been prepared in accordance with GAAP for interim financial information. These unaudited condensed financial statements include all adjustments necessary to fairly state the financial position and the results of our operations and cash flows for interim periods in accordance with GAAP. Interim-period results are not necessarily indicative of results of operations or cash flows for a full year or any subsequent interim period.

The accompanying condensed financial statements should be read in conjunction with our audited financial statements and notes included in our prospectus dated June 26, 2019 filed with the Securities and Exchange Commission (“SEC”) on June 27, 2019 in connection with our IPO (“Prospectus”).

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

Cash and Cash Equivalents

Cash and cash equivalents are stated at fair value. Cash equivalents include only securities having an original maturity of three months or less at the time of purchase. We limit our credit risk associated with cash and cash equivalents by placing our investments with banks that we believe are highly creditworthy and with highly rated money market funds. Cash and cash equivalents primarily consist of bank deposits and investments in money market funds, as well as highly liquid U.S. government debt and agency securities and commercial paper with original maturities of three months or less.

Concentrations of Risk

We are subject to a concentration of risk from a limited number of suppliers, or in some cases, single suppliers for some of our laboratory instruments and materials. This risk is managed by targeting a quantity of surplus stock.

Cash, cash equivalents and marketable securities are financial instruments that potentially subject us to concentrations of credit risk. We invest in money market funds, U.S. government debt securities, U.S. government agency bonds, commercial paper and corporate bonds with high-quality accredited financial institutions.

Significant customers are those which represent more than 10% of our total revenue or accounts receivable balance at each respective balance sheet date. Revenue from these customers reflects their purchase of our products and services and we do not believe their loss would have a material adverse effect on our business.

For each significant customer, revenue as a percentage of total revenue and accounts receivable, net as a percentage of total accounts receivable, net were as follows:

	Revenue				Accounts Receivable, Net	
	Three Months Ended June 30,		Six Months Ended June 30,		June 30,	December 31,
	2019	2018	2019	2018	2019	2018
	(unaudited)		(unaudited)		(unaudited)	
Customer A	12.7%	25.5%	*%	26.4%	32.7%	*%
Customer B	*	11.0	*	*	*	15.1
Customer C	*	*	*	*	*	13.2
Genentech, Inc.	40.0	*	43.6	*	*	*

* less than 10%

Revenue Recognition

We recognize revenue in accordance with Accounting Standards Codification (“ASC”) Topic 606 (“ASC 606”), *Revenue from Contracts with Customers*. Under ASC 606, for all revenue-generating contracts, we perform the following steps to determine the amount of revenue to be recognized: (i) identify the contract or contracts; (ii) determine whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measure the transaction price, including the constraint on variable consideration; (iv) allocate the transaction price to the performance obligations based on estimated selling prices; and (v) recognize revenue when (or as) we satisfy each performance obligation. The following is a summary of the application of the respective model to each of our revenue classifications.

Overview

Our revenue is generated from immunosequencing (“sequencing”) products and services (“sequencing revenue”) and from regulatory or development support services leveraging our immune medicine platform (“development revenue”). When revenue generating contracts have elements of both sequencing revenue and development revenue, we allocate revenue based on the nature of the performance obligation and the allocated transaction price.

Sequencing Revenue

Sequencing revenue reflects the amounts generated from providing sequencing services and testing through our immunoSEQ and clonoSEQ products and services to our research and clinical customers, respectively.

For research customers, contracts typically include an amount billed in advance of services (“upfront”), and subsequent billings as sample results are delivered to the customer. Upfront amounts received are recorded as deferred revenue, which we recognize as revenue upon satisfaction of performance obligations. We have identified two typical performance obligations under the terms of our

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

research service contracts: sequencing services and related data analysis. We recognize revenue for both identified performance obligations as sample results are delivered to the customer.

For other research customers who choose to purchase a research use only kit, the kits are sold on a price per kit basis with amounts payable upon delivery of the kit. Payments received are recorded as deferred revenue. For these customers, we have identified one performance obligation: the delivery of sample results. We recognize revenue as the results are delivered to the customer based on a proportion of the estimated samples that can be reported on for each kit.

For clinical customers, we derive revenues from providing our clonoSEQ test report to ordering physicians, and we bill and receive payments from commercial third-party payors and medical institutions. In these transactions, we have identified one performance obligation: the delivery of a clonoSEQ report. As payment from the respective payors may vary based on the various reimbursement rates and patient responsibilities, we consider the transaction price to be variable and record an estimate of the transaction price, subject to the constraint for variable consideration, as revenue at the time of delivery. The estimate of transaction price is based on historical reimbursement rates with the various payors, which are monitored in subsequent periods and adjusted as necessary based on actual collection experience.

In January 2019, clonoSEQ received Medicare coverage aligned with the FDA label and National Comprehensive Cancer Network (“NCCN”) guidelines for longitudinal monitoring in multiple myeloma (“MM”) and B cell acute lymphoblastic leukemia (“ALL”). We bill Medicare for an episode of treatment when we deliver the first eligible test results. This billing contemplates all necessary tests required during a patient’s treatment cycle, which is currently estimated at approximately four tests per patient, including the initial sequence identification test. Revenue is recognized at the time the initial billable test result is delivered and is based upon cumulative tests delivered to date. For the three and six months ended June 30, 2019, we recognized \$0.3 million and \$0.8 million relating to the coverage policy, respectively; \$0.1 million and \$0.4 million of this revenue was related to tests delivered in periods prior to the three and six months ended June 30, 2019, respectively. Any unrecognized revenue from the initial billable test is recorded as deferred revenue, and is recognized as we deliver the remaining tests in a patient’s treatment cycle.

Development Revenue

We derive revenue by providing services through development agreements to biopharmaceutical customers who seek access to our immune medicine platform technologies. We generate revenues from the delivery of professional support activities pertaining to the use of our proprietary immunoSEQ and clonoSEQ services in the development of the respective customers’ initiatives. The transaction price for these contracts may consist of a combination of non-refundable upfront fees, separately priced sequencing fees, progress based milestones and regulatory milestones. The development agreements may include single or multiple performance obligations depending on the contract. For certain contracts, we may perform services to support the biopharmaceutical customers’ regulatory submission as part of their registrational trials. These services include regulatory support pertaining to our technology intended to be utilized as part of the submission, development of analytical plans for our sequencing data, participation on joint research committees and assistance in completing a regulatory submission. Generally, these services are not distinct within the context of the contract, and they are accounted for as a single performance obligation.

When sequencing services are separately priced customer options, we assess if a material right exists and, if not, the customer option to purchase additional sequencing services is not considered part of the contract. Except for any non-refundable upfront fees, the other forms of compensation represent variable consideration. Variable consideration related to progress based and regulatory milestones is estimated using the most likely amount method where variable consideration is constrained until it is probable that a significant reversal of cumulative revenue recognized will not occur. Progress milestones such as the first sample result delivered or final patient enrollment in a customer trial are customer dependent and are included in the transaction price when the respective milestone is probable of occurring. Milestone payments that are not within our customers’ control, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. Determining whether regulatory milestone payments are probable is an area that requires significant judgment. In making this assessment, we evaluate the scientific, clinical, regulatory and other risks that must be managed, as well as the level of effort and investment required to achieve the respective milestone.

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

The primary method used to estimate standalone selling price for performance obligations is the adjusted market assessment approach. Using this approach, we evaluate the market in which we sell our services and estimate the price that a customer in that market would be willing to pay for our services. We recognize revenue using either an input or output measure of progress that faithfully depicts performance on a contract, depending on the contract. The measure used is dependent on the nature of the service to be provided in each contract. Selecting the measure of progress and estimating progress to date requires significant judgment.

Deferred Offering Costs

Deferred offering costs consist of fees and expenses incurred in connection with the anticipated sale of our common stock in the IPO, including the legal, accounting, printing and other IPO-related costs. Deferred offering costs of \$4.8 million are capitalized and classified within restricted cash and other assets on the condensed balance sheet as of June 30, 2019.

Net Loss Per Share Attributable to Common Shareholders

We calculate our basic and diluted net loss per share attributable to common shareholders in conformity with the two-class method required for companies with participating securities. We consider our convertible preferred stock to be participating securities. In the event a dividend is declared or paid on common stock, holders of convertible preferred stock are entitled to a share of such dividend in proportion to the holders of common stock on an as-if converted basis. Under the two-class method, basic net loss per share attributable to common shareholders is calculated by dividing the net loss attributable to common shareholders by the weighted-average number of shares of common stock outstanding for the period. Net loss attributable to common shareholders is determined by allocating undistributed earnings between common and preferred shareholders. The diluted net loss per share attributable to common shareholders is computed by giving effect to all potential dilutive common stock equivalents outstanding for the period determined using the treasury stock method. The net loss attributable to common shareholders was not allocated to the convertible preferred stock under the two-class method as the convertible preferred stock does not have a contractual obligation to share in our losses. For purposes of this calculation, convertible preferred stock, stock options and warrants to purchase common stock or convertible preferred stock are considered common stock equivalents but have been excluded from the calculation of diluted net loss per share attributable to common shareholders as their effect is anti-dilutive.

Recently Adopted Accounting Pronouncements

In March 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2016-09, *Compensation—Stock Compensation* (Topic 718), intended to simplify the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities and classification on the statements of cash flows. This guidance also allowed for an entity-wide accounting policy election to either estimate the number of awards that are expected to vest or account for forfeitures as they occur. We adopted this guidance as of January 1, 2018 and elected to account for forfeitures as they occur. We utilized a modified retrospective transition method, recorded the cumulative impact of applying this guidance, and recognized a cumulative increase to additional paid-in capital and an increase to accumulated deficit of \$0.1 million.

In January 2017, the FASB issued ASU No. 2017-04, *Intangibles—Goodwill and Other* (Topic 350): *Simplifying the Test for Goodwill Impairment*, intended to simplify the goodwill impairment test. Under the new guidance, goodwill impairment is measured by the amount by which the carrying value of a reporting unit exceeds its fair value, without exceeding the carrying amount of goodwill allocated to that reporting unit. This guidance is effective January 1, 2022 and is required to be adopted on a prospective basis, with early adoption permitted. We adopted this guidance as of January 1, 2018 and the adoption did not have any impact on our financial statements.

In June 2018, the FASB issued ASU 2018-07, *Compensation—Stock Compensation* (Topic 718): *Improvements to Nonemployee Share-Based Payment Accounting*, which expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. The guidance is effective for us beginning in 2019, with early adoption permitted. We adopted the guidance effective January 1, 2019 and the adoption did not have any impact on our financial statements.

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

New Accounting Pronouncements Not Yet Adopted

In February 2016, the FASB issued ASU No. 2016-02, *Leases* (Topic 842), intended to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheets and disclosing key information about leasing arrangements. This guidance is effective for us in fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. Although we are currently evaluating the impact that adopting this guidance will have on our financial statements, we believe the most significant changes will be related to the recognition of the right-of-use assets and related lease liabilities related to our operating leases on the balance sheets.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments—Credit Losses* (Topic 326): *Measurement of Credit Losses on Financial Instruments*, which amends the impairment model by requiring entities to use a forward-looking approach based on expected losses to estimate credit losses on certain types of financial instruments, including trade receivables and available-for-sale debt securities. The guidance is effective for us beginning in 2020, with early adoption permitted. Although we are currently evaluating the impact that adopting this guidance prospectively will have on our financial statements, we do not expect the adoption to have a material impact on our financial statements.

In August 2018, the FASB issued ASU No. 2018-15, *Intangibles—Goodwill and Other: Internal-Use Software* (Subtopic 350-40), to provide additional guidance on the accounting for costs of implementation activities performed in a cloud computing arrangement. This guidance is effective for fiscal years beginning after December 15, 2019 and early adoption of the amendments in this update are permitted. We do not expect the adoption of this guidance to have a material impact on our financial statements.

3. Revenue

Translational Development Agreements

On December 18, 2015, we entered into a translational development agreement with a biopharmaceutical customer for access to certain of our oncology immunosequencing research datasets, including full-time employee support, to accelerate the customer's preclinical, nonclinical and clinical trial testing. Under the initial terms of the agreement we could be entitled to up to \$40.0 million over a period of four years which does not include any separately negotiated research sequencing contracts. If the biopharmaceutical customer terminates the agreement prior to the end of the initial four-year research term for any reason other than a material uncured breach by us, then the biopharmaceutical partner has agreed to pay us \$0.8 million. In May 2019, the agreement was subsequently amended to reduce the services provided, which in turn reduced the fourth year of eligible payments to \$2.3 million.

We identified one performance obligation under this agreement, as the services were determined to be highly interrelated. We determined that any separately negotiated sequencing contracts are not performance obligations under the contract, as the contract did not contain any material rights related to such sequencing contracts. For the identified performance obligation, we assessed the work to be performed over the duration of the contract and determined that it is a consistent level of support throughout the period, and therefore revenue has been recognized straight-line over the contract term.

Revenue recognized from this translational development agreement, excluding separately negotiated research sequencing contracts, was \$1.1 million and \$2.5 million in the three months ended June 30, 2019 and 2018, respectively, and \$1.1 million and \$5.0 million in the six months ended June 30, 2019 and 2018, respectively.

In 2017, we entered into an agreement with a customer to provide services to accelerate its research initiatives. We identified one performance obligation under the agreement, as the services were determined to be highly interrelated. We determined that any separately negotiated sequencing contracts are not performance obligations under the contract, as the contract did not contain any material rights related to such sequencing contracts. Revenue recognized from this agreement, excluding sequencing revenue, was \$0.1 million and \$0.2 million in the three months ended June 30, 2019 and 2018, respectively, and \$0.2 million and \$0.3 million in the six months ended June 30, 2019 and 2018, respectively.

MRD Development Agreements

In 2017 and 2018, we entered into agreements with biopharmaceutical customers to further develop and commercialize clonoSEQ and the biopharmaceutical customers' therapeutics. Under each of the agreements, we received or will receive non-refundable upfront payments and could receive substantial additional payments upon reaching certain progress milestones or achievement of certain regulatory milestones pertaining to the customers' therapeutic and our clonoSEQ test.

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

Under the contracts, we identify performance obligations, which may include: (i) obligations to provide services supporting the customer's regulatory submission activities as they relate to our clonoSEQ test; and (ii) sequencing services for customer-provided samples for their regulatory submissions. The transaction price allocated to the respective performance obligations is estimated using an adjusted market assessment approach for the regulatory support services and a standalone selling price for the estimated immunosequencing services. At contract inception we fully constrained any consideration related to the regulatory milestones, as the achievement of such milestones is subject to third-party regulatory approval and the customers' own submission decision-making. We recognize revenue relating to the sequencing services over time using an output method based on the proportion of sample results delivered relative to the total amount of sample results expected to be delivered and when expected to be a faithful depiction of progress. We use the same method to recognize the regulatory support services. When an output method based on the proportion of sample results delivered is not expected to be a faithful depiction of progress, we utilize an input method based on estimates of effort completed using a cost-based model.

We recognized \$0.5 million and \$0.6 million in development revenue related to these contracts in the three months ended June 30, 2019 and 2018, respectively, and \$0.8 million and \$1.9 million in the six months ended June 30, 2019 and 2018, respectively.

As of June 30, 2019, in future periods we could receive up to an additional \$115.0 million in milestone payments if certain regulatory approvals are obtained by our customers' therapeutics in connection with MRD data generated from our clonoSEQ test.

Genentech Collaboration Agreement

In December 2018, we entered into a worldwide collaboration and license agreement ("Genentech Agreement") with Genentech, Inc. ("Genentech") to leverage our capability to develop cellular therapies in oncology. Subsequent to receipt of regulatory approval in January 2019, we received a non-refundable upfront payment of \$300.0 million in February 2019 and may be eligible to receive more than \$1.8 billion over time, including payments of up to \$75.0 million upon the achievement of specified regulatory milestones, up to \$300.0 million upon the achievement of specified development milestones and up to \$1,430.0 million upon the achievement of specified commercial milestones. In addition, we are separately able to receive tiered royalties at a rate ranging from the mid-single digits to the mid-teens on aggregate worldwide net sales of products arising from the strategic collaboration, subject to certain reductions, with aggregate minimum floors. Under the agreement, we are pursuing two product development pathways for novel T cell immunotherapies in which Genentech intends to use T cell receptors ("TCRs") screened by our immune medicine platform to engineer and manufacture cellular medicines:

- **Shared Products.** The shared products will use "off-the-shelf" TCRs identified against cancer antigens shared among patients ("Shared Products").
- **Personalized Product.** The personalized product will use patient-specific TCRs identified by real-time screening of TCRs against cancer antigens in each patient ("Personalized Product").

Under the terms of the agreement, we granted Genentech exclusive worldwide licenses to develop and commercialize TCR-based cellular therapies in the field of oncology, including licenses to existing shared antigen data packages. Additionally, Genentech has the right to determine which product candidates to further develop for commercialization purposes. We determined that this arrangement meets the criteria set forth in ASC Topic 808, *Collaborative Arrangements* ("ASC 808"), because both parties are active participants in the activity and are exposed to significant risks and rewards depending on the activity's commercial failure or success. Because ASC 808 does not provide guidance on how to account for the activities under a collaborative arrangement, we applied the guidance in ASC 606 to account for the activities related to the Genentech collaboration.

In applying ASC 606, we identified the following performance obligations at the inception of the agreement:

1. License to utilize on an exclusive basis all TCR-specific platform intellectual property to develop and commercialize any licensed products in the field of oncology.
2. License to utilize all data and information within each shared antigen data package and any other know-how disclosed by us to Genentech in oncology.
3. License to utilize all private antigen TCR product data in connection with research and development activities in the field of use.
4. License to existing shared antigen data packages.
5. Research and development services for shared product development including expansion of shared antigen data packages.
6. Research and development services for private product development.
7. Obligations to participate on various joint research, development and project committees.

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

We determined that none of the licenses, research and development services or obligations to participate on various committees were distinct within the context of the contract given such rights and activities were highly interrelated and there was substantial additional research and development to further develop the licenses. We considered factors such as the stage of development of the respective existing antigen data packages, the subsequent development that would be required to both identify and submit a potential target for investigational new drug acceptance under both product pathways and the variability in research and development pathways given Genentech's control of product commercialization. Specifically, under the agreement, Genentech is not required to pursue development or commercialization activities pertaining to both product pathways and may choose to proceed with one or the other as opposed to both. Accordingly, we determined that all of the identified performance obligations were attributable to one general performance obligation, which is to further the development of our TCR-specific platform, including data packages, and continue to make our TCR identification process available to Genentech to pursue either product pathway.

Separately, we have a responsibility to Genentech to enter into a supply and manufacturing agreement for patient specific TCRs as it pertains to any Personalized Product therapeutic. We determined this was an option right of Genentech should they pursue commercialization of a Personalized Product therapy. Because of the uncertainty as a result of the early stage of development, the novel approach of our collaboration with Genentech and our rights to future commercial milestones and royalty payments, we determined that this option right was not a material right that should be accounted for at inception. As such, we will account for the supply and manufacturing agreement when entered into between the parties.

We determined the initial transaction price shall be made up of only the \$300.0 million upfront, non-refundable payment as all potential regulatory and development milestone payments were probable of significant revenue reversal as their achievement was highly dependent on factors outside our control. As a result, these payments were fully constrained and were not included in the transaction price as of June 30, 2019. We excluded the commercial milestones and potential royalties from the transaction price as those items relate predominantly to the license rights granted to Genentech and will be assessed when and if such events occur.

As there are potential substantive developments necessary, which Genentech may be able to direct, we determined that we would apply a proportional performance model to recognize revenue for our performance obligation. We measure proportional performance using an input method based on costs incurred relative to the total estimated costs of research and development efforts to pursue both the Shared Product and Personalized Product pathways. We currently expect to recognize the revenue over a period of approximately seven to eight years from the effective date. This estimate of the research and development period considers pursuit options of development activities supporting both the Shared Product and the Personalized Product, but may be reduced or increased based on the various activities as directed by the joint committees, decisions made by Genentech, regulatory feedback or other factors not currently known.

We recognized revenue of approximately \$8.5 million and \$14.8 million for the three and six months ended June 30, 2019, respectively, related to the Genentech collaboration. Costs related to the Genentech collaboration are included in research and development expenses.

4. Fair Value Measurements

The following table sets forth the fair value of financial assets and liabilities that were measured at fair value on a recurring basis (in thousands):

	June 30, 2019			
	Level 1	Level 2	Level 3	Total
	(unaudited)			
Financial assets				
Money market funds	\$ 35,695	\$ —	\$ —	\$ 35,695
Commercial paper	—	88,161	—	88,161
U.S. government debt and agency securities	—	273,713	—	273,713
Corporate bonds	—	22,661	—	22,661
Total financial assets	<u>\$ 35,695</u>	<u>\$ 384,535</u>	<u>\$ —</u>	<u>\$ 420,230</u>
Financial liabilities				
Convertible preferred stock warrant liability	\$ —	\$ —	\$ 2,602	\$ 2,602
Total financial liabilities	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 2,602</u>	<u>\$ 2,602</u>

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

	December 31, 2018			
	Level 1	Level 2	Level 3	Total
Financial assets				
Money market funds	\$ 45,998	\$ —	\$ —	\$ 45,998
Commercial paper	—	16,887	—	16,887
U.S. government debt and agency securities	—	85,623	—	85,623
Corporate bonds	—	7,478	—	7,478
Total financial assets	<u>\$ 45,998</u>	<u>\$ 109,988</u>	<u>\$ —</u>	<u>\$ 155,986</u>
Financial liabilities				
Convertible preferred stock warrant liability	\$ —	\$ —	\$ 336	\$ 336
Total financial liabilities	<u>\$ —</u>	<u>\$ —</u>	<u>\$ 336</u>	<u>\$ 336</u>

Level 1 securities include highly liquid money market funds, which we measure the fair value based on quoted prices in active markets for identical assets or liabilities. Level 2 securities consist of U.S. government debt securities, U.S. government agency bonds, commercial paper and corporate bonds, and are valued based on recent trades of securities in inactive markets or based on quoted market prices of similar instruments and other significant inputs derived from or corroborated by observable market data. Of the Level 2 commercial paper and U.S. government debt and agency securities balances, \$6.0 million and \$4.0 million, respectively, is recorded as cash and cash equivalents. Level 3 liabilities that are measured at fair value on a recurring basis consist of a convertible preferred stock warrant liability. During the six months ended June 30, 2019, we recognized \$2.3 million of expense related to the revaluation of the convertible preferred stock warrant liability in interest and other income, net.

The fair value of the convertible preferred stock warrant liability is estimated using the Black-Scholes option-pricing model. Certain inputs were utilized in the option-pricing model as follows:

	June 30, 2019 (unaudited)	December 31, 2018
Fair value estimate	\$ 48.30	\$ 8.27
Expected term (in years)	1.81	2.31
Risk-free interest rate	1.8%	2.5%
Expected volatility	61.1%	55.3%
Expected dividend yield	—	—

5. Investments

Available-for-sale investments consisted of the following as of June 30, 2019 and December 31, 2018 (in thousands):

	June 30, 2019			
	Amortized Cost	Unrealized Gain	Unrealized Loss	Estimated Fair Value
(unaudited)				
Short-term marketable securities				
Commercial paper	\$ 82,165	\$ —	\$ —	\$ 82,165
U.S. government debt and agency securities	269,366	351	(1)	269,716
Corporate bonds	22,630	32	—	22,662
Total short-term marketable securities	<u>\$ 374,161</u>	<u>\$ 383</u>	<u>\$ (1)</u>	<u>\$ 374,543</u>
December 31, 2018				
Short-term marketable securities				
Commercial paper	\$ 16,887	\$ —	\$ —	\$ 16,887
U.S. government debt and agency securities	85,722	—	(99)	85,623
Corporate bonds	7,486	—	(8)	7,478
Total short-term marketable securities	<u>\$ 110,095</u>	<u>\$ —</u>	<u>\$ (107)</u>	<u>\$ 109,988</u>

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

The following table presents the gross unrealized holding losses and fair value for investments in an unrealized loss position, and the length of time that individual securities have been in a continuous loss position, as of June 30, 2019 (in thousands):

	Less Than 12 Months		12 Months Or Greater	
	Fair Value	Unrealized Loss	Fair Value	Unrealized Loss
(unaudited)				
Short-term marketable securities				
U.S. government debt and agency securities	\$ —	\$ —	\$ 4,997	\$ (1)
Total short-term marketable securities	\$ —	\$ —	\$ 4,997	\$ (1)

We evaluated our securities for other-than-temporary impairment and considered the decline in market value for the securities to be primarily attributable to current economic and market conditions. It is not more likely than not that we will be required to sell the securities, and we do not intend to do so prior to the recovery of the amortized cost basis. Based on this analysis, these marketable securities were not considered to be other-than-temporarily impaired as of June 30, 2019.

All the corporate debt, U.S. government and agency securities and commercial paper have an effective maturity date of less than one year.

6. Goodwill and Intangible Assets

There have been no changes in the carrying amount of goodwill since its recognition in 2015.

Intangible assets subject to amortization as of the dates presented consisted of the following (in thousands):

	June 30, 2019		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
(unaudited)			
Acquired developed technology	\$ 20,000	\$ (7,462)	\$ 12,538
Purchased intellectual property	325	(79)	246
Balance at June 30, 2019	\$ 20,325	\$ (7,541)	\$ 12,784

	December 31, 2018		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Acquired developed technology	\$ 20,000	\$ (6,636)	\$ 13,364
Purchased intellectual property	325	(63)	262
Balance at December 31, 2018	\$ 20,325	\$ (6,699)	\$ 13,626

The developed technology was acquired in connection with our acquisition of Sequentia, Inc. (“Sequentia”) in 2015. The remaining balance of the acquired technology and the purchased intellectual property is expected to be amortized over the next approximately 7.5 years.

As of June 30, 2019, expected future amortization expense for intangible assets was as follows (in thousands) (unaudited):

2019	\$ 856
2020	1,698
2021	1,698
2022	1,698
2023	1,698
Thereafter	5,136
Total future amortization expense	\$ 12,784

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

7. Deferred Revenue

Deferred revenue by revenue classification was as follows (in thousands):

	<u>June 30, 2019</u> (unaudited)	<u>December 31, 2018</u>
Current deferred revenue		
Sequencing	\$ 14,616	\$ 11,238
Development	46,578	1,457
Total current deferred revenue	<u>61,194</u>	<u>12,695</u>
Non-current deferred revenue		
Sequencing	493	516
Development	240,426	188
Total non-current deferred revenue	<u>240,919</u>	<u>704</u>
Total current and non-current deferred revenue	<u>\$ 302,113</u>	<u>\$ 13,399</u>

Genentech deferred revenue represents \$45.0 million and \$240.2 million of the current and non-current development deferred revenue balances, respectively, at June 30, 2019. In general, the current amounts will be recognized as revenue within 12 months and the long-term amounts will be recognized as revenue over a period of approximately seven to eight years. This period of time represents an estimate of the research and development period to develop cellular therapies in oncology, which may be reduced or increased based on the various development activities.

Changes in deferred revenue during the six months ended June 30, 2019 were as follows (in thousands):

Deferred revenue balance at December 31, 2018	\$ 13,399
Additions to deferred revenue during the period (unaudited)	308,055
Revenue recognized during the period (unaudited)	(19,341)
Deferred revenue balance at June 30, 2019 (unaudited)	<u>\$ 302,113</u>

As of June 30, 2019, \$4.4 million was recognized that was included in the deferred revenue balance at December 31, 2018. As a result of cancelled customer sequencing contracts, we recognized \$0.8 million of sequencing revenue during the six months ended June 30, 2019.

8. Commitments and Contingencies

Operating Leases

We have entered into various non-cancelable lease agreements for our office and laboratory spaces.

In July 2011, we entered into a non-cancelable lease agreement with a minority shareholder for laboratory and office space in Seattle, Washington. The lease terms were subsequently amended multiple times, most recently in June 2016. The lease terminates in June 2023. The lease also requires us to pay additional amounts for operating and maintenance expenses.

In October 2016, we entered into an agreement to sublease certain laboratory and office space in South San Francisco, California. The lease commenced in October 2016 and terminated in March 2019. The lease required us to pay additional amounts for operating and maintenance expenses.

In April 2018, we entered into a lease agreement to lease additional space in South San Francisco, California. The lease term is through March 2026 and provides for one five-year option. We will be responsible for our share of allocable operating expenses, tax expenses and utilities cost during the duration of the lease term. In connection with the lease, the landlord funded agreed-upon improvements prior to the lease commencement date of December 12, 2018. The landlord was solely responsible for the \$2.4 million cost of such improvements, which we recognized as a leasehold improvement asset that depreciates beginning from the commencement date to the initial lease term, and a corresponding leasehold incentive obligation, which is amortized over the life of the lease.

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

As of June 30, 2019, future minimum lease payments, exclusive of operating and maintenance costs, were as follows (in thousands) (unaudited):

2019	\$	1,781
2020		3,819
2021		3,917
2022		4,017
2023		2,295
Thereafter		2,315
Total future minimum lease payments	\$	<u>18,144</u>

Rent expenses, inclusive of operating and maintenance costs, were \$1.1 million and \$0.9 million for the three months ended June 30, 2019 and 2018, respectively, and \$2.3 million and \$1.8 million for the six months ended June 30, 2019 and 2018, respectively.

Legal Proceedings

We are subject to claims and assessments from time to time in the ordinary course of business. We will accrue a liability for such matters when it is probable that a liability has been incurred and the amount can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued. We are not currently party to any material legal proceedings.

Indemnification Agreements

In the ordinary course of business, we may provide indemnification of varying scope and terms to vendors, lessors, customers and other parties with respect to certain matters including, but not limited to, losses arising out of breach of our agreements with them or from intellectual property infringement claims made by third parties. In addition, we have entered into indemnification agreements with members of our Board of Directors and certain of our executive officers that will require us to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. The maximum potential amount of future payments that we could be required to make under these indemnification agreements is, in many cases, unlimited. We have not incurred any material costs as a result of such indemnifications and are not currently aware of any indemnification claims.

9. Convertible Preferred Stock

Convertible preferred stock at June 30, 2019 consisted of the following (in thousands, except share data) (unaudited):

	Shares Authorized	Shares Issued and Outstanding	Amount	Liquidation Preference
Series A	4,550,000	4,550,000	\$ 12,405	\$ 4,550
Series B	5,645,706	5,645,706	16,018	9,669
Series C	4,804,227	4,747,352	14,425	12,521
Series D	19,269,117	19,269,117	106,905	106,999
Series E	15,524,350	15,524,350	93,698	93,750
Series E-1	17,407,441	16,854,887	73,640 ⁽¹⁾	101,785
Series F	21,761,676	21,761,676	195,013	195,100
Series F-1	4,800,000	4,686,649	49,827	50,000
Total convertible preferred stock	<u>93,762,517</u>	<u>93,039,737</u>	<u>\$ 561,931</u>	<u>\$ 574,374</u>

(1) Includes vested Series E-1 convertible preferred stock options of \$0.7 million which are not included in the shares issued and outstanding.

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

10. Shareholders' Deficit

Common Stock

We are authorized to issue 131,000,000 shares of common stock. Our common stock has a par value of \$0.0001, no preferences or privileges and is not redeemable. Holders of our common stock are entitled to one vote for each share of common stock held.

We have reserved shares of common stock for the following as of June 30, 2019 (unaudited):

Shares to be issued upon conversion of all series of convertible preferred stock	93,039,737
Shares to be issued upon exercise of outstanding common stock options	17,681,436
Shares available for future stock option grants	3,155,968
Shares to be issued upon exercise of outstanding Series E-1 convertible preferred stock options	15,034
Shares to be issued upon conversion of Series C convertible preferred stock in connection with warrant exercise	56,875
Shares to be issued upon conversion of common stock warrants	55,032
Shares of common stock reserved for future issuance	<u>114,004,082</u>

Common Stock Warrants

In connection with two transactions in 2012 and 2013, we granted warrants to purchase up to 55,032 shares of common stock. The warrants are exercisable at any time for a period of ten years from the date of issuance at a weighted-average exercise price of \$0.37, except in the case of a warrant to purchase 20,000 shares of common stock at an exercise price of \$0.45 per share that would have expired if unexercised prior to the closing of our IPO.

11. Equity Incentive Plans

Adaptive 2009 Equity Incentive Plan

We adopted an equity incentive plan in 2009 ("2009 Plan") that provides for the issuance of incentive and nonqualified common stock options, and other share-based awards for employees, directors and consultants. Under the 2009 Plan, the option exercise price for incentive and nonqualified stock options may not be less than the fair market value of our common stock at the date of grant as determined by our Board of Directors. Options expire no later than ten years from the grant date, and vesting is established at the time of grant. As of June 30, 2019, we have 20,837,404 shares of common stock available for issuance under the 2009 Plan.

A summary of our option activity during the six months ended June 30, 2019 is as follows:

	Shares Available for Grant	Shares Subject to Outstanding Options	Weighted- Average Exercise Price per Share	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2018	6,827,996	14,893,253	\$ 4.59	\$ 39,864
Options granted (unaudited)	(3,890,331)	3,890,331	7.55	
Forfeited or cancelled (unaudited)	218,303	(218,303)	6.19	
Exercised (unaudited)	—	(883,845)	2.13	
Outstanding at June 30, 2019 (unaudited)	<u>3,155,968</u>	<u>17,681,436</u>	5.35	759,479

Sequentia 2008 Stock Plan, as amended

In connection with our acquisition of Sequentia in January 2015, we assumed Sequentia's Equity Incentive Plan ("2008 Plan"), including all outstanding options and shares available for future issuance under the 2008 Plan, which are all exercisable for Series E-1 convertible preferred stock.

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Notes to Unaudited Condensed Financial Statements (Continued)

A summary of our Series E-1 convertible preferred stock option activity during the six months ended June 30, 2019 is as follows:

	Convertible Preferred Shares Subject to Outstanding Options	Weighted- Average Exercise Price per Share	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2018	264,677	\$ 0.44	\$ 1,826
Options granted (unaudited)	—	—	
Forfeited or cancelled (unaudited)	—	—	
Exercised (unaudited)	(249,643)	0.44	
Outstanding at June 30, 2019 (unaudited)	15,034	0.49	719

Fair Value of Options Granted

The estimated fair value of options granted during the six months ended June 30, 2019 and 2018 was estimated using the Black-Scholes option-pricing model with the following weighted-average assumptions for our 2009 Plan:

	Adaptive 2009 Equity Incentive Plan		
	Six Months Ended June 30,		
	2019	(unaudited)	
	2018		
Grant date fair value	\$ 8.55	\$ 6.55	
Expected term (in years)	6.06	6.16	
Risk-free interest rate	2.4%	2.7%	
Expected volatility	67.9%	69.2%	
Expected dividend yield	—	—	

The determination of the fair value of stock options on the date of grant using a Black-Scholes option-pricing model is affected by the estimated fair value of our common stock, as well as assumptions regarding a number of variables that are complex, subjective and generally require significant judgment to determine. The valuation assumptions were determined as follows:

Fair value of common stock—The grant date fair value of our common stock has been determined by our Board of Directors with input from management. The grant date fair value of the common stock was determined using valuation methodologies which utilize certain assumptions, including probability weighting of events, volatility, time to liquidation, a risk-free interest rate and an assumption for a discount for lack of marketability (Level 3 inputs). In determining the fair value of the common stock, the methodologies used to estimate the enterprise value were performed using methodologies, approaches and assumptions consistent with the American Institute of Certified Public Accountants Accounting and Valuation Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation. For valuations after the closing of our IPO, our board of directors plans to determine the fair value of each share of common stock based on the closing price of our common stock on the date of grant or other relevant determination date, as reported on The Nasdaq Global Select Market.

Expected term—The expected life of options granted to employees is determined using the “simplified” method, as illustrated in ASC Topic 718, *Compensation—Stock Compensation*, as we do not have sufficient exercise history to determine a better estimate of expected term. Under this approach, the expected term is presumed to be the average of the weighted-average vesting term and the contractual term of the option.

Risk-free interest rate—We utilize a risk-free interest rate in the option valuation model based on U.S. Treasury zero-coupon issues, with remaining terms similar to the expected term of the options.

Expected volatility—As we do not have sufficient trading history for our common stock, the expected volatility is based on the historical volatility of our publicly traded industry peers utilizing a period of time consistent with our estimate of the expected term.

Expected dividend yield—We do not anticipate paying any cash dividends in the foreseeable future and, therefore, use an expected dividend yield of zero in the option valuation model.

Adaptive Biotechnologies Corporation

Notes to Unaudited Condensed Financial Statements (Continued)

Share-based compensation expense of \$3.3 million and \$2.4 million was recognized during the three months ended June 30, 2019 and 2018, respectively, and \$6.4 million and \$5.6 million was recognized during the six months ended June 30, 2019 and 2018, respectively. The compensation costs related to stock options are included in our unaudited condensed statements of operations as follows (in thousands):

	<u>Three Months Ended June 30,</u>		<u>Six Months Ended June 30,</u>	
	<u>2019</u>	<u>2018</u>	<u>2019</u>	<u>2018</u>
	(unaudited)			
Cost of revenue	\$ 113	\$ 92	\$ 243	\$ 176
Research and development	978	652	1,895	1,468
Sales and marketing	943	592	1,849	1,549
General and administration	1,298	1,112	2,391	2,357
Total share-based compensation expense	<u>\$ 3,332</u>	<u>\$ 2,448</u>	<u>\$ 6,378</u>	<u>\$ 5,550</u>

At June 30, 2019, unrecognized share-based compensation expense related to unvested stock options was \$33.2 million, which is expected to be recognized over a remaining weighted-average period of 3.16 years.

12. Net Loss Per Share Attributable to Common Shareholders

Net Loss Per Share

The following table sets forth the computation of the basic and diluted net loss per share attributable to common shareholders (in thousands, except shares and per share amounts):

	<u>Three Months Ended June 30,</u>		<u>Six Months Ended June 30,</u>	
	<u>2019</u>	<u>2018</u>	<u>2019</u>	<u>2018</u>
	(unaudited)			
Net loss	\$ (15,659)	\$ (12,493)	\$ (34,045)	\$ (24,884)
Fair value adjustments to redemption value for Series E-1 convertible preferred stock options	(710)	(2)	(964)	2
Net loss attributable to common shareholders, basic and diluted	<u>\$ (16,369)</u>	<u>\$ (12,495)</u>	<u>\$ (35,009)</u>	<u>\$ (24,882)</u>
Weighted-average shares used in computing net loss per share	<u>13,279,324</u>	<u>12,385,888</u>	<u>13,074,692</u>	<u>12,334,227</u>
Net loss per share attributable to common shareholders, basic and diluted	<u>\$ (1.23)</u>	<u>\$ (1.01)</u>	<u>\$ (2.68)</u>	<u>\$ (2.02)</u>

Since we were in a loss position for all periods presented, basic net loss per share attributable to common shareholders is the same as diluted net loss per share attributable to common shareholders, as the inclusion of all potential shares of common stock outstanding would have been anti-dilutive. The following weighted-average common stock equivalents were excluded from the calculation of diluted net loss per share attributable to common shareholders for the periods presented, as they had an anti-dilutive effect:

	<u>Three Months Ended June 30,</u>		<u>Six Months Ended June 30,</u>	
	<u>2019</u>	<u>2018</u>	<u>2019</u>	<u>2018</u>
	(unaudited)			
Convertible preferred stock (on as if converted basis)	93,028,311	92,768,158	92,973,101	92,751,261
2009 Plan stock options issued and outstanding	17,591,720	14,597,833	16,826,833	13,927,507
2008 Plan stock options issued and outstanding	26,460	364,625	81,670	403,591
Common stock warrants	55,032	55,032	55,032	55,032
Convertible preferred stock warrants	56,875	56,875	56,875	56,875
Total	<u>110,758,398</u>	<u>107,842,523</u>	<u>109,993,511</u>	<u>107,194,266</u>

Adaptive Biotechnologies Corporation
Notes to Unaudited Condensed Financial Statements (Continued)

13. Subsequent Events

On July 1, 2019, we completed our IPO. For details regarding this event, including the automatic conversion of all shares of our convertible preferred stock into common stock, our amended and restated articles of incorporation and bylaws and our 2019 Plan, please refer to Note 1 – Organization and Description of Business – Initial Public Offering.

In August 2019, we entered into an operating lease to rent 100,000 square feet in a to-be-constructed building in Seattle, Washington. Shell construction is expected to be completed in 2020. The lease term commences on the date that the landlord delivers the premises to us for construction of certain tenant improvements. Rent obligations commence 10 months thereafter, and the lease term ends 142 months from the date rent commences, subject to our option to twice extend the lease for five years. The lease is cancellable under certain circumstances if the landlord fails to deliver the premises to us by May 1, 2021. We plan to occupy the new building in 2021, once interior construction is finished. The lease also requires us to pay additional amounts for operating and maintenance expenses. In connection with the new lease, we also entered into a letter of credit of \$2.1 million with one of our existing financial institutions.

Furthermore, in August 2019, we amended the lease for our current headquarters in Seattle, Washington to expand the size of the existing premises by approximately 8,400 square feet. Rent obligations of the expanded premises commence four months after the landlord delivers the premises to us for construction of certain tenant improvements, and the lease term for both the existing premises and the expanded premises ends 142 months after the commencement date of the new lease mentioned above, subject to our option to twice extend the lease for five years. If the new lease does not commence, the lease term for the existing premises and the expanded premises ends March 31, 2024.

Expected future minimum payments for the leased spaces, exclusive of operating and maintenance costs and assuming attainment of our target commencement dates, are as follows (in thousands) (unaudited):

2019	\$	1,431
2020		3,053
2021		5,802
2022		9,706
2023		9,975
Thereafter		105,270
Total future minimum lease payments	\$	<u>135,237</u>

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

You should read the following discussion and analysis of our financial condition and results of operations together with our unaudited condensed financial statements and related notes and the other financial information appearing elsewhere in this report, as well as the other financial information we file with the SEC from time to time. Some of the information contained in this discussion and analysis or set forth elsewhere in this report, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this report, our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

We are advancing the field of immune-driven medicine by harnessing the inherent biology of the adaptive immune system to transform the diagnosis and treatment of disease. Our immune medicine platform applies our proprietary technologies to read the diverse genetic code of a patient's immune system and understand precisely how it detects and treats disease in that patient. We capture these insights in our dynamic clinical immunomics database, which is underpinned by computational biology and machine learning, and use them to develop and commercialize clinical products and services that we are tailoring to each individual patient. We have two commercial products and services and a robust pipeline of clinical products and services that we are designing to diagnose, monitor and enable the treatment of diseases such as cancer, autoimmune conditions and infectious diseases.

Our immune medicine platform is the foundation for our expanding suite of products and services. The cornerstone of our platform and core immunosequencing product, immunoSEQ, serves as our underlying research and development engine and generates revenue from academic and biopharmaceutical customers. Our first clinical diagnostic product, clonoSEQ, is the first test authorized by the FDA for the detection and monitoring of MRD in patients with MM and ALL and is being validated for patients with other blood cancers. Leveraging our collaboration with Microsoft to create the TCR-Antigen Map, we are also developing a diagnostic product, immunoSEQ Dx, that may enable early detection of many diseases from a single blood test. Our therapeutic product candidates, being developed under the Genentech Agreement, leverage our platform to identify specific immune cells to develop into cellular therapies in oncology.

Since our inception, we have devoted a majority of our resources to research and development activities to develop our immune medicine platform, which enables the delivery of our products and services for life sciences research, clinical diagnostics and drug discovery customers.

For our life science research customers, we provide two categories of products and services using immunoSEQ, our core sequencing and immunomics tracking technology. First, we provide immunosequencing services, the revenue from which we record as sequencing revenue. Second, we provide certain research customers professional support, for which we may receive payments upon those customers achieving specified milestones. We record these support activities as development revenue.

For our clinical diagnostics customers, we sell our clonoSEQ diagnostic tests, which include our immunosequencing services and are thus recorded as sequencing revenue. In the future, we intend to sell other diagnostics products and services, which we also expect to record as sequencing revenue.

For our current drug discovery collaborator, Genentech, we screen, identify and characterize TCRs in support of our collaboration. We record revenue from this collaboration as development revenue.

Historically, we have sold immunoSEQ as a fee-for-service offering to academic centers and biopharmaceutical customers and further deepened those relationships over time by supporting their development initiatives. These research offerings have comprised the vast majority of our revenue to date, although our business is pursuing broader opportunities. As we continue to expand the use of our clonoSEQ diagnostic tests, develop and commercialize immunoSEQ Dx and develop and commercialize therapeutic product candidates with our drug discovery collaborator, we expect our mix of revenue to shift to clinical products and services, which we believe will become our largest sources of revenue.

We are actively pursuing opportunities to deepen our relationships with current customers and initiate relationships with new customers. We have an experienced, specialty salesforce that is targeting department heads, laboratory directors, principal investigators, core facility directors, clinicians, payors and research scientists and pathologists at leading academic institutions, biopharmaceutical companies, research institutions and contract research organizations. As MRD assessment becomes standard practice for patient management across a range of blood cancers, we believe it will be essential for clinicians and patients to have access to a highly accurate, sensitive and standardized MRD assessment tool. We are focused on establishing and maintaining collaborative relationships with payors, developing health economic evidence and building billing and patient access infrastructure to expand reimbursement coverage for our clinical diagnostics.

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We generated revenue of \$22.1 million and \$34.8 million for the three and six months ended June 30, 2019, respectively, and \$11.6 million and \$21.3 million for the three and six months ended June 30, 2018, respectively. Our net losses were \$15.7 million and \$34.0 million for the three and six months ended June 30, 2019, respectively, and \$12.5 million and \$24.9 million for the three and six months ended June 30, 2018. We have funded our operations to date principally from the sale of convertible preferred stock, and to a lesser extent sequencing and development revenue. As of June 30, 2019 and December 31, 2018, we had cash, cash equivalents and marketable securities of \$423.0 million and \$165.0 million, respectively. In December 2018, we entered into the Genentech Agreement pursuant to which we received a \$300.0 million initial upfront payment in February 2019, may be eligible to receive approximately \$1.8 billion over time, including payments upon achievement of specified development, regulatory and commercial milestones, and may receive additional royalties on sales of products commercialized under this agreement.

Components of Results of Operations

Revenue

We derive our revenue from two sources: (i) sequencing revenue and (ii) development revenue.

Sequencing revenue. Sequencing revenue reflects the amounts generated from providing sequencing services through immunoSEQ to research customers and from providing testing services through clonoSEQ to clinical and research customers.

For our research customers, which include biopharmaceutical customers and academic institutions, delivery of the sequencing results may include some level of professional support and analysis. Terms with biopharmaceutical customers generally include non-refundable upfront payments, which we record as deferred revenue. For all customers, we recognize revenue as we deliver sequencing results. From time to time, we offer discounts in order to gain rights and access to certain datasets. Revenue is recognized net of these discounts and costs associated with these services are reflected in cost of revenue.

For our clinical customers, we derive revenue from providing our clonoSEQ test report to ordering physicians. We bill commercial payors and medical institutions as we deliver test results to ordering physicians. Amounts paid for clonoSEQ diagnostic tests by commercial payors and medical institutions vary based on respective reimbursement rates and patient responsibilities, which may vary from our targeted list price. To date, the majority of our clonoSEQ diagnostic test revenue has been received from medical institutions. We recognize clinical revenue by evaluating customer payment history and estimating the amount of revenue that is collectible. As of December 31, 2018, we did not have reimbursement available to us through any government payors for clonoSEQ.

In January 2019, clonoSEQ received Medicare coverage aligned with the FDA label and NCCN guidelines for longitudinal monitoring in MM and ALL. We bill Medicare for an episode of treatment when we deliver the first eligible test results. This billing contemplates all necessary tests required during a patient's treatment cycle, which is currently estimated at approximately four tests per patient, including the initial sequence identification test. Revenue is recognized at the time the initial billable test result is delivered and is based upon cumulative tests delivered to date. Any unrecognized revenue from the initial billable test is recorded as deferred revenue and recognized as we deliver the remaining tests in a patient's treatment cycle.

Development revenue. Development revenue primarily represents regulatory or development support services, other than sequencing revenue, that we provide to biopharmaceutical customers who seek access to our platform to support their therapeutic development activities. Additionally, we generate development revenue from the achievement of regulatory milestones. We enter into collaboration and similar agreements with these customers. When these agreements include sequencing activities, we separately classify those activities as sequencing revenue. These agreements may also include substantial non-refundable upfront payments, which we recognize as development revenue over time as we perform the respective services.

We expect revenue to increase over the long term, particularly as the mix of revenue migrates to clinical diagnostics and drug discovery. The pace by which this mix migrates will be determined by the level of customer adoption and frequency of use of our products and services. However, our revenue may fluctuate from period to period due to the uncertain nature of delivery of our product and services and milestone achievement.

Cost of Revenue

Cost of revenue includes the cost of materials, personnel-related expenses (comprised of salaries, benefits and share-based compensation), shipping and handling, equipment and allocated facility costs associated with processing samples and professional support for our sequencing revenue. Allocated facility costs include depreciation of laboratory equipment, allocated facility occupancy and information technology costs. Costs associated with processing samples are recorded as expense, regardless of the timing of revenue recognition. As such, cost of revenue and related volume does not always trend in the same direction as revenue recognition and related volume.

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We expect cost of revenue to increase in absolute dollars as we grow our sequencing volume but the cost per sample to decrease over the long term due to the efficiencies we may gain as sequencing volume increases from improved utilization of our laboratory capacity, automation and other value engineering initiatives.

Research and Development Expenses

Research and development expenses comprise laboratory materials costs, personnel-related expenses, allocated facility costs, information technology and contract service expenses. Research and development activities support further development and refinement of existing assays and products, discovery of new technologies and investments into our immune medicine platform. We also include in research and development expenses the costs associated with software development activities to support laboratory scaling and workflow, as well as development of applications to support future commercial opportunities. We are currently conducting research and development activities for several products and services, and we typically use our laboratory materials, personnel, facilities, information technology and other development resources across multiple development programs. Additionally, certain of these research and development activities benefit more than one of our product opportunities. We do not track research and development expenses by specific product candidates.

A component of our research and development activities is supporting clinical and analytical validations to obtain regulatory approval for future clinical products and services. Some of these activities have generated and may in the future generate development revenue.

We expect our research and development expenses to continue to increase in absolute dollars as we innovate and expand the application of our platform. However, we expect research and development expenses to decrease as a percentage of revenue in the long term, and they may fluctuate as a percentage of revenue from period to period due to the timing and extent of our efforts needed to develop and commercialize new products and services.

Sales and Marketing Expenses

Sales and marketing expenses consist primarily of personnel-related expenses for commercial sales, account management, marketing, reimbursement, medical education and business development personnel that support commercialization of our platform products. In addition, these expenses include external costs such as advertising expenses, customer education and promotional expenses, market analysis expenses, conference fees, travel expenses and allocated facility costs.

We expect our sales and marketing expenses to increase in absolute dollars as we expand our commercial sales, marketing and business development teams and increase marketing activities to drive awareness and adoption of our products and services. However, we expect sales and marketing expenses to decrease as a percentage of revenue in the long term, though they may fluctuate as a percentage of revenue from period to period due to the timing and magnitude of these expenses.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel-related expenses, including share-based compensation, salaries and benefits for our personnel in executive, legal, finance and accounting, human resources and other administrative functions, including third-party billing services. In addition, these expenses include external legal costs, accounting and tax service expenses, consulting fees and allocated facilities costs.

We expect our general and administrative expenses to continue to increase in absolute dollars as we increase headcount and incur costs associated with operating as a public company, including expenses related to legal, accounting, regulatory matters, maintaining compliance with exchange listing and requirements of the SEC, director and officer insurance premiums and investor relations. Though expected to increase in absolute dollars, we expect these expenses to decrease as a percentage of revenue in the long term.

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Statements of Operations Data and Other Financial and Operating Data

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
	(unaudited)			
	(in thousands, except share and per share amounts)			
Statements of Operations Data:				
Revenue				
Sequencing revenue	\$ 11,865	\$ 8,281	\$ 17,948	\$ 14,061
Development revenue	10,273	3,287	16,856	7,222
Total revenue	<u>22,138</u>	<u>11,568</u>	<u>34,804</u>	<u>21,283</u>
Operating expenses				
Cost of revenue	5,734	5,044	10,722	9,033
Research and development	16,527	9,452	29,010	18,307
Sales and marketing	8,897	5,329	16,714	10,376
General and administrative	6,662	4,632	13,666	9,175
Amortization of intangible assets	423	424	842	843
Total operating expenses	<u>38,243</u>	<u>24,881</u>	<u>70,954</u>	<u>47,734</u>
Loss from operations	(16,105)	(13,313)	(36,150)	(26,451)
Interest and other income, net	446	820	2,105	1,567
Net loss	(15,659)	(12,493)	(34,045)	(24,884)
Fair value adjustment to Series E-1 convertible preferred stock options	(710)	(2)	(964)	2
Net loss attributable to common shareholders	<u>\$ (16,369)</u>	<u>\$ (12,495)</u>	<u>\$ (35,009)</u>	<u>\$ (24,882)</u>
Net loss per share attributable to common shareholders, basic and diluted	<u>\$ (1.23)</u>	<u>\$ (1.01)</u>	<u>\$ (2.68)</u>	<u>\$ (2.02)</u>
Weighted-average shares used in computing net loss per share attributable to common shareholders, basic and diluted	<u>13,279,324</u>	<u>12,385,888</u>	<u>13,074,692</u>	<u>12,334,227</u>
Other Financial and Operating Data:				
Adjusted EBITDA (1)	<u>\$ (10,903)</u>	<u>\$ (9,374)</u>	<u>\$ (26,119)</u>	<u>\$ (17,959)</u>

(1) Adjusted EBITDA is a non-GAAP financial measure that we define as net loss adjusted for interest and other income, net, income tax benefit (expense), depreciation and amortization and share-based compensation expenses. Please refer to "Adjusted EBITDA" below for a reconciliation between Adjusted EBITDA and net loss, the most directly comparable GAAP financial measure, and a discussion about the limitations of Adjusted EBITDA.

Comparison of the Three Months Ended June 30, 2019 and 2018

Revenue

	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Revenue						
Sequencing revenue	\$ 11,865	\$ 8,281	\$ 3,584	43%	54%	72%
Development revenue	10,273	3,287	6,986	213	46	28
Total revenue	<u>\$22,138</u>	<u>\$ 11,568</u>	<u>\$ 10,570</u>	<u>91%</u>	<u>100%</u>	<u>100%</u>

Total revenue was \$22.1 million for the three months ended June 30, 2019 compared to \$11.6 million for the three months ended June 30, 2018, representing an increase of approximately \$10.6 million, or 91%.

Sequencing revenue increased to \$11.9 million for the three months ended June 30, 2019, representing an increase of \$3.6 million, or 43%. The increase in sequencing revenue was primarily attributable to an increase of \$2.6 million in revenue generated from biopharmaceutical and academic customers and a \$1.0 million increase in revenue generated from clinical customers.

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Research sequencing volume increased by 22% to 9,084 sequences delivered in the three months ended June 30, 2019 from 7,457 sequences delivered in the three months ended June 30, 2018. Clinical sequencing volume increased by 50% to 2,388 clinical tests delivered in the three months ended June 30, 2019 from 1,587 clinical tests delivered in the three months ended June 30, 2018.

Development revenue increased to \$10.3 million for the three months ended June 30, 2019, representing an increase of \$7.0 million, or 213%. The increase was primarily attributable to \$8.6 million of revenue generated from the Genentech Agreement, offset by a \$1.4 million decrease in revenue generated from translational agreements and a \$0.2 million decrease in revenue generated from MRD development agreements.

Cost of Revenue

<i>(in thousands, except percentages)</i>	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Cost of revenue	\$ 5,734	\$ 5,044	\$ 690	14%	26%	44%

Cost of revenue was \$5.7 million for the three months ended June 30, 2019, compared to \$5.0 million for the three months ended June 30, 2018, representing an increase of \$0.7 million, or 14%. The increase in cost of revenue was primarily attributable to an increase of \$0.6 million in the cost of overhead and \$0.1 million in the cost of materials due to the production laboratory expansion and increased sample volumes.

Research and Development

<i>(in thousands, except percentages)</i>	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Research and development	\$ 16,527	\$ 9,452	\$ 7,075	75%	75%	82%

The following table presents disaggregated research and development expenses by cost classification for the periods presented:

<i>(in thousands)</i>	Three Months Ended June 30,		Change
	2019	2018	
	(unaudited)		
Research and development materials and allocated production laboratory expenses	\$ 7,589	\$ 3,605	\$ 3,984
Personnel expenses	6,765	4,344	2,421
Allocable facilities and information technology expenses	783	815	(32)
Software and cloud services expenses	462	244	218
Depreciation and other expenses	928	444	484
Total	<u>\$ 16,527</u>	<u>\$ 9,452</u>	<u>\$ 7,075</u>

Research and development expenses were \$16.5 million for the three months ended June 30, 2019, compared to \$9.5 million for the three months ended June 30, 2018, representing an increase of approximately \$7.1 million, or approximately 75%. The increase was primarily attributable to \$4.0 million in additional cost of materials and allocated production laboratory expenses to support our TCR discovery efforts and other platform expansions, a \$2.4 million increase in personnel costs, a \$0.5 million increase in depreciation and other expenses and a \$0.2 million increase in software and cloud services.

Sales and Marketing

<i>(in thousands, except percentages)</i>	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Sales and marketing	\$ 8,897	\$ 5,329	\$ 3,568	67%	40%	46%

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Sales and marketing expenses were \$8.9 million for the three months ended June 30, 2019, compared to \$5.3 million for the three months ended June 30, 2018, representing an increase of \$3.6 million, or approximately 67%. The increase was primarily attributable to \$2.3 million in additional personnel costs, \$0.6 million in additional consulting and marketing expenses and \$0.5 million in additional travel, entertainment and customer event related expenses. An additional \$0.1 million in computer and software expenses also contributed to the overall increase.

General and Administrative

<i>(in thousands, except percentages)</i>	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
General and administrative	\$ 6,662	\$ 4,632	\$ 2,030	44%	30%	40%

General and administrative expenses were \$6.7 million for the three months ended June 30, 2019, compared to \$4.6 million for the three months ended June 30, 2018, representing an increase of approximately 2.0 million, or approximately 44%. The increase was primarily attributable to \$1.3 million in additional personnel costs, \$0.2 million in additional travel and entertainment related expenses and \$0.2 million in additional consulting fees. A \$0.1 million increase in computer and software expenses and a \$0.1 million increase in insurance expenses also contributed to the overall increase.

Interest and Other Income, Net

<i>(in thousands, except percentages)</i>	Three Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Interest and other income, net	\$ 446	\$ 820	\$ (374)	(46)%	2%	7%

Interest and other income was \$0.4 million for the three months ended June 30, 2019, compared to \$0.8 million for the three months ended June 30, 2018, representing a decrease of \$0.4 million, or approximately negative 46%. The decrease was primarily attributable to the \$2.2 million impact of revaluing a convertible preferred stock warrant liability in the second quarter of 2019 due to an increase in valuation of our common stock, offset by a \$1.9 million increase in interest earned on and investment amortization of a larger portfolio.

Comparison of the Six Months Ended June 30, 2019 and 2018

Revenue

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Revenue						
Sequencing revenue	\$17,948	\$ 14,061	\$ 3,887	28%	52%	66%
Development revenue	16,856	7,222	9,634	133	48	34
Total revenue	<u>\$34,804</u>	<u>\$ 21,283</u>	<u>\$ 13,521</u>	<u>64%</u>	<u>100%</u>	<u>100%</u>

Total revenue was \$34.8 million for the six months ended June 30, 2019 compared to \$21.3 million for the six months ended June 30, 2018, representing an increase of \$13.5 million, or approximately 64%.

Sequencing revenue increased to \$17.9 million for the six months ended June 30, 2019, representing an increase of \$3.9 million, or 28%. The increase in sequencing revenue was primarily attributable to an increase of \$2.3 million in revenue generated from biopharmaceutical and academic customers, driven by a mix to higher priced products and services, and a \$1.6 million increase in revenue generated from clinical customers.

Research sequencing volume decreased by 2% to 13,975 sequences delivered in the six months ended June 30, 2019 from 14,315 sequences delivered in the six months ended June 30, 2018. Clinical sequencing volume increased by 44% to 4,399 clinical tests delivered in the six months ended June 30, 2019 from 3,053 clinical tests delivered in the six months ended June 30, 2018.

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Development revenue increased to \$16.9 million for the six months ended June 30, 2019, representing an increase of \$9.6 million, or 133%. The increase was primarily attributable to \$14.8 million of revenue generated from the Genentech Agreement, offset by a \$4.0 million decrease in revenue generated from translational agreements and a \$1.2 million decrease in revenue generated from MRD development agreements.

Cost of Revenue

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Cost of revenue	\$10,722	\$ 9,033	\$ 1,689	19%	31%	42%

Cost of revenue was \$10.7 million for the six months ended June 30, 2019, compared to \$9.0 million for the six months ended June 30, 2018, representing an increase of \$1.7 million, or 19%. The increase in cost of revenue was primarily attributable to an increase of \$1.5 million in the cost of overhead and \$0.1 million in the cost of materials due to the production laboratory expansion and increased sample volumes, as well as an increase in personnel costs of \$0.1 million. This increase was offset by a \$0.1 million decrease in computer and software expenses.

Research and Development

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Research and development	\$29,010	\$ 18,307	\$ 10,703	58%	83%	86%

The following table presents disaggregated research and development expenses by cost classification for the periods presented:

<i>(in thousands)</i>	Six Months Ended June 30,		Change
	2019	2018	
	(unaudited)		
Research and development materials and allocated production laboratory expenses	\$ 12,649	\$ 7,178	\$ 5,471
Personnel expenses	12,372	8,414	3,958
Allocable facilities and information technology expenses	1,603	1,384	219
Software and cloud services expenses	728	453	275
Depreciation and other expenses	1,658	878	780
Total	<u>\$ 29,010</u>	<u>\$ 18,307</u>	<u>\$ 10,703</u>

Research and development expenses were \$29.0 million for the six months ended June 30, 2019, compared to \$18.3 million for the six months ended June 30, 2018, representing an increase of \$10.7 million, or 58%. The increase was primarily attributable to \$5.5 million in additional cost of materials and allocated production laboratory expenses to support our TCR discovery efforts and other platform expansions, \$4.0 million increase in personnel costs, a \$0.8 million increase in depreciation and other expenses, a \$0.3 million increase in software and cloud service costs and an increase in allocable facilities and information technology costs of \$0.2 million.

Sales and Marketing

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Sales and marketing	\$16,714	\$ 10,376	\$ 6,338	61%	48%	49%

Sales and marketing expenses were \$16.7 million for the six months ended June 30, 2019, compared to \$10.4 million for the six months ended June 30, 2018, representing an increase of \$6.3 million, or 61%. The increase was primarily attributable to \$3.9 million in additional personnel costs, \$1.2 million in additional travel, entertainment and customer event related expenses and \$1.0 million in

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additional consulting and marketing expenses. An additional \$0.2 million in computer and software expenses also contributed to the overall increase.

General and Administrative

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
General and administrative	\$ 13,666	\$ 9,175	\$ 4,491	49%	39%	43%

General and administrative expenses were \$13.7 million for the six months ended June 30, 2019, compared to \$9.2 million for the six months ended June 30, 2018, representing an increase of \$4.5 million, or 49%. The increase was primarily attributable to \$1.7 million in additional personnel costs, \$1.2 million in additional business taxes, largely due to the Genentech upfront payment received in February 2019, and a \$0.9 million increase in legal, tax, accounting and consultant fees. A \$0.2 million increase in computer and software expenses, a \$0.2 million increase in travel and entertaining expenses, a \$0.1 million increase in insurance expense and a \$0.1 million increase in administration costs also contributed to the overall increase.

Interest and Other Income, Net

<i>(in thousands, except percentages)</i>	Six Months Ended June 30,		Change		Percent of Revenue	
	2019	2018	\$	%	2019	2018
	(unaudited)					
Interest and other income, net	\$ 2,105	\$ 1,567	\$ 538	34%	6%	7%

Interest income was \$2.1 million for the six months ended June 30, 2019, compared to \$1.6 million for the six months ended June 30, 2018, representing an increase of \$0.5 million, or approximately 34%. The increase was primarily attributable to a \$2.8 million increase in interest earned on and investment amortization of a larger portfolio, offset by the \$2.3 million impact of revaluing a convertible preferred stock warrant liability in 2019.

Adjusted EBITDA

Adjusted EBITDA is a non-GAAP financial measure that we define as net loss adjusted for interest and other income, net, income tax benefit (expense), depreciation and amortization and share-based compensation expenses.

Management uses Adjusted EBITDA to evaluate the financial performance of our business and the effectiveness of our business strategies. We present Adjusted EBITDA because we believe it is frequently used by analysts, investors and other interested parties to evaluate companies in our industry and it facilitates comparisons on a consistent basis across reporting periods. Further, we believe it is helpful in highlighting trends in our operating results because it excludes items that are not indicative of our core operating performance.

Adjusted EBITDA has limitations as an analytical tool and you should not consider it in isolation, or as a substitute for analysis of our results as reported under GAAP. We may in the future incur expenses similar to the adjustments in the presentation of Adjusted EBITDA. In particular, we expect to incur meaningful share-based compensation expense in the future. Other limitations include that Adjusted EBITDA does not reflect:

- all expenditures or future requirements for capital expenditures or contractual commitments;
- changes in our working capital needs;
- income tax expense (benefit), which may be a necessary element of our costs and ability to operate;
- the costs of replacing the assets being depreciated and amortized, which will often have to be replaced in the future;
- the non-cash component of employee compensation expense; and
- the impact of earnings or charges resulting from matters we consider not to be reflective, on a recurring basis, of our ongoing operations.

In addition, Adjusted EBITDA may not be comparable to similarly titled measures used by other companies in our industry or across different industries.

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The following is a reconciliation of our net loss to Adjusted EBITDA (in thousands):

	Three Months Ended June 30,		Six Months Ended June 30,	
	2019	2018	2019	2018
	(unaudited)			
Net loss	\$ (15,659)	\$ (12,493)	\$ (34,045)	\$ (24,884)
Interest and other income, net	(446)	(820)	(2,105)	(1,567)
Income tax (benefit) expense	—	—	—	—
Depreciation and amortization expense	1,870	1,491	3,653	2,942
Share-based compensation expense ⁽¹⁾	3,332	2,448	6,378	5,550
Adjusted EBITDA	<u>\$ (10,903)</u>	<u>\$ (9,374)</u>	<u>\$ (26,119)</u>	<u>\$ (17,959)</u>

(1) Represents share-based compensation expense related to option awards. See Note 11 to our unaudited condensed financial statements appearing elsewhere in this report for details on our share-based compensation expense.

Liquidity and Capital Resources

We have incurred losses since inception and have incurred negative cash flows from operations from inception through December 31, 2018. As of June 30, 2019, we had an accumulated deficit of \$330.9 million.

We have funded our operations to date principally from the sale of convertible preferred stock and, to a lesser extent, sequencing and development revenue. In December 2018, we entered into the Genentech Agreement pursuant to which we received a \$300.0 million initial upfront payment in February 2019, may receive approximately \$1.8 billion over time, including payments upon achievement of specified development, regulatory and commercial milestones, and may receive additional royalties on sales of products commercialized under this agreement. As of June 30, 2019, we had cash, cash equivalents and marketable securities of \$423.0 million.

We believe our cash flows from operations and our existing cash, cash equivalents and marketable securities, together with the net proceeds from our IPO that closed July 1, 2019, will be sufficient to fund our operating expenses and capital expenditure requirements through at least the next 12 months. We may consider raising additional capital to expand our business, to pursue strategic investments, to take advantage of financing opportunities or for other reasons.

We plan to utilize the existing cash, cash equivalents and marketable securities on hand primarily to fund our commercial and marketing activities associated with our clinical products and services, continued research and development initiatives for our pipeline candidates and drug discovery initiatives, ongoing investments into our immune medicine platform and scaling of our laboratory operations with our anticipated growth. Cash in excess of immediate requirements is invested in accordance with our investment policy, primarily with a view to liquidity and capital preservation. Currently, our funds are held in money market funds and marketable securities consisting of U.S. government debt securities, U.S. government agency bonds, commercial paper and corporate bonds.

As revenue from sales of immunoSEQ and clonoSEQ is expected to grow, we expect our accounts receivable and inventory balances to increase. Any increase in accounts receivable and inventory may not be completely offset by increases in accounts payable and accrued expenses, which could result in greater working capital requirements. Moreover, following the closing of our IPO, we expect to incur additional costs associated with operating as a public company, including expenses related to legal, accounting, regulatory, exchange listing and SEC compliance matters.

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If our available cash, cash equivalents and marketable securities balances, net proceeds from our IPO that closed July 1, 2019 and anticipated cash flow from operations are insufficient to satisfy our liquidity requirements, we may seek to sell additional equity or convertible debt securities, enter into a credit facility or another form of third-party funding or seek other debt financing. The sale of equity and convertible debt securities may result in dilution to our shareholders and, in the case of preferred equity securities or convertible debt, those securities could provide for rights, preferences or privileges senior to those of our common stock. The terms of debt securities issued or borrowings pursuant to a credit agreement could impose significant restrictions on our operations. Additional capital may not be available on reasonable terms, or at all.

Cash Flows

The following table summarizes our uses and sources of cash for the periods presented (in thousands):

	Six Months Ended June 30,	
	2019	2018
	(unaudited)	
Net cash provided by (used in) operating activities	\$ 262,333	\$ (15,163)
Net cash used in investing activities	(267,525)	(32,026)
Net cash (used in) provided by financing activities	(1,380)	913

Operating Activities

Cash provided by operating activities during the six months ended June 30, 2019 was \$262.3 million, which was primarily attributable to a net change in our operating assets and liabilities of \$286.1 million, non-cash share-based compensation of \$6.4 million, non-cash depreciation and amortization of \$1.8 million and a \$2.3 million fair value adjustment of the convertible preferred stock warrant liability due to an increase in valuation of our common stock, partially offset by a net loss of \$34.0 million. The net change in our operating assets and liabilities primarily reflects an increase in deferred revenue of \$288.7 million, primarily due to the \$300.0 million upfront payment by Genentech, and an increase in accounts payable and accrued liabilities of \$1.3 million primarily due to growth in operating expenses and timing of vendor payments, partially offset by an increase in accounts receivable of \$2.4 million primarily due to an increase in sequencing revenue paid in arrears rather than upfront by biopharmaceutical customers, an increase in prepaid expenses and other current assets of \$0.9 million primarily due to receivables from investment maturities and a \$0.5 million decrease in deferred rent due to increased cash rent payments.

Cash used in operating activities during the six months ended June 30, 2018 was \$15.2 million, which was primarily attributable to a net loss of \$24.9 million, partially offset by non-cash share-based compensation of \$5.6 million, non-cash depreciation and amortization of \$2.5 million and a net change in our operating assets and liabilities of \$1.7 million. The net change in our operating assets and liabilities reflects a \$5.4 million increase in deferred revenue primarily due to upfront payments from MRD biopharmaceutical agreements, a decrease in accounts receivable of \$1.2 million primarily due to the timing of receipts, partially offset by an increase in inventory of \$2.9 million to support growth in revenue and research and development activities, a decrease in accounts payable and accrued liabilities of \$1.0 million primarily due to corporate bonus payments and reduction in marketing and legal payables, an increase in prepaid expenses and other current assets of \$0.4 million primarily due to receivables from investment maturities and reductions in deferred rent of \$0.4 million due to increased cash rent payments.

Investing Activities

Cash used in investing activities during the six months ended June 30, 2019 was \$267.5 million, which was primarily attributable to purchases of marketable securities of \$358.7 million and purchases of property and equipment of \$5.4 million, partially offset by maturities of marketable securities of \$96.5 million.

Cash used in investing activities during the six months ended June 30, 2018 was \$32.0 million, which was primarily attributable to purchases of marketable securities of \$110.9 million and purchases of property and equipment of \$1.6 million, partially offset by maturities of marketable securities of \$80.5 million.

Financing Activities

Cash used by financing activities during the six months ended June 30, 2019 was \$1.4 million, which was primarily attributable to payment of deferred IPO costs of \$3.4 million, partially offset by proceeds of \$2.0 million from the exercise of stock options.

Cash provided by financing activities during the six months ended June 30, 2018 was \$0.9 million, which was primarily attributable to proceeds from the exercise of stock options.

Contractual Obligations and Commitments

Our principal contractual obligations and commitments were reported in our Prospectus. As of June 30, 2019, there have been no material changes to our contractual obligations and commitments as disclosed in our Prospectus.

Net Operating Loss Carryforwards

Utilization of our NOL carryforwards and credits may be subject to a substantial annual limitation due to the ownership change limitations provided by Section 382 of the Code (“Section 382”) and similar state provisions. The annual limitation may result in the expiration of NOL carryforwards and credits before utilization. If there should be an ownership change, our ability to utilize our NOL carryforwards and credits could be limited. We have completed a Section 382 analysis and have determined there are no permanent limitations on the utilization of approximately \$186.9 million of our federal NOLs as of December 31, 2018. Based on the available objective evidence, management determined that it was more likely than not that the net deferred tax assets would not be realizable as of December 31, 2018. Accordingly, management applied a full valuation allowance against net deferred tax assets as of December 31, 2018.

Off-Balance Sheet Arrangements

As of June 30, 2019 and December 31, 2018, we have not had any off-balance sheet arrangements, as defined in the rules and regulations of the SEC.

Critical Accounting Policies and Estimates

We have prepared our financial statements in accordance with GAAP. Our preparation of these financial statements requires us to make estimates, assumptions and judgments that affect the reported amounts of assets, liabilities and related disclosures at the date of the financial statements, as well as revenue and expense recorded during the reporting periods. We evaluate our estimates and judgments on an ongoing basis. We base our estimates on historical experience and or other relevant assumptions that we believe to be reasonable under the circumstances. Estimates are used in several areas, including, but not limited to, estimates of progress to date for certain performance obligations and transaction price for certain contracts with customers, share-based compensation, including the fair value of common stock granted prior to our IPO, the provision for income taxes, including related reserves, and goodwill, among others. These estimates generally involve complex issues and require judgments, involve the analysis of historical results and prediction of future trends, can require extended periods of time to resolve and are subject to change from period to period. Actual results may differ materially from management’s estimates.

While our significant accounting policies are described in more detail in our Prospectus, as well as in Note 2 to our unaudited condensed financial statements included elsewhere in this report, we believe the following accounting policies are critical to the judgments and estimates used in the preparation of our financial statements:

- revenue recognition;
- share-based compensation;
- common stock valuations; and
- goodwill.

There have been no material changes to our critical accounting policies and estimates as previously disclosed in our Prospectus.

JOBS Act Accounting Election

We are an “emerging growth company” within the meaning of the JOBS Act. The JOBS Act allows an emerging growth company to delay the adoption of new or revised accounting standards that have different effective dates for public and private companies until those standards apply to private companies. We have elected to use this extended transition period and, as a result, our financial statements may not be comparable to companies that comply with public company effective dates. We also intend to rely on other exemptions provided by the JOBS Act, including not being required to comply with the auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act.

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We will remain an emerging growth company until the earliest of (1) the last day of the fiscal year following the fifth anniversary of the closing of the IPO, (2) the last day of the fiscal year in which we have total annual gross revenue of at least \$1.07 billion, (3) the last day of the fiscal year in which we are deemed to be a “large accelerated filer” as defined in Rule 12b-2 under the Exchange Act of 1934, as amended (“Exchange Act”), which would occur if the market value of our common stock held by non-affiliates exceeded \$700.0 million as of the last business day of the second fiscal quarter of such year or (4) the date on which we have issued more than \$1.0 billion in non-convertible debt securities during the prior three-year period.

Recent Accounting Pronouncements

See Note 2 to the unaudited condensed financial statements included elsewhere in this report for more information.

Item 3. Quantitative and Qualitative Disclosures about Market Risk

Interest Rate Risk

We are exposed to market risk for changes in interest rates related primarily to our cash and cash equivalents and marketable securities. As of June 30, 2019, we had cash and cash equivalents of \$48.5 million, held primarily in cash deposits, money market funds, commercial paper and U.S. government debt securities. Our marketable securities are held in U.S. government debt securities, U.S. government agency bonds, commercial paper and corporate bonds. As of June 30, 2019, we had short-term marketable securities of \$374.5 million. Our primary exposure to market risk is interest income sensitivity, which is affected by changes in the general level of interest rates in the United States. As of June 30, 2019, a hypothetical 100 basis point increase in interest rates would have resulted in an approximate \$1.4 million decline of the fair value of our available-for-sale securities. This estimate is based on a sensitivity model that measures market value changes when changes in interest rates occur.

Item 4. Controls and Procedures

Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we evaluated the effectiveness of the design and operation of our disclosure controls and procedures pursuant to Rule 13a-15 under the Exchange Act as of the end of the period covered by this report. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective as of June 30, 2019. There was not any change in our internal control over financial reporting (as such term is defined in Rules 13a-15(f) under the Exchange Act) during the quarter ended June 30, 2019 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 1. Legal Proceedings

From time to time, we may be subject to legal proceedings. We are not currently a party to or aware of any proceedings that we believe will have, individually or in the aggregate, a material adverse effect on our business, financial condition or results of operations. Regardless of outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources and other factors.

Item 1A. Risk Factors

Investing in our common stock involves a high degree of risk. Our risk factors are set forth in our Prospectus and incorporated herein by reference, and there have been no material changes to such risk factors. You should carefully consider the risks and uncertainties we describe in the Prospectus, together with all other information in this report, including our unaudited condensed financial statements and related notes and the “Management’s Discussion and Analysis of Financial Condition and Results of Operations” section of this report, before investing in our common stock. Any of the risk factors we describe in the Prospectus could adversely affect our business, financial condition, results of operations or prospects. The market price of our common stock could decline if one or more of these risks or uncertainties actually occur, causing you to lose all or part of your investment in our common stock. Additional risks that we currently do not know about or that we currently believe to be immaterial may also impair our business, financial condition, operating results and prospects.

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

Sales of Unregistered Securities

During the quarter ended June 30, 2019, we had the following unregistered securities transactions:

1. We granted stock options to purchase an aggregate of 1,740,331 shares of our common stock, with exercise prices ranging from \$7.80 to \$9.62 per share, to certain of our employees and directors in connection with services provided to us by such persons.
2. We issued an aggregate of 794,845 shares of our common stock to our employees and consultants upon their exercise of stock options, for aggregate cash consideration of approximately \$1.8 million.
3. We issued an aggregate of 16,043 shares of our Series E-1 preferred stock, which automatically converted into the same number of shares of our common stock upon the closing of our IPO, to our employees and consultants upon their exercise of stock options, for aggregate cash consideration of approximately \$11,000.

The issuances of the securities described above were exempt from registration pursuant to Section 4(a)(2) of the Securities Act as transactions by an issuer not involving a public offering or Rule 701 promulgated under the Securities Act as transactions pursuant to compensatory benefit plans. The shares of common stock issued upon the exercise of options are deemed to be restricted securities for purposes of the Securities Act.

Use of Proceeds from our IPO

On July 1, 2019, we closed our IPO, in which we issued and sold 17,250,000 shares of our common stock (including the full exercise of the underwriters’ over-allotment option) at a public offering price of \$20.00 per share for an aggregate offering price of \$345.0 million. Net proceeds to us were \$316.0 million after deducting aggregate underwriting discounts and commissions of \$24.2 million and estimated offering expenses of \$4.8 million. Goldman Sachs & Co. LLC, J.P. Morgan Securities LLC and BofA Securities, Inc. acted as joint lead book-running managers for the offering. Cowen and Company, LLC and Guggenheim Securities, LLC acted as book-running managers for the offering. William Blair & Company, L.L.C. and BTIG, LLC acted as co-managers for the offering. All of the shares of common stock issued and sold in the offering were registered under the Securities Act pursuant to a registration statement on Form S-1 (File No. 333-231838), which was declared effective by the SEC on June 26, 2019. Following the sale of these shares, the offering terminated. No payments were made by us to directors, officers or persons owning 10% or more of any class of our equity securities or to any of our affiliates. There has been no material change in the planned use of proceeds from our IPO as described in our Prospectus. As our IPO closed after the period covered by this report, none of the proceeds from our IPO were used during the period covered by this report.

Item 3. Defaults Upon Senior Securities

Not applicable.

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Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Not applicable.

Item 6. Exhibits

Exhibit Number	Exhibit Title	Incorporated by Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
3.1	Amended and Restated Articles of Incorporation	8-K	001-38957	3.1	7/1/2019	
3.2	Amended and Restated Bylaws	8-K	001-38957	3.2	7/1/2019	
4.1	Seventh Amended and Restated Investors' Rights Agreement among the Registrant and certain of its shareholders, dated May 30, 2019	S-1	333-231838	4.1	5/30/2019	
10.1†	Master Terms & Conditions of Sale between Illumina, Inc. and the Registrant, dated May 28, 2019	S-1/A	333-231838	10.3	6/17/2019	
10.2	Amended and Restated Side Letter Agreement among Viking Global Equities LP, Viking Global Equities II LP, VGE III Portfolio Ltd., Viking Long Fund Master Ltd. and the Registrant, dated May 8, 2019	S-1	333-231838	10.5	5/30/2019	
10.3	Form of Amended and Restated Employment Agreement between the Registrant and certain of its executive officers	S-1	333-231838	10.7	5/30/2019	
10.4	Form of Amended and Restated Employment Agreement between the Registrant and each of Lance Baldo, MD and Francis T. Lo	S-1	333-231838	10.8	5/30/2019	
10.5	Form of Restated Non-Employee Director Change in Control Agreement between the Registrant and each of its non-employee directors	S-1	333-231838	10.9	5/30/2019	
10.6	Executive Severance Agreement between the Registrant and Chad Cohen, dated May 1, 2019	S-1	333-231838	10.10	5/30/2019	
10.7	Executive Severance Agreement between the Registrant and Lance Baldo, MD, dated April 22, 2019	S-1	333-231838	10.11	5/30/2019	
10.8	Executive Severance Agreement between the Registrant and Charles Sang, dated May 1, 2019	S-1	333-231838	10.12	5/30/2019	
10.9	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers	S-1	333-231838	10.13	5/30/2019	
10.10	Adaptive Biotechnologies Corporation Non-Employee Director Compensation Policy	S-1/A	333-231838	10.14	6/17/2019	
10.11	Adaptive Biotechnologies Corporation 2009 Equity Incentive Plan and form of award agreement thereunder	S-1	333-231838	10.15	5/30/2019	
10.12	Adaptive Biotechnologies Corporation 2019 Equity Incentive Plan and form of award agreement thereunder					X
31.1	Certification of Principal Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X
31.2	Certification of Principal Financial and Accounting Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X
32.1*	Certification of Principal Executive Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
32.2*	Certification of Principal Financial and Accounting Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X

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101.INS	XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.	X
101.SCH	XBRL Taxonomy Extension Schema Document	X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	X

- † Portions of this exhibit have been omitted pursuant to Item 601 of Regulation S-K promulgated under the Securities Act because the information is not material and would be competitively harmful if publicly disclosed.
- * This certification is deemed not filed for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act or the Exchange Act.

SIGNATURES

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

Adaptive Biotechnologies Corporation

Date: August 13, 2019

By: /s/ Chad Robins
Chad Robins
Chief Executive Officer and Director (Principal Executive Officer)

Date: August 13, 2019

By: /s/ Chad Cohen
Chad Cohen
Chief Financial Officer (Principal Financial and Accounting Officer)

ADAPTIVE BIOTECHNOLOGIES CORPORATION
2019 EQUITY INCENTIVE PLAN

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Adaptive Biotechnologies Corporation

2019 Equity Incentive Plan

1. Establishment, Purpose and Term of Plan.

1.1 **Establishment.** The Adaptive Biotechnologies Corporation 2019 Equity Incentive Plan (the “*Plan*”) is hereby established effective as of June 13, 2019, the date of its approval by the shareholders of the Company (the “*Effective Date*”).

1.2 **Purpose.** The purpose of the Plan is to advance the interests of the Participating Company Group and its shareholders by providing an incentive to attract, retain and reward persons performing services for the Participating Company Group and by motivating such persons to contribute to the growth and profitability of the Participating Company Group. The Plan seeks to achieve this purpose by providing for Awards in the form of Options, Stock Appreciation Rights, Restricted Stock Awards, Restricted Stock Units, Performance Shares, Performance Units, Cash-Based Awards and Other Stock-Based Awards.

1.3 **Term of Plan.** The Plan shall continue in effect until its termination by the Committee; provided, however, that all Awards shall be granted, if at all, within ten (10) years from the Effective Date.

2. Definitions and Construction.

2.1 **Definitions.** Whenever used herein, the following terms shall have their respective meanings set forth below:

(a) “*Affiliate*” means (i) a parent entity, other than a Parent Corporation, that directly, or indirectly through one or more intermediary entities, controls the Company or (ii) a subsidiary entity, other than a Subsidiary Corporation, that is controlled by the Company directly or indirectly through one or more intermediary entities. For this purpose, the terms “parent,” “subsidiary,” “control” and “controlled by” shall have the meanings assigned such terms for the purposes of registration of securities on Form S-8 under the Securities Act.

(b) “*Award*” means any Option, Stock Appreciation Right, Restricted Stock Purchase Right, Restricted Stock Bonus, Restricted Stock Unit, Performance Share, Performance Unit, Cash-Based Award or Other Stock-Based Award granted under the Plan.

(c) “*Award Agreement*” means a written or electronic agreement between the Company and a Participant setting forth the terms, conditions and restrictions applicable to an Award.

(d) “*Board*” means the Board of Directors of the Company.

(e) “*Cash-Based Award*” means an Award denominated in cash and granted pursuant to Section 11.

(f) “*Cashless Exercise*” means a Cashless Exercise as defined in Section 6.3(b)(i).

(g) “*Cause*” means, unless such term or an equivalent term is otherwise defined by the applicable Award Agreement or other written agreement between a Participant and a Participating Company applicable to an Award, any of the following: (i) the Participant’s theft, dishonesty, willful misconduct, breach of fiduciary duty for personal profit, or falsification of any Participating Company documents or records; (ii) the Participant’s material failure to abide by a Participating Company’s code of conduct or other policies (including, without limitation, policies relating to confidentiality and reasonable workplace conduct); (iii) the Participant’s unauthorized use, misappropriation, destruction or diversion of any tangible or intangible asset or corporate opportunity of a Participating Company (including, without limitation, the Participant’s improper use or disclosure of a Participating Company’s confidential or proprietary information); (iv) any intentional act by the Participant which has a material detrimental effect on a Participating Company’s reputation or business; (v) the Participant’s repeated failure or inability to perform any reasonable assigned duties after written notice from a Participating Company of, and a reasonable opportunity to cure, such failure or inability; (vi) any material breach by the Participant of any employment, service, non-disclosure, non-competition, non-solicitation or other similar agreement between the Participant and a Participating Company, which breach is not cured pursuant to the terms of such agreement; or (vii) the Participant’s conviction (including any plea of guilty or *nolo contendere*) of any criminal act involving fraud, dishonesty, misappropriation or moral turpitude, or which impairs the Participant’s ability to perform his or her duties with a Participating Company.

(h) “*Change in Control*” means the occurrence of any one or a combination of the following:

(i) any “person” (as such term is used in Sections 13(d) and 14(d) of the Exchange Act) becomes the “beneficial owner” (as such term is defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities of the Company representing more than fifty percent (50%) of the total Fair Market Value or total combined voting power of the Company’s then-outstanding securities entitled to vote generally in the election of Directors; provided, however, that a Change in Control shall not be deemed to have occurred if such degree of beneficial ownership results from any of the following: (A) an acquisition by any person who on the Effective Date is the beneficial owner of more than fifty percent (50%) of such voting power, (B) any acquisition directly from the Company, including, without limitation, pursuant to or in connection with a public offering of securities, (C) any acquisition by the Company, (D) any acquisition by a trustee or other fiduciary under an employee benefit plan of a Participating Company or (E) any acquisition by an entity owned directly or indirectly by the shareholders of the Company in substantially the same proportions as their ownership of the voting securities of the Company; or

(ii) an Ownership Change Event or series of related Ownership Change Events (collectively, a “*Transaction*”) in which the shareholders of the Company immediately before the Transaction do not retain immediately after the Transaction direct or indirect beneficial ownership of more than fifty percent (50%) of the total combined voting power of the outstanding securities entitled to vote generally in the election of Directors or, in

the case of an Ownership Change Event described in Section 2.1(dd)(iii), the entity to which the assets of the Company were transferred (the “*Transferee*”), as the case may be; or

(iii) a date specified by the Committee following approval by the shareholders of a plan of complete liquidation or dissolution of the Company;

provided, however, that a Change in Control shall be deemed not to include a transaction described in subsections (i) or (ii) of this Section 2.1(h) in which a majority of the members of the board of directors of the continuing, surviving or successor entity, or parent thereof, immediately after such transaction is comprised of Incumbent Directors.

For purposes of the preceding sentence, indirect beneficial ownership shall include, without limitation, an interest resulting from ownership of the voting securities of one or more corporations or other business entities which own the Company or the Transferee, as the case may be, either directly or through one or more subsidiary corporations or other business entities. The Committee shall determine whether multiple events described in subsections (i), (ii) and (iii) of this Section 2.1(h) are related and to be treated in the aggregate as a single Change in Control, and its determination shall be final, binding and conclusive.

(i) “*Code*” means the Internal Revenue Code of 1986, as amended, and any applicable regulations and administrative guidelines promulgated thereunder.

(j) “*Committee*” means the Compensation Committee and such other committee or subcommittee of the Board, if any, duly appointed to administer the Plan and having such powers in each instance as shall be specified by the Board. If, at any time, there is no committee of the Board then authorized or properly constituted to administer the Plan, the Board shall exercise all of the powers of the Committee granted herein, and, in any event, the Board may in its discretion exercise any or all of such powers.

(k) “*Company*” means Adaptive Biotechnologies Corporation, a Washington corporation, and any successor corporation thereto.

(l) “*Consultant*” means a person engaged to provide consulting or advisory services (other than as an Employee or a Director) to a Participating Company, provided that the identity of such person, the nature of such services or the entity to which such services are provided would not preclude the Company from offering or selling securities to such person pursuant to the Plan in reliance on registration on Form S-8 under the Securities Act.

(m) “*Director*” means a member of the Board.

(n) “*Disability*” means, unless such term or an equivalent term is otherwise defined by the applicable Award Agreement or other written agreement between the Participant and a Participating Company applicable to an Award, the permanent and total disability of the Participant, within the meaning of Section 22(e)(3) of the Code.

(o) “*Dividend Equivalent Right*” means the right of a Participant, granted at the discretion of the Committee or as otherwise provided by the Plan, to receive a credit for

the account of such Participant in an amount equal to the cash dividends paid on one share of Stock for each share of Stock represented by an Award held by such Participant.

(p) “**Employee**” means any person treated as an employee (including an Officer or a Director who is also treated as an employee) in the records of a Participating Company and, with respect to any Incentive Stock Option granted to such person, who is an employee for purposes of Section 422 of the Code; provided, however, that neither service as a Director nor payment of a Director’s fee shall be sufficient to constitute employment for purposes of the Plan. The Company shall determine in good faith and in the exercise of its discretion whether an individual has become or has ceased to be an Employee and the effective date of such individual’s employment or termination of employment, as the case may be. For purposes of an individual’s rights, if any, under the terms of the Plan as of the time of the Company’s determination of whether or not the individual is an Employee, all such determinations by the Company shall be final, binding and conclusive as to such rights, if any, notwithstanding that the Company or any court of law or governmental agency subsequently makes a contrary determination as to such individual’s status as an Employee.

(q) “**Exchange Act**” means the Securities Exchange Act of 1934, as amended.

(r) “**Fair Market Value**” means, as of any date, the value of a share of Stock or other property as determined by the Committee, in its discretion, or by the Company, in its discretion, if such determination is expressly allocated to the Company herein, subject to the following:

(i) Except as otherwise determined by the Committee, if, on such date, the Stock is listed or quoted on a national or regional securities exchange or quotation system, the Fair Market Value of a share of Stock shall be the closing price of a share of Stock as quoted on the national or regional securities exchange or quotation system constituting the primary market for the Stock, as reported in *The Wall Street Journal* or such other source as the Company deems reliable. If the relevant date does not fall on a day on which the Stock has traded on such securities exchange or quotation system, the date on which the Fair Market Value shall be established shall be the last day on which the Stock was so traded or quoted prior to the relevant date, or such other appropriate day as shall be determined by the Committee, in its discretion.

(ii) Notwithstanding the foregoing, the Committee may, in its discretion, determine the Fair Market Value of a share of Stock on the basis of the opening, closing, or average of the high and low sale prices of a share of Stock on such date or the preceding trading day, the actual sale price of a share of Stock received by a Participant, any other reasonable basis using actual transactions in the Stock as reported on a national or regional securities exchange or quotation system, or on any other basis consistent with the requirements of Section 409A. The Committee may also determine the Fair Market Value upon the average selling price of the Stock during a specified period that is within thirty (30) days before or thirty (30) days after such date, provided that, with respect to the grant of an Option or SAR, the commitment to grant such Award based on such valuation method must be irrevocable before the beginning of the specified period. The Committee may vary its method of determination of the

Fair Market Value as provided in this Section for different purposes under the Plan to the extent consistent with the requirements of Section 409A.

(iii) If, on such date, the Stock is not listed or quoted on a national or regional securities exchange or quotation system, the Fair Market Value of a share of Stock shall be as determined by the Committee in good faith without regard to any restriction other than a restriction which, by its terms, will never lapse, and in a manner consistent with the requirements of Section 409A.

(s) “**Full Value Award**” means any Award settled in Stock, other than (i) an Option, (ii) a Stock Appreciation Right, or (iii) a Restricted Stock Purchase Right or an Other Stock-Based Award under which the Company will receive monetary consideration equal to the Fair Market Value (determined on the effective date of grant) of the shares subject to such Award.

(t) “**Incentive Stock Option**” means an Option intended to be (as set forth in the Award Agreement) and which qualifies as an incentive stock option within the meaning of Section 422(b) of the Code.

(u) “**Incumbent Director**” means a director who either (i) is a member of the Board as of the Effective Date or (ii) is elected, or nominated for election, to the Board with the affirmative votes of at least a majority of the Incumbent Directors at the time of such election or nomination (but excluding a director who was elected or nominated in connection with an actual or threatened proxy contest relating to the election of directors of the Company).

(v) “**Insider**” means an Officer, a Director or other person whose transactions in Stock are subject to Section 16 of the Exchange Act.

(w) “**Net Exercise**” means a Net Exercise as defined in Section 6.3(b)(iii).

(x) “**Nonemployee Director**” means a Director who is not an Employee.

(y) “**Nonemployee Director Award**” means any Award granted to a Nonemployee Director.

(z) “**Nonstatutory Stock Option**” means an Option not intended to be (as set forth in the Award Agreement) or which does not qualify as an incentive stock option within the meaning of Section 422(b) of the Code.

(aa) “**Officer**” means any person designated by the Board as an officer of the Company.

(bb) “**Option**” means an Incentive Stock Option or a Nonstatutory Stock Option granted pursuant to the Plan.

(cc) “**Other Stock-Based Award**” means an Award denominated in shares of Stock and granted pursuant to Section 11.

(dd) **“Ownership Change Event”** means the occurrence of any of the following with respect to the Company: (i) the direct or indirect sale or exchange in a single or series of related transactions by the shareholders of the Company of securities of the Company representing more than fifty percent (50%) of the total combined voting power of the Company’s then outstanding securities entitled to vote generally in the election of Directors; (ii) a merger or consolidation in which the Company is a party; or (iii) the sale, exchange, or transfer of all or substantially all of the assets of the Company (other than a sale, exchange or transfer to one or more subsidiaries of the Company).

(ee) **“Parent Corporation”** means any present or future “parent corporation” of the Company, as defined in Section 424(e) of the Code.

(ff) **“Participant”** means any eligible person who has been granted one or more Awards.

(gg) **“Participating Company”** means the Company or any Parent Corporation, Subsidiary Corporation or Affiliate.

(hh) **“Participating Company Group”** means, at any point in time, the Company and all other entities collectively which are then Participating Companies.

(ii) **“Performance Award”** means an Award of Performance Shares or Performance Units.

(jj) **“Performance Award Formula”** means, for any Performance Award, a formula or table established by the Committee pursuant to Section 10.3 which provides the basis for computing the value of a Performance Award at one or more levels of attainment of the applicable Performance Goal(s) measured as of the end of the applicable Performance Period.

(kk) **“Performance Goal”** means a performance goal established by the Committee pursuant to Section 10.3.

(ll) **“Performance Period”** means a period established by the Committee pursuant to Section 10.3 at the end of which one or more Performance Goals are to be measured.

(mm) **“Performance Share”** means a right granted to a Participant pursuant to Section 10 to receive a payment equal to the value of a Performance Share, as determined by the Committee, based upon attainment of applicable Performance Goal(s).

(nn) **“Performance Unit”** means a right granted to a Participant pursuant to Section 10 to receive a payment equal to the value of a Performance Unit, as determined by the Committee, based upon attainment of applicable Performance Goal(s).

(oo) **“Predecessor Plan”** means the Company’s 2009 Equity Incentive Plan, as amended.

(pp) **“Restricted Stock Award”** means an Award of a Restricted Stock Bonus or a Restricted Stock Purchase Right.

- (qq) *“Restricted Stock Bonus”* means Stock granted to a Participant pursuant to Section 8.
- (rr) *“Restricted Stock Purchase Right”* means a right to purchase Stock granted to a Participant pursuant to Section 8.
- (ss) *“Restricted Stock Unit”* means a right granted to a Participant pursuant to Section 9 to receive on a future date or occurrence of a future event a share of Stock or cash in lieu thereof, as determined by the Committee.
- (tt) *“Rule 16b-3”* means Rule 16b-3 under the Exchange Act, as amended from time to time, or any successor rule or regulation.
- (uu) *“SAR”* or *“Stock Appreciation Right”* means a right granted to a Participant pursuant to Section 7 to receive payment, for each share of Stock subject to such Award, of an amount equal to the excess, if any, of the Fair Market Value of a share of Stock on the date of exercise of the Award over the exercise price thereof.
- (vv) *“Section 409A”* means Section 409A of the Code.
- (ww) *“Section 409A Deferred Compensation”* means compensation provided pursuant to an Award that constitutes nonqualified deferred compensation within the meaning of Section 409A.
- (xx) *“Securities Act”* means the Securities Act of 1933, as amended.
- (yy) *“Service”* means a Participant’s employment or service with the Participating Company Group, whether as an Employee, a Director or a Consultant. Unless otherwise provided by the Committee, a Participant’s Service shall not be deemed to have terminated merely because of a change in the capacity in which the Participant renders Service or a change in the Participating Company for which the Participant renders Service, provided that there is no interruption or termination of the Participant’s Service. Furthermore, a Participant’s Service shall not be deemed to have been interrupted or terminated if the Participant takes any military leave, sick leave, or other bona fide leave of absence approved by the Company. However, unless otherwise provided by the Committee, if any such leave taken by a Participant exceeds three (3) months, then on the first (1st) day following the end of such three-month period the Participant’s Service shall be deemed to have terminated, unless the Participant’s right to return to Service is guaranteed by statute or contract. Notwithstanding the foregoing, unless otherwise designated by the Company or required by law, an unpaid leave of absence shall not be treated as Service for purposes of determining vesting under the Participant’s Award Agreement. A Participant’s Service shall be deemed to have terminated either upon an actual termination of Service or upon the business entity for which the Participant performs Service ceasing to be a Participating Company. Subject to the foregoing, the Company, in its discretion, shall determine whether the Participant’s Service has terminated and the effective date of and reason for such termination.
- (zz) *“Stock”* means the common stock of the Company, as adjusted from time to time in accordance with Section 4.5.

(aaa) **“Stock Tender Exercise”** means a Stock Tender Exercise as defined in Section 6.3(b)(ii).

(bbb) **“Subsidiary Corporation”** means any present or future “subsidiary corporation” of the Company, as defined in Section 424(f) of the Code.

(ccc) **“Ten Percent Owner”** means a Participant who, at the time an Option is granted to the Participant, owns stock possessing more than ten percent (10%) of the total combined voting power of all classes of stock of a Participating Company (other than an Affiliate) within the meaning of Section 422(b)(6) of the Code.

(ddd) **“Trading Compliance Policy”** means the written policy of the Company pertaining to the purchase, sale, transfer or other disposition of the Company’s equity securities by Directors, Officers, Employees or other service providers who may possess material, nonpublic information regarding the Company or its securities.

(eee) **“Vesting Conditions”** mean those conditions established in accordance with the Plan prior to the satisfaction of which an Award or shares subject to an Award remain subject to forfeiture or a repurchase option in favor of the Company exercisable for the Participant’s monetary purchase price, if any, for such shares upon the Participant’s termination of Service or failure of a performance condition to be satisfied.

2.2 **Construction.** Captions and titles contained herein are for convenience only and shall not affect the meaning or interpretation of any provision of the Plan. Except when otherwise indicated by the context, the singular shall include the plural and the plural shall include the singular. Use of the term “or” is not intended to be exclusive, unless the context clearly requires otherwise.

3. **Administration.**

3.1 **Administration by the Committee.** The Plan shall be administered by the Committee. All questions of interpretation of the Plan, of any Award Agreement or of any other form of agreement or other document employed by the Company in the administration of the Plan or of any Award shall be determined by the Committee, and such determinations shall be final, binding and conclusive upon all persons having an interest in the Plan or such Award, unless fraudulent or made in bad faith. Any and all actions, decisions and determinations taken or made by the Committee in the exercise of its discretion pursuant to the Plan or Award Agreement or other agreement thereunder (other than determining questions of interpretation pursuant to the preceding sentence) shall be final, binding and conclusive upon all persons having an interest therein. All expenses incurred in connection with the administration of the Plan shall be paid by the Company.

3.2 **Authority of Officers.** Any Officer shall have the authority to act on behalf of the Company with respect to any matter, right, obligation, determination or election that is the responsibility of or that is allocated to the Company herein, provided that the Officer has apparent authority with respect to such matter, right, obligation, determination or election. To the extent permitted by applicable law, the Committee may, in its discretion, delegate to a committee comprised of one or more Officers the authority to grant one or more Awards, without

further approval of the Committee, to any Employee, other than a person who, at the time of such grant, is an Insider, and to exercise such other powers under the Plan as the Committee may determine; provided, however, that (a) such Officers may not grant awards for more than 30,000 shares to any Employee in any fiscal year, (b) each such Award shall be subject to the terms and conditions of the appropriate standard form of Award Agreement approved by the Board or the Committee and shall conform to the provisions of the Plan, and (c) each such Award shall conform to such other limits and guidelines as may be established from time to time by the Committee.

3.3 **Administration with Respect to Insiders.** With respect to participation by Insiders in the Plan, at any time that any class of equity security of the Company is registered pursuant to Section 12 of the Exchange Act, the Plan shall be administered in compliance with the requirements, if any, of Rule 16b-3.

3.4 **Powers of the Committee.** In addition to any other powers set forth in the Plan and subject to the provisions of the Plan, the Committee shall have the full and final power and authority, in its discretion:

(a) to determine the persons to whom, and the time or times at which, Awards shall be granted and the number of shares of Stock, units or monetary value to be subject to each Award;

(b) to determine the type of Award granted;

(c) to determine the Fair Market Value of shares of Stock or other property;

(d) to determine the terms, conditions and restrictions applicable to each Award (which need not be identical) and any shares acquired pursuant thereto, including, without limitation, (i) the exercise or purchase price of shares pursuant to any Award, (ii) the method of payment for shares purchased pursuant to any Award, (iii) the method for satisfaction of any tax withholding obligation arising in connection with any Award, including by the withholding or delivery of shares of Stock, (iv) the timing, terms and conditions of the exercisability or vesting of any Award or any shares acquired pursuant thereto, (v) the Performance Measures, Performance Period, Performance Award Formula and Performance Goals applicable to any Award and the extent to which such Performance Goals have been attained, (vi) the time of expiration of any Award, (vii) the effect of any Participant's termination of Service on any of the foregoing, and (viii) all other terms, conditions and restrictions applicable to any Award or shares acquired pursuant thereto not inconsistent with the terms of the Plan;

(e) to determine whether an Award will be settled in shares of Stock, cash, other property or in any combination thereof;

(f) to approve one or more forms of Award Agreement;

(g) to amend, modify, extend, cancel or renew any Award or to waive any restrictions or conditions applicable to any Award or any shares acquired pursuant thereto;

(h) to accelerate, continue, extend or defer the exercisability or vesting of any Award or any shares acquired pursuant thereto, including with respect to the period following a Participant's termination of Service;

(i) to prescribe, amend or rescind rules, guidelines and policies relating to the Plan, or to adopt sub-plans or supplements to, or alternative versions of, the Plan, including, without limitation, as the Committee deems necessary or desirable to comply with the laws of, or to accommodate the tax policy, accounting principles or custom of, foreign jurisdictions whose residents may be granted Awards; and

(j) to correct any defect, supply any omission or reconcile any inconsistency in the Plan or any Award Agreement and to make all other determinations and take such other actions with respect to the Plan or any Award as the Committee may deem advisable to the extent not inconsistent with the provisions of the Plan or applicable law.

3.5 **Option or SAR Repricing.** The Committee shall have the authority, without additional approval by the shareholders of the Company, to approve a program providing for either (a) the cancellation of outstanding Options or SARs having exercise prices per share greater than the then Fair Market Value of a share of Stock ("*Underwater Awards*") and the grant in substitution therefor of new Options or SARs covering the same or a different number of shares but with an exercise price per share equal to the Fair Market Value per share on the new grant date, Full Value Awards, or payments in cash, or (b) the amendment of outstanding Underwater Awards to reduce the exercise price thereof to the Fair Market Value per share on the date of amendment.

3.6 **Indemnification.** In addition to such other rights of indemnification as they may have as members of the Board or the Committee or as officers or employees of the Participating Company Group, to the extent permitted by applicable law, members of the Board or the Committee and any officers or employees of the Participating Company Group to whom authority to act for the Board, the Committee or the Company is delegated shall be indemnified by the Company against all reasonable expenses, including attorneys' fees, actually and necessarily incurred in connection with the defense of any action, suit or proceeding, or in connection with any appeal therein, to which they or any of them may be a party by reason of any action taken or failure to act under or in connection with the Plan, or any right granted hereunder, and against all amounts paid by them in settlement thereof (provided such settlement is approved by independent legal counsel selected by the Company) or paid by them in satisfaction of a judgment in any such action, suit or proceeding, except in relation to matters as to which it shall be adjudged in such action, suit or proceeding that such person is liable for gross negligence, bad faith or intentional misconduct in duties; provided, however, that within sixty (60) days after the institution of such action, suit or proceeding, such person shall offer to the Company, in writing, the opportunity at its own expense to handle and defend the same.

4. **Shares Subject to Plan.**

4.1 **Maximum Number of Shares Issuable.** Subject to adjustment as provided in Sections 4.2, 4.3, 4.4 and 4.5, the maximum aggregate number of shares of Stock that may be

issued under the Plan shall be equal to 15,519,170 shares, and such shares shall consist of authorized but unissued or reacquired shares of Stock or any combination thereof.

4.2 **Annual Increase in Maximum Number of Shares Issuable.** Subject to adjustment as provided in Section 4.5, the maximum aggregate number of shares of Stock that may be issued under the Plan as set forth in Section 4.1 shall be cumulatively increased on January 1, 2020 and on each subsequent January 1, by a number of shares (the “*Annual Increase*”) equal to the lesser of (a) five percent (5%) of the number of shares of Stock issued and outstanding on the immediately preceding December 31, or (b) an amount determined by the Board.

4.3 **Adjustment for Unissued or Forfeited Predecessor Plan Shares.** The maximum aggregate number of shares of Stock that may be issued under the Plan as set forth in Section 4.1 shall be cumulatively increased from time to time by:

(a) the number of shares of Stock subject to that portion of any option or other award outstanding pursuant to the Predecessor Plan as of the Effective Date which, on or after the Effective Date, expires or is terminated or canceled for any reason without having been exercised or settled in full; and

(b) the number of shares of Stock acquired pursuant to the Predecessor Plan subject to forfeiture or repurchase by the Company for an amount not greater than the Participant’s purchase price which, on or after the Effective Date, is so forfeited or repurchased;

provided, however, that the aggregate number of shares of Stock authorized for issuance under the Predecessor Plan that may become authorized for issuance under the Plan pursuant to this Section 4.3 shall not exceed 18,180,587 shares.

4.4 **Share Counting.** If an outstanding Award for any reason expires or is terminated or canceled without having been exercised or settled in full, or if shares of Stock acquired pursuant to an Award subject to forfeiture or repurchase are forfeited or repurchased by the Company for an amount not greater than the Participant’s purchase price, the shares of Stock allocable to the terminated portion of such Award or such forfeited or repurchased shares of Stock shall again be available for issuance under the Plan. Shares of Stock shall not be deemed to have been issued pursuant to the Plan with respect to any portion of an Award that is settled in cash or to the extent that shares are withheld or reacquired by the Company in satisfaction of tax withholding obligations pursuant to Section 16.2. Upon payment in shares of Stock pursuant to the exercise of an SAR, the number of shares available for issuance under the Plan shall be reduced only by the number of shares actually issued in such payment. If the exercise price of an Option is paid by tender to the Company, or attestation to the ownership, of shares of Stock owned by the Participant, or by means of a Net Exercise, the number of shares available for issuance under the Plan shall be reduced by the net number of shares for which the Option is exercised.

4.5 **Adjustments for Changes in Capital Structure.** Subject to any required action by the shareholders of the Company and the requirements of Sections 409A and 424 of the Code to the extent applicable, in the event of any change in the Stock effected without receipt of

accordance with this Section shall not entitle any person to be granted an Award, or, having been granted an Award, to be granted an additional Award.

5.3 **Incentive Stock Option Limitations.**

(a) **Maximum Number of Shares Issuable Pursuant to Incentive Stock Options.** Subject to adjustment as provided in Section 4.5, the maximum aggregate number of shares of Stock that may be issued under the Plan pursuant to the exercise of Incentive Stock Options shall not exceed 33,699,757 shares, cumulatively increased on January 1, 2020 and on each subsequent January 1, by a number of shares equal to the Annual Increase determined under Section 4.2. The maximum aggregate number of shares of Stock that may be issued under the Plan pursuant to all Awards other than Incentive Stock Options shall be the number of shares determined in accordance with Section 4.1, subject to adjustment as provided in Sections 4.2, 4.3, 4.4 and 4.5.

(b) **Persons Eligible.** An Incentive Stock Option may be granted only to a person who, on the effective date of grant, is an Employee of the Company, a Parent Corporation or a Subsidiary Corporation (each being an “*ISO-Qualifying Corporation*”). Any person who is not an Employee of an ISO-Qualifying Corporation on the effective date of the grant of an Option to such person may be granted only a Nonstatutory Stock Option.

(c) **Fair Market Value Limitation.** To the extent that options designated as Incentive Stock Options (granted under all stock plans of the Participating Company Group, including the Plan) become exercisable by a Participant for the first time during any calendar year for stock having a Fair Market Value greater than One Hundred Thousand Dollars (\$100,000), the portion of such options which exceeds such amount shall be treated as Nonstatutory Stock Options. For purposes of this Section, options designated as Incentive Stock Options shall be taken into account in the order in which they were granted, and the Fair Market Value of stock shall be determined as of the time the option with respect to such stock is granted. If the Code is amended to provide for a limitation different from that set forth in this Section, such different limitation shall be deemed incorporated herein effective as of the date and with respect to such Options as required or permitted by such amendment to the Code. If an Option is treated as an Incentive Stock Option in part and as a Nonstatutory Stock Option in part by reason of the limitation set forth in this Section, the Participant may designate which portion of such Option the Participant is exercising. In the absence of such designation, the Participant shall be deemed to have exercised the Incentive Stock Option portion of the Option first. Upon exercise of the Option, shares issued pursuant to each such portion shall be separately identified.

5.4 **Nonemployee Director Award Limit.** The grant date Fair Market Value of all Awards made under the Plan and all other cash compensation paid by the Company to any Nonemployee Director in any calendar year may not exceed \$750,000 for the first year of service and \$600,000 for each year of service thereafter.

6. **Stock Options.**

Options shall be evidenced by Award Agreements specifying the number of shares of Stock covered thereby, in such form as the Committee shall establish. Such Award

Agreements may incorporate all or any of the terms of the Plan by reference and shall comply with and be subject to the following terms and conditions:

6.1 **Exercise Price.** The exercise price for each Option shall be established in the discretion of the Committee; provided, however, that (a) the exercise price per share shall be not less than the Fair Market Value of a share of Stock on the effective date of grant of the Option and (b) no Incentive Stock Option granted to a Ten Percent Owner shall have an exercise price per share less than one hundred ten percent (110%) of the Fair Market Value of a share of Stock on the effective date of grant of the Option. Notwithstanding the foregoing, an Option (whether an Incentive Stock Option or a Nonstatutory Stock Option) may be granted with an exercise price less than the minimum exercise price set forth above if such Option is granted pursuant to an assumption or substitution for another option in a manner that would qualify under the provisions of Section 409A or Section 424(a) of the Code.

6.2 **Exercisability and Term of Options.** Options shall be exercisable at such time or times, or upon such event or events, and subject to such terms, conditions, performance criteria and restrictions as shall be determined by the Committee and set forth in the Award Agreement evidencing such Option; provided, however, that (a) no Option shall be exercisable after the expiration of ten (10) years after the effective date of grant of such Option, (b) no Incentive Stock Option granted to a Ten Percent Owner shall be exercisable after the expiration of five (5) years after the effective date of grant of such Option and (c) no Option granted to an Employee who is a non-exempt employee for purposes of the Fair Labor Standards Act of 1938, as amended, shall be first exercisable until at least six (6) months following the date of grant of such Option (except in the event of such Employee's death, disability or retirement, upon a Change in Control, or as otherwise permitted by the Worker Economic Opportunity Act). Subject to the foregoing, unless otherwise specified by the Committee in the grant of an Option, each Option shall terminate ten (10) years after the effective date of grant of the Option, unless earlier terminated in accordance with its provisions.

6.3 **Payment of Exercise Price.**

(a) **Forms of Consideration Authorized.** Except as otherwise provided below, payment of the exercise price for the number of shares of Stock being purchased pursuant to any Option shall be made (i) in cash, by check or in cash equivalent; (ii) if permitted by the Committee and subject to the limitations contained in Section 6.3(b), by means of (1) a Cashless Exercise, (2) a Stock Tender Exercise or (3) a Net Exercise; (iii) by such other consideration as may be approved by the Committee from time to time to the extent permitted by applicable law, or (iv) by any combination thereof. The Committee may at any time or from time to time grant Options which do not permit all of the foregoing forms of consideration to be used in payment of the exercise price or which otherwise restrict one or more forms of consideration.

(b) **Limitations on Forms of Consideration.**

(i) **Cashless Exercise.** A "*Cashless Exercise*" means the delivery of a properly executed notice of exercise together with irrevocable instructions to a broker providing for the assignment to the Company of the proceeds of a sale or loan with respect to some or all of the shares being acquired upon the exercise of the Option (including,

without limitation, through an exercise complying with the provisions of Regulation T as promulgated from time to time by the Board of Governors of the Federal Reserve System). The Company reserves, at any and all times, the right, in the Company's sole and absolute discretion, to establish, decline to approve or terminate any program or procedures for the exercise of Options by means of a Cashless Exercise, including with respect to one or more Participants specified by the Company notwithstanding that such program or procedures may be available to other Participants.

(ii) **Stock Tender Exercise.** A "**Stock Tender Exercise**" means the delivery of a properly executed exercise notice accompanied by a Participant's tender to the Company, or attestation to the ownership, in a form acceptable to the Company of whole shares of Stock owned by the Participant having a Fair Market Value that does not exceed the aggregate exercise price for the shares with respect to which the Option is exercised. A Stock Tender Exercise shall not be permitted if it would constitute a violation of the provisions of any law, regulation or agreement restricting the redemption of the Company's stock. If required by the Company, an Option may not be exercised by tender to the Company, or attestation to the ownership, of shares of Stock unless such shares either have been owned by the Participant for a period of time required by the Company (and not used for another option exercise by attestation during such period) or were not acquired, directly or indirectly, from the Company.

(iii) **Net Exercise.** A "**Net Exercise**" means the delivery of a properly executed exercise notice followed by a procedure pursuant to which (1) the Company will reduce the number of shares otherwise issuable to a Participant upon the exercise of an Option by the largest whole number of shares having a Fair Market Value that does not exceed the aggregate exercise price for the shares with respect to which the Option is exercised, and (2) the Participant shall pay to the Company in cash the remaining balance of such aggregate exercise price not satisfied by such reduction in the number of whole shares to be issued.

6.4 **Effect of Termination of Service.**

(a) **Option Exercisability.** Subject to earlier termination of the Option as otherwise provided by this Plan and unless otherwise provided by the Committee, an Option shall terminate immediately upon the Participant's termination of Service to the extent that it is then unvested and shall be exercisable after the Participant's termination of Service to the extent it is then vested only during the applicable time period determined in accordance with this Section and thereafter shall terminate.

(i) **Disability.** If the Participant's Service terminates because of the Disability of the Participant, the Option, to the extent unexercised and exercisable for vested shares on the date on which the Participant's Service terminated, may be exercised by the Participant (or the Participant's guardian or legal representative) at any time prior to the expiration of twelve (12) months (or such longer or shorter period provided by the Award Agreement) after the date on which the Participant's Service terminated, but in any event no later than the date of expiration of the Option's term as set forth in the Award Agreement evidencing such Option (the "**Option Expiration Date**").

(ii) **Death.** If the Participant's Service terminates because of the death of the Participant, the Option, to the extent unexercised and exercisable for vested shares on the date on which the Participant's Service terminated, may be exercised by the Participant's legal representative or other person who acquired the right to exercise the Option by reason of the Participant's death at any time prior to the expiration of twelve (12) months (or such longer or shorter period provided by the Award Agreement) after the date on which the Participant's Service terminated, but in any event no later than the Option Expiration Date. The Participant's Service shall be deemed to have terminated on account of death if the Participant dies within three (3) months (or such longer or shorter period provided by the Award Agreement) after the Participant's termination of Service.

(iii) **Termination for Cause.** Notwithstanding any other provision of the Plan to the contrary, if the Participant's Service is terminated for Cause or if, following the Participant's termination of Service and during any period in which the Option otherwise would remain exercisable, the Participant engages in any act that would constitute Cause, the Option shall terminate in its entirety and cease to be exercisable immediately upon such termination of Service or act.

(iv) **Other Termination of Service.** If the Participant's Service terminates for any reason, except Disability, death or Cause, the Option, to the extent unexercised and exercisable for vested shares on the date on which the Participant's Service terminated, may be exercised by the Participant at any time prior to the expiration of three (3) months (or such longer or shorter period provided by the Award Agreement) after the date on which the Participant's Service terminated, but in any event no later than the Option Expiration Date.

(b) **Extension if Exercise Prevented by Law.** Notwithstanding the foregoing, other than termination of Service for Cause, if the exercise of an Option within the applicable time periods set forth in Section 6.4(a) is prevented by the provisions of Section 14 below, the Option shall remain exercisable until the later of (i) thirty (30) days after the date such exercise first would no longer be prevented by such provisions or (ii) the end of the applicable time period under Section 6.4(a), but in any event no later than the Option Expiration Date.

6.5 **Transferability of Options.** During the lifetime of the Participant, an Option shall be exercisable only by the Participant or the Participant's guardian or legal representative. An Option shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. Notwithstanding the foregoing, to the extent permitted by the Committee, in its discretion, and set forth in the Award Agreement evidencing such Option, an Option shall be assignable or transferable subject to the applicable limitations, if any, described in the General Instructions to Form S-8 under the Securities Act or, in the case of an Incentive Stock Option, only as permitted by applicable regulations under Section 421 of the Code in a manner that does not disqualify such Option as an Incentive Stock Option.

7. **Stock Appreciation Rights.**

Stock Appreciation Rights shall be evidenced by Award Agreements specifying the number of shares of Stock subject to the Award, in such form as the Committee shall establish. Such Award Agreements may incorporate all or any of the terms of the Plan by reference and shall comply with and be subject to the following terms and conditions:

7.1 **Types of SARs Authorized.** SARs may be granted in tandem with all or any portion of a related Option (a “*Tandem SAR*”) or may be granted independently of any Option (a “*Freestanding SAR*”). A Tandem SAR may only be granted concurrently with the grant of the related Option.

7.2 **Exercise Price.** The exercise price for each SAR shall be established in the discretion of the Committee; provided, however, that (a) the exercise price per share subject to a Tandem SAR shall be the exercise price per share under the related Option and (b) the exercise price per share subject to a Freestanding SAR shall be not less than the Fair Market Value of a share of Stock on the effective date of grant of the SAR. Notwithstanding the foregoing, an SAR may be granted with an exercise price lower than the minimum exercise price set forth above if such SAR is granted pursuant to an assumption or substitution for another stock appreciation right in a manner that would qualify under the provisions of Section 409A of the Code.

7.3 **Exercisability and Term of SARs.**

(a) **Tandem SARs.** Tandem SARs shall be exercisable only at the time and to the extent, and only to the extent, that the related Option is exercisable, subject to such provisions as the Committee may specify where the Tandem SAR is granted with respect to less than the full number of shares of Stock subject to the related Option. The Committee may, in its discretion, provide in any Award Agreement evidencing a Tandem SAR that such SAR may not be exercised without the advance approval of the Company and, if such approval is not given, then the Option shall nevertheless remain exercisable in accordance with its terms. A Tandem SAR shall terminate and cease to be exercisable no later than the date on which the related Option expires or is terminated or canceled. Upon the exercise of a Tandem SAR with respect to some or all of the shares subject to such SAR, the related Option shall be canceled automatically as to the number of shares with respect to which the Tandem SAR was exercised. Upon the exercise of an Option related to a Tandem SAR as to some or all of the shares subject to such Option, the related Tandem SAR shall be canceled automatically as to the number of shares with respect to which the related Option was exercised.

(b) **Freestanding SARs.** Freestanding SARs shall be exercisable at such time or times, or upon such event or events, and subject to such terms, conditions, performance criteria and restrictions as shall be determined by the Committee and set forth in the Award Agreement evidencing such SAR; provided, however, that (i) no Freestanding SAR shall be exercisable after the expiration of ten (10) years after the effective date of grant of such SAR and (ii) no Freestanding SAR granted to an Employee who is a non-exempt employee for purposes of the Fair Labor Standards Act of 1938, as amended, shall be first exercisable until at least six (6) months following the date of grant of such SAR (except in the event of such Employee’s death, disability or retirement, upon a Change in Control, or as otherwise permitted by the Worker

Economic Opportunity Act). Subject to the foregoing, unless otherwise specified by the Committee in the grant of a Freestanding SAR, each Freestanding SAR shall terminate ten (10) years after the effective date of grant of the SAR, unless earlier terminated in accordance with its provisions.

7.4 **Exercise of SARs.** Upon the exercise (or deemed exercise pursuant to Section 7.5) of an SAR, the Participant (or the Participant's legal representative or other person who acquired the right to exercise the SAR by reason of the Participant's death) shall be entitled to receive payment of an amount for each share with respect to which the SAR is exercised equal to the excess, if any, of the Fair Market Value of a share of Stock on the date of exercise of the SAR over the exercise price. Payment of such amount shall be made (a) in the case of a Tandem SAR, solely in shares of Stock in a lump sum upon the date of exercise of the SAR and (b) in the case of a Freestanding SAR, in cash, shares of Stock, or any combination thereof as determined by the Committee, in a lump sum upon the date of exercise of the SAR. When payment is to be made in shares of Stock, the number of shares to be issued shall be determined on the basis of the Fair Market Value of a share of Stock on the date of exercise of the SAR. For purposes of Section 7, an SAR shall be deemed exercised on the date on which the Company receives notice of exercise from the Participant or as otherwise provided in Section 7.5.

7.5 **Deemed Exercise of SARs.** If, on the date on which an SAR would otherwise terminate or expire, the SAR by its terms remains exercisable immediately prior to such termination or expiration and, if so exercised, would result in a payment to the holder of such SAR, then any portion of such SAR which has not previously been exercised shall automatically be deemed to be exercised as of such date with respect to such portion.

7.6 **Effect of Termination of Service.** Subject to earlier termination of the SAR as otherwise provided herein and unless otherwise provided by the Committee, an SAR shall be exercisable after a Participant's termination of Service only to the extent and during the applicable time period determined in accordance with Section 6.4 (treating the SAR as if it were an Option) and thereafter shall terminate.

7.7 **Transferability of SARs.** During the lifetime of the Participant, an SAR shall be exercisable only by the Participant or the Participant's guardian or legal representative. An SAR shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. Notwithstanding the foregoing, to the extent permitted by the Committee, in its discretion, and set forth in the Award Agreement evidencing such Award, a Tandem SAR related to a Nonstatutory Stock Option or a Freestanding SAR shall be assignable or transferable subject to the applicable limitations, if any, described in the General Instructions to Form S-8 under the Securities Act.

8. **Restricted Stock Awards.**

Restricted Stock Awards shall be evidenced by Award Agreements specifying whether the Award is a Restricted Stock Bonus or a Restricted Stock Purchase Right and the number of shares of Stock subject to the Award, in such form as the Committee shall establish.

Such Award Agreements may incorporate all or any of the terms of the Plan by reference and shall comply with and be subject to the following terms and conditions:

8.1 **Types of Restricted Stock Awards Authorized.** Restricted Stock Awards may be granted in the form of either a Restricted Stock Bonus or a Restricted Stock Purchase Right. Restricted Stock Awards may be granted upon such conditions as the Committee shall determine, including, without limitation, upon the attainment of one or more Performance Goals described in Section 10.4. If either the grant of or satisfaction of Vesting Conditions applicable to a Restricted Stock Award is to be contingent upon the attainment of one or more Performance Goals, the Committee shall follow procedures substantially equivalent to those set forth in Sections 10.3 through 10.5(a).

8.2 **Purchase Price.** The purchase price for shares of Stock issuable under each Restricted Stock Purchase Right shall be established by the Committee in its discretion. No monetary payment (other than applicable tax withholding) shall be required as a condition of receiving shares of Stock pursuant to a Restricted Stock Bonus, the consideration for which shall be services actually rendered to a Participating Company or for its benefit. Notwithstanding the foregoing, if required by applicable state corporate law, the Participant shall furnish consideration in the form of cash or past services rendered to a Participating Company or for its benefit having a value not less than the par value of the shares of Stock subject to a Restricted Stock Award.

8.3 **Purchase Period.** A Restricted Stock Purchase Right shall be exercisable within a period established by the Committee, which shall in no event exceed thirty (30) days from the effective date of the grant of the Restricted Stock Purchase Right.

8.4 **Payment of Purchase Price.** Except as otherwise provided below, payment of the purchase price for the number of shares of Stock being purchased pursuant to any Restricted Stock Purchase Right shall be made (a) in cash, by check or in cash equivalent, (b) by such other consideration as may be approved by the Committee from time to time to the extent permitted by applicable law, or (c) by any combination thereof.

8.5 **Vesting and Restrictions on Transfer.** Shares issued pursuant to any Restricted Stock Award may (but need not) be made subject to Vesting Conditions based upon the satisfaction of such Service requirements, conditions, restrictions or performance criteria, including, without limitation, Performance Goals as described in Section 10.4, as shall be established by the Committee and set forth in the Award Agreement evidencing such Award. During any period in which shares acquired pursuant to a Restricted Stock Award remain subject to Vesting Conditions, such shares may not be sold, exchanged, transferred, pledged, assigned or otherwise disposed of other than pursuant to an Ownership Change Event or as provided in Section 8.8. The Committee, in its discretion, may provide in any Award Agreement evidencing a Restricted Stock Award that, if the satisfaction of Vesting Conditions with respect to any shares subject to such Restricted Stock Award would otherwise occur on a day on which the sale of such shares would violate the provisions of the Trading Compliance Policy, then satisfaction of the Vesting Conditions automatically shall be determined on the next trading day on which the sale of such shares would not violate the Trading Compliance Policy. Upon request by the Company, each Participant shall execute any agreement evidencing such transfer restrictions

prior to the receipt of shares of Stock hereunder and shall promptly present to the Company any and all certificates representing shares of Stock acquired hereunder for the placement on such certificates of appropriate legends evidencing any such transfer restrictions.

8.6 **Voting Rights; Dividends and Distributions.** Except as provided in this Section, Section 8.5, and any Award Agreement, during any period in which shares acquired pursuant to a Restricted Stock Award remain subject to Vesting Conditions, the Participant shall have all of the rights of a shareholder of the Company holding shares of Stock, including the right to vote such shares and to receive all dividends and other distributions paid with respect to such shares; provided, however, that such dividends and distributions shall be subject to the same Vesting Conditions as the shares subject to the Restricted Stock Award with respect to which such dividends or distributions were paid, and otherwise shall be paid no later than the end of the calendar year in which such dividends or distributions are paid to shareholders (or, if later, the 15th day of the third month following the date such dividends or distributions are paid to shareholders). In the event of a dividend or distribution paid in shares of Stock or other property or any other adjustment made upon a change in the capital structure of the Company as described in Section 4.5, any and all new, substituted or additional securities or other property (other than regular, periodic cash dividends) to which the Participant is entitled by reason of the Participant's Restricted Stock Award shall be immediately subject to the same Vesting Conditions as the shares subject to the Restricted Stock Award with respect to which such dividends or distributions were paid or adjustments were made.

8.7 **Effect of Termination of Service.** Unless otherwise provided by the Committee in the Award Agreement evidencing a Restricted Stock Award, if a Participant's Service terminates for any reason, whether voluntary or involuntary (including the Participant's death or disability), then (a) the Company shall have the option to repurchase for the purchase price paid by the Participant any shares acquired by the Participant pursuant to a Restricted Stock Purchase Right which remain subject to Vesting Conditions as of the date of the Participant's termination of Service and (b) the Participant shall forfeit to the Company any shares acquired by the Participant pursuant to a Restricted Stock Bonus which remain subject to Vesting Conditions as of the date of the Participant's termination of Service. The Company shall have the right to assign at any time any repurchase right it may have, whether or not such right is then exercisable, to one or more persons as may be selected by the Company.

8.8 **Nontransferability of Restricted Stock Award Rights.** Rights to acquire shares of Stock pursuant to a Restricted Stock Award shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or the laws of descent and distribution. All rights with respect to a Restricted Stock Award granted to a Participant hereunder shall be exercisable during his or her lifetime only by such Participant or the Participant's guardian or legal representative.

9. **Restricted Stock Units.**

Restricted Stock Unit Awards shall be evidenced by Award Agreements specifying the number of Restricted Stock Units subject to the Award, in such form as the Committee shall establish. Such Award Agreements may incorporate all or any of the terms of

the Plan by reference and shall comply with and be subject to the following terms and conditions:

9.1 **Grant of Restricted Stock Unit Awards.** Restricted Stock Unit Awards may be granted upon such conditions as the Committee shall determine, including, without limitation, upon the attainment of one or more Performance Goals described in Section 10.4. If either the grant of a Restricted Stock Unit Award or the Vesting Conditions with respect to such Award is to be contingent upon the attainment of one or more Performance Goals, the Committee shall follow procedures substantially equivalent to those set forth in Sections 10.3 through 10.5(a).

9.2 **Purchase Price.** No monetary payment (other than applicable tax withholding, if any) shall be required as a condition of receiving a Restricted Stock Unit Award, the consideration for which shall be services actually rendered to a Participating Company or for its benefit. Notwithstanding the foregoing, if required by applicable state corporate law, the Participant shall furnish consideration in the form of cash or past services rendered to a Participating Company or for its benefit having a value not less than the par value of the shares of Stock issued upon settlement of the Restricted Stock Unit Award.

9.3 **Vesting.** Restricted Stock Unit Awards may (but need not) be made subject to Vesting Conditions based upon the satisfaction of such Service requirements, conditions, restrictions or performance criteria, including, without limitation, Performance Goals as described in Section 10.4, as shall be established by the Committee and set forth in the Award Agreement evidencing such Award.

9.4 **Voting Rights, Dividend Equivalent Rights and Distributions.** Participants shall have no voting rights with respect to shares of Stock represented by Restricted Stock Units until the date of the issuance of such shares (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). However, the Committee, in its discretion, may provide in the Award Agreement evidencing any Restricted Stock Unit Award that the Participant shall be entitled to Dividend Equivalent Rights with respect to the payment of cash dividends on Stock during the period beginning on the date such Award is granted and ending, with respect to each share subject to the Award, on the earlier of the date the Award is settled or the date on which it is terminated. Dividend Equivalent Rights, if any, shall be paid by crediting the Participant with a cash amount or with additional whole Restricted Stock Units as of the date of payment of such cash dividends on Stock, as determined by the Committee. The number of additional Restricted Stock Units (rounded to the nearest whole number), if any, to be credited shall be determined by dividing (a) the amount of cash dividends paid on the dividend payment date with respect to the number of shares of Stock represented by the Restricted Stock Units previously credited to the Participant by (b) the Fair Market Value per share of Stock on such date. If so determined by the Committee and provided by the Award Agreement, such cash amount or additional Restricted Stock Units shall be subject to the same terms and conditions and shall be settled in the same manner and at the same time as the Restricted Stock Units originally subject to the Restricted Stock Unit Award. In the event of a dividend or distribution paid in shares of Stock or other property or any other adjustment made upon a change in the capital structure of the Company as described in Section 4.5, appropriate adjustments shall be made in the Participant's Restricted Stock Unit Award so that it represents the right to receive upon settlement any and all new, substituted or additional securities or other

property (other than regular, periodic cash dividends) to which the Participant would be entitled by reason of the shares of Stock issuable upon settlement of the Award, and all such new, substituted or additional securities or other property shall be immediately subject to the same Vesting Conditions as are applicable to the Award.

9.5 **Effect of Termination of Service.** Unless otherwise provided by the Committee and set forth in the Award Agreement evidencing a Restricted Stock Unit Award, if a Participant's Service terminates for any reason, whether voluntary or involuntary (including the Participant's death or disability), then the Participant shall forfeit to the Company any Restricted Stock Units pursuant to the Award which remain subject to Vesting Conditions as of the date of the Participant's termination of Service.

9.6 **Settlement of Restricted Stock Unit Awards.** The Company shall issue to a Participant on the date on which Restricted Stock Units subject to the Participant's Restricted Stock Unit Award vest or on such other date determined by the Committee in compliance with Section 409A, if applicable, and set forth in the Award Agreement one (1) share of Stock (and/or any other new, substituted or additional securities or other property pursuant to an adjustment described in Section 9.4) for each Restricted Stock Unit then becoming vested or otherwise to be settled on such date, subject to the withholding of applicable taxes, if any. The Committee, in its discretion, may provide in any Award Agreement evidencing a Restricted Stock Unit Award that if the settlement date with respect to any shares issuable upon vesting of Restricted Stock Units would otherwise occur on a day on which the sale of such shares would violate the provisions of the Trading Compliance Policy, then the settlement date shall be deferred until the next trading day on which the sale of such shares would not violate the Trading Compliance Policy but in any event no later than the 15th day of the third calendar month following the year in which such Restricted Stock Units vest. If permitted by the Committee, the Participant may elect, consistent with the requirements of Section 409A, to defer receipt of all or any portion of the shares of Stock or other property otherwise issuable to the Participant pursuant to this Section, and such deferred issuance date(s) and amount(s) elected by the Participant shall be set forth in the Award Agreement. Notwithstanding the foregoing, the Committee, in its discretion, may provide for settlement of any Restricted Stock Unit Award by payment to the Participant in cash of an amount equal to the Fair Market Value on the payment date of the shares of Stock or other property otherwise issuable to the Participant pursuant to this Section.

9.7 **Nontransferability of Restricted Stock Unit Awards.** The right to receive shares pursuant to a Restricted Stock Unit Award shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. All rights with respect to a Restricted Stock Unit Award granted to a Participant hereunder shall be exercisable during his or her lifetime only by such Participant or the Participant's guardian or legal representative.

10. **Performance Awards.**

Performance Awards shall be evidenced by Award Agreements in such form as the Committee shall establish. Such Award Agreements may incorporate all or any of the terms

of the Plan by reference and shall comply with and be subject to the following terms and conditions:

10.1 **Types of Performance Awards Authorized.** Performance Awards may be granted in the form of either Performance Shares or Performance Units. Each Award Agreement evidencing a Performance Award shall specify the number of Performance Shares or Performance Units subject thereto, the Performance Award Formula, the Performance Goal(s) and Performance Period applicable to the Award, and the other terms, conditions and restrictions of the Award.

10.2 **Initial Value of Performance Shares and Performance Units.** Unless otherwise provided by the Committee in granting a Performance Award, each Performance Share shall have an initial monetary value equal to the Fair Market Value of one (1) share of Stock, subject to adjustment as provided in Section 4.5, on the effective date of grant of the Performance Share, and each Performance Unit shall have an initial monetary value established by the Committee at the time of grant. The final value payable to the Participant in settlement of a Performance Award determined on the basis of the applicable Performance Award Formula will depend on the extent to which Performance Goals established by the Committee are attained within the applicable Performance Period established by the Committee.

10.3 **Establishment of Performance Period, Performance Goals and Performance Award Formula.** In granting each Performance Award, the Committee shall establish in writing the applicable Performance Period, Performance Award Formula and one or more Performance Goals which, when measured at the end of the Performance Period, shall determine on the basis of the Performance Award Formula the final value of the Performance Award to be paid to the Participant. The Company shall notify each Participant granted a Performance Award of the terms of such Award, including the Performance Period, Performance Goal(s) and Performance Award Formula.

10.4 **Measurement of Performance Goals.** Performance Goals shall be established by the Committee on the basis of targets to be attained ("**Performance Targets**") with respect to one or more measures of business or financial performance or other criteria established by the Committee (each, a "**Performance Measure**"), subject to the following:

(a) **Performance Measures.** Performance Measures based on objective criteria shall be calculated in accordance with the Company's financial statements, or, if such measures are not reported in the Company's financial statements, they shall be calculated in accordance with generally accepted accounting principles, a method used generally in the Company's industry, or in accordance with a methodology established by the Committee prior to the grant of the Performance Award. Performance Measures based on subjective criteria shall be determined on the basis established by the Committee in granting the Award. As specified by the Committee, Performance Measures may be calculated with respect to the Company and each Subsidiary Corporation consolidated therewith for financial reporting purposes, one or more Subsidiary Corporations or such division or other business unit of any of them selected by the Committee. Unless otherwise determined by the Committee prior to the grant of the Performance Award, the Performance Measures applicable to the Performance Award shall be calculated prior to the accrual of expense for any Performance Award for the same Performance

Period and excluding the effect (whether positive or negative) on the Performance Measures of any change in accounting standards or any unusual or infrequently occurring event or transaction, as determined by the Committee, occurring after the establishment of the Performance Goals applicable to the Performance Award. Each such adjustment, if any, shall be made solely for the purpose of providing a consistent basis from period to period for the calculation of Performance Measures in order to prevent the dilution or enlargement of the Participant's rights with respect to a Performance Award. Performance Measures may be based upon one or more of the following, without limitation, as determined by the Committee:

- (i) revenue;
- (ii) sales;
- (iii) expenses;
- (iv) operating income;
- (v) gross margin;
- (vi) operating margin;
- (vii) earnings before any one or more of: stock-based compensation expense, interest, taxes, depreciation and amortization;
- (viii) pre-tax profit;
- (ix) net operating income;
- (x) net income;
- (xi) economic value added;
- (xii) free cash flow;
- (xiii) operating cash flow;
- (xiv) balance of cash, cash equivalents and marketable securities;
- (xv) stock price;
- (xvi) earnings per share;
- (xvii) return on shareholder equity;
- (xviii) return on capital;
- (xix) return on assets;
- (xx) return on investment;

- (xxi) total shareholder return;
- (xxii) employee satisfaction;
- (xxiii) employee retention;
- (xxiv) market share;
- (xxv) customer satisfaction;
- (xxvi) product development;
- (xxvii) research and development expenses;
- (xxviii) completion of an identified special project;
- (xxix) completion of a joint venture or other corporate transaction; and
- (xxx) personal performance objectives established for an individual Participant or group of Participants.

(b) **Performance Targets.** Performance Targets may include a minimum, maximum, target level and intermediate levels of performance, with the final value of a Performance Award determined under the applicable Performance Award Formula by the Performance Target level attained during the applicable Performance Period. A Performance Target may be stated as an absolute value, an increase or decrease in a value, or as a value determined relative to an index, budget or other standard selected by the Committee.

10.5 Settlement of Performance Awards.

(a) **Determination of Final Value.** As soon as practicable following the completion of the Performance Period applicable to a Performance Award, the Committee shall determine the extent to which the applicable Performance Goals have been attained and the resulting final value of the Award earned by the Participant and to be paid upon its settlement in accordance with the applicable Performance Award Formula.

(b) **Discretionary Adjustment of Award Formula.** In its discretion, the Committee may, either at the time it grants a Performance Award or at any time thereafter, provide for the positive or negative adjustment of the Performance Award Formula applicable to a Performance Award to reflect such Participant's individual performance in his or her position with the Company or such other factors as the Committee may determine.

(c) **Effect of Leaves of Absence.** Unless otherwise required by law or a Participant's Award Agreement, payment of the final value, if any, of a Performance Award held by a Participant who has taken in excess of thirty (30) days in unpaid leaves of absence during a Performance Period shall be prorated on the basis of the number of days of the Participant's

Service during the Performance Period during which the Participant was not on an unpaid leave of absence.

(d) **Notice to Participants.** As soon as practicable following the Committee's determination in accordance with Sections 10.5(a) and (b), the Company shall notify each Participant of the determination of the Committee.

(e) **Payment in Settlement of Performance Awards.** As soon as practicable following the Committee's determination in accordance with Sections 10.5(a) and (b), but in any event within the Short-Term Deferral Period described in Section 15.1 (except as otherwise provided below or consistent with the requirements of Section 409A), payment shall be made to each eligible Participant (or such Participant's legal representative or other person who acquired the right to receive such payment by reason of the Participant's death) of the final value of the Participant's Performance Award. Payment of such amount shall be made in cash, shares of Stock, or a combination thereof as determined by the Committee. Unless otherwise provided in the Award Agreement evidencing a Performance Award, payment shall be made in a lump sum. If permitted by the Committee, the Participant may elect, consistent with the requirements of Section 409A, to defer receipt of all or any portion of the payment to be made to the Participant pursuant to this Section, and such deferred payment date(s) elected by the Participant shall be set forth in the Award Agreement. If any payment is to be made on a deferred basis, the Committee may, but shall not be obligated to, provide for the payment during the deferral period of Dividend Equivalent Rights or interest.

(f) **Provisions Applicable to Payment in Shares.** If payment is to be made in shares of Stock, the number of such shares shall be determined by dividing the final value of the Performance Award by the Fair Market Value of a share of Stock determined by the method specified in the Award Agreement. Shares of Stock issued in payment of any Performance Award may be fully vested and freely transferable shares or may be shares of Stock subject to Vesting Conditions as provided in Section 8.5. Any shares subject to Vesting Conditions shall be evidenced by an appropriate Award Agreement and shall be subject to the provisions of Sections 8.5 through 8.8 above.

10.6 **Voting Rights; Dividend Equivalent Rights and Distributions.** Participants shall have no voting rights with respect to shares of Stock represented by Performance Share Awards until the date of the issuance of such shares, if any (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). However, the Committee, in its discretion, may provide in the Award Agreement evidencing any Performance Share Award that the Participant shall be entitled to Dividend Equivalent Rights with respect to the payment of cash dividends on Stock during the period beginning on the date the Award is granted and ending, with respect to each share subject to the Award, on the earlier of the date on which the Performance Shares are settled or the date on which they are forfeited. Such Dividend Equivalent Rights, if any, shall be credited to the Participant either in cash or in the form of additional whole Performance Shares as of the date of payment of such cash dividends on Stock, as determined by the Committee. The number of additional Performance Shares (rounded to the nearest whole number), if any, to be so credited shall be determined by dividing (a) the amount of cash dividends paid on the dividend payment date with respect to the number of shares of Stock represented by the Performance Shares

previously credited to the Participant by (b) the Fair Market Value per share of Stock on such date. Dividend Equivalent Rights, if any, shall be accumulated and paid to the extent that the related Performance Shares become nonforfeitable. Settlement of Dividend Equivalent Rights may be made in cash, shares of Stock, or a combination thereof as determined by the Committee, and may be paid on the same basis as settlement of the related Performance Share as provided in Section 10.5. Dividend Equivalent Rights shall not be paid with respect to Performance Units. In the event of a dividend or distribution paid in shares of Stock or other property or any other adjustment made upon a change in the capital structure of the Company as described in Section 4.5, appropriate adjustments shall be made in the Participant's Performance Share Award so that it represents the right to receive upon settlement any and all new, substituted or additional securities or other property (other than regular, periodic cash dividends) to which the Participant would be entitled by reason of the shares of Stock issuable upon settlement of the Performance Share Award, and all such new, substituted or additional securities or other property shall be immediately subject to the same Performance Goals as are applicable to the Award.

10.7 **Effect of Termination of Service.** Unless otherwise provided by the Committee and set forth in the Award Agreement evidencing a Performance Award, the effect of a Participant's termination of Service on the Performance Award shall be as follows:

(a) **Death or Disability.** If the Participant's Service terminates because of the death or Disability of the Participant before the completion of the Performance Period applicable to the Performance Award, the final value of the Participant's Performance Award shall be determined by the extent to which the applicable Performance Goals have been attained with respect to the entire Performance Period and shall be prorated based on the number of months of the Participant's Service during the Performance Period. Payment shall be made following the end of the Performance Period in any manner permitted by Section 10.5.

(b) **Other Termination of Service.** If the Participant's Service terminates for any reason except death or Disability before the completion of the Performance Period applicable to the Performance Award, such Award shall be forfeited in its entirety; provided, however, that in the event of an involuntary termination of the Participant's Service, the Committee, in its discretion, may waive the automatic forfeiture of all or any portion of any such Award and determine the final value of the Performance Award in the manner provided by Section 10.7(a). Payment of any amount pursuant to this Section shall be made following the end of the Performance Period in any manner permitted by Section 10.5.

10.8 **Nontransferability of Performance Awards.** Prior to settlement in accordance with the provisions of the Plan, no Performance Award shall be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. All rights with respect to a Performance Award granted to a Participant hereunder shall be exercisable during his or her lifetime only by such Participant or the Participant's guardian or legal representative.

11. **Cash-Based Awards and Other Stock-Based Awards.**

Cash-Based Awards and Other Stock-Based Awards shall be evidenced by Award Agreements in such form as the Committee shall establish. Such Award Agreements may incorporate all or any of the terms of the Plan by reference and shall comply with and be subject to the following terms and conditions:

11.1 **Grant of Cash-Based Awards.** Subject to the provisions of the Plan, the Committee, at any time and from time to time, may grant Cash-Based Awards to Participants in such amounts and upon such terms and conditions, including the achievement of performance criteria, as the Committee may determine.

11.2 **Grant of Other Stock-Based Awards.** The Committee may grant other types of equity-based or equity-related Awards not otherwise described by the terms of this Plan (including the grant or offer for sale of unrestricted securities, stock-equivalent units, stock appreciation units, securities or debentures convertible into common stock or other forms determined by the Committee) in such amounts and subject to such terms and conditions as the Committee shall determine. Other Stock-Based Awards may be made available as a form of payment in the settlement of other Awards or as payment in lieu of compensation to which a Participant is otherwise entitled. Other Stock-Based Awards may involve the transfer of actual shares of Stock to Participants, or payment in cash or otherwise of amounts based on the value of Stock and may include, without limitation, Awards designed to comply with or take advantage of the applicable local laws of jurisdictions other than the United States.

11.3 **Value of Cash-Based and Other Stock-Based Awards.** Each Cash-Based Award shall specify a monetary payment amount or payment range as determined by the Committee. Each Other Stock-Based Award shall be expressed in terms of shares of Stock or units based on such shares of Stock, as determined by the Committee. The Committee may require the satisfaction of such Service requirements, conditions, restrictions or performance criteria, including, without limitation, Performance Goals as described in Section 10.4, as shall be established by the Committee and set forth in the Award Agreement evidencing such Award. If the Committee exercises its discretion to establish performance criteria, the final value of Cash-Based Awards or Other Stock-Based Awards that will be paid to the Participant will depend on the extent to which the performance criteria are met.

11.4 **Payment or Settlement of Cash-Based Awards and Other Stock-Based Awards.** Payment or settlement, if any, with respect to a Cash-Based Award or an Other Stock-Based Award shall be made in accordance with the terms of the Award, in cash, shares of Stock or other securities or any combination thereof as the Committee determines. To the extent applicable, payment or settlement with respect to each Cash-Based Award and Other Stock-Based Award shall be made in compliance with the requirements of Section 409A.

11.5 **Voting Rights; Dividend Equivalent Rights and Distributions.** Participants shall have no voting rights with respect to shares of Stock represented by Other Stock-Based Awards until the date of the issuance of such shares of Stock (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company), if any, in settlement of such Award. However, the Committee, in its discretion, may provide in the Award Agreement evidencing any Other Stock-Based Award that the Participant shall be entitled to Dividend Equivalent Rights with respect to the payment of cash dividends on

Stock during the period beginning on the date such Award is granted and ending, with respect to each share subject to the Award, on the earlier of the date the Award is settled or the date on which it is terminated. Such Dividend Equivalent Rights, if any, shall be paid in accordance with the provisions set forth in Section 9.4. Dividend Equivalent Rights shall not be granted with respect to Cash-Based Awards. In the event of a dividend or distribution paid in shares of Stock or other property or any other adjustment made upon a change in the capital structure of the Company as described in Section 4.5, appropriate adjustments shall be made in the Participant's Other Stock-Based Award so that it represents the right to receive upon settlement any and all new, substituted or additional securities or other property (other than regular, periodic cash dividends) to which the Participant would be entitled by reason of the shares of Stock issuable upon settlement of such Award, and all such new, substituted or additional securities or other property shall be immediately subject to the same Vesting Conditions and performance criteria, if any, as are applicable to the Award.

11.6 **Effect of Termination of Service.** Each Award Agreement evidencing a Cash-Based Award or Other Stock-Based Award shall set forth the extent to which the Participant shall have the right to retain such Award following termination of the Participant's Service. Such provisions shall be determined in the discretion of the Committee, need not be uniform among all Cash-Based Awards or Other Stock-Based Awards, and may reflect distinctions based on the reasons for termination, subject to the requirements of Section 409A, if applicable.

11.7 **Nontransferability of Cash-Based Awards and Other Stock-Based Awards.** Prior to the payment or settlement of a Cash-Based Award or Other Stock-Based Award, the Award shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. The Committee may impose such additional restrictions on any shares of Stock issued in settlement of Cash-Based Awards and Other Stock-Based Awards as it may deem advisable, including, without limitation, minimum holding period requirements, restrictions under applicable federal securities laws, under the requirements of any stock exchange or market upon which such shares of Stock are then listed and/or traded, or under any state securities laws or foreign law applicable to such shares of Stock.

12. **Standard Forms of Award Agreement.**

12.1 **Award Agreements.** Each Award shall comply with and be subject to the terms and conditions set forth in the appropriate form of Award Agreement approved by the Committee and as amended from time to time. No Award or purported Award shall be a valid and binding obligation of the Company unless evidenced by a fully executed Award Agreement, which execution may be evidenced by electronic means.

12.2 **Authority to Vary Terms.** The Committee shall have the authority from time to time to vary the terms of any standard form of Award Agreement either in connection with the grant or amendment of an individual Award or in connection with the authorization of a new standard form or forms; provided, however, that the terms and conditions of any such new,

revised or amended standard form or forms of Award Agreement are not inconsistent with the terms of the Plan.

13. **Change in Control.**

13.1 **Effect of Change in Control on Awards.** In the event of a Change in Control, outstanding Awards shall be subject to the definitive agreement entered into by the Company in connection with the Change in Control. Subject to the requirements and limitations of Section 409A, if applicable, the Committee may provide for any one or more of the following:

(a) ***Accelerated Vesting.*** In its discretion, the Committee may provide in the grant of any Award or at any other time may take such action as it deems appropriate to provide for acceleration of the exercisability, vesting and/or settlement in connection with a Change in Control of each or any outstanding Award or portion thereof and shares acquired pursuant thereto upon such conditions, including termination of the Participant's Service prior to, upon, or following the Change in Control, and to such extent as the Committee determines.

(b) ***Assumption, Continuation, or Substitution.*** In the event of a Change in Control, the surviving, continuing, successor, or purchasing corporation or other business entity or parent thereof, as the case may be (the "***Acquiror***"), may, without the consent of any Participant, assume or continue the Company's rights and obligations under each or any Award or portion thereof outstanding immediately prior to the Change in Control or substitute for each or any such outstanding Award or portion thereof a substantially equivalent award with respect to the Acquiror's stock, as applicable. For purposes of this Section, if so determined by the Committee in its discretion, an Award denominated in shares of Stock shall be deemed assumed if, following the Change in Control, the Award confers the right to receive, subject to the terms and conditions of the Plan and the applicable Award Agreement, for each share of Stock subject to the Award immediately prior to the Change in Control, the consideration (whether stock, cash, other securities or property or a combination thereof) to which a holder of a share of Stock on the effective date of the Change in Control was entitled (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Stock); provided, however, that if such consideration is not solely common stock of the Acquiror, the Committee may, with the consent of the Acquiror, provide for the consideration to be received upon the exercise or settlement of the Award, for each share of Stock subject to the Award, to consist solely of common stock of the Acquiror equal in Fair Market Value to the per share consideration received by holders of Stock pursuant to the Change in Control. Any Award or portion thereof which is neither assumed or continued by the Acquiror in connection with the Change in Control nor exercised or settled as of the time of consummation of the Change in Control shall terminate and cease to be outstanding effective as of the time of consummation of the Change in Control.

(c) ***Cash-Out of Outstanding Stock-Based Awards.*** The Committee may, in its discretion and without the consent of any Participant, determine that, upon the occurrence of a Change in Control, each or any Award denominated in shares of Stock or portion thereof outstanding immediately prior to the Change in Control and not previously exercised or settled shall be canceled in exchange for a payment with respect to each vested share (and each unvested share, if so determined by the Committee) of Stock subject to such canceled Award in (i) cash,

(ii) stock of the Company or of a corporation or other business entity a party to the Change in Control, or (iii) other property which, in any such case, shall be in an amount having a Fair Market Value equal to the Fair Market Value of the consideration to be paid per share of Stock in the Change in Control, reduced (but not below zero) by the exercise or purchase price per share, if any, under such Award. In the event such determination is made by the Committee, an Award having an exercise or purchase price per share equal to or greater than the Fair Market Value of the consideration to be paid per share of Stock in the Change in Control may be canceled without payment of consideration to the holder thereof.

13.2 **Effect of Change in Control on Nonemployee Director Awards.** Subject to the requirements and limitations of Section 409A, if applicable, including as provided by Section 15.4(f), in the event of a Change in Control, each outstanding Nonemployee Director Award shall become immediately exercisable and vested in full and, except to the extent assumed, continued or substituted for pursuant to Section 13.1(b), shall be settled effective immediately prior to the time of consummation of the Change in Control.

13.3 **Federal Excise Tax Under Section 4999 of the Code.**

(a) **Excess Parachute Payment.** If any acceleration of vesting pursuant to an Award and any other payment or benefit received or to be received by a Participant would subject the Participant to any excise tax pursuant to Section 4999 of the Code due to the characterization of such acceleration of vesting, payment or benefit as an “excess parachute payment” under Section 280G of the Code, then, provided such election would not subject the Participant to taxation under Section 409A, the Participant may elect to reduce the amount of any acceleration of vesting called for under the Award in order to avoid such characterization.

(b) **Determination by Tax Firm.** To aid the Participant in making any election called for under Section 13.3(a), no later than the date of the occurrence of any event that might reasonably be anticipated to result in an “excess parachute payment” to the Participant as described in Section 13.3(a), the Company shall request a determination in writing by the professional firm engaged by the Company for general tax purposes, or, if the tax firm so engaged by the Company is serving as accountant or auditor for the Acquiror, the Company will appoint a nationally recognized tax firm to make the determinations required by this Section (the “**Tax Firm**”). As soon as practicable thereafter, the Tax Firm shall determine and report to the Company and the Participant the amount of such acceleration of vesting, payments and benefits which would produce the greatest after-tax benefit to the Participant. For the purposes of such determination, the Tax Firm may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and the Participant shall furnish to the Tax Firm such information and documents as the Tax Firm may reasonably request in order to make its required determination. The Company shall bear all fees and expenses the Tax Firm charges in connection with its services contemplated by this Section.

14. **Compliance with Securities Law.**

The grant of Awards and the issuance of shares of Stock pursuant to any Award shall be subject to compliance with all applicable requirements of federal, state and foreign law with respect to such securities and the requirements of any stock exchange or market system

upon which the Stock may then be listed. In addition, no Award may be exercised or shares issued pursuant to an Award unless (a) a registration statement under the Securities Act shall at the time of such exercise or issuance be in effect with respect to the shares issuable pursuant to the Award, or (b) in the opinion of legal counsel to the Company, the shares issuable pursuant to the Award may be issued in accordance with the terms of an applicable exemption from the registration requirements of the Securities Act. The inability of the Company to obtain from any regulatory body having jurisdiction the authority, if any, deemed by the Company's legal counsel to be necessary to the lawful issuance and sale of any shares under the Plan shall relieve the Company of any liability in respect of the failure to issue or sell such shares as to which such requisite authority shall not have been obtained. As a condition to issuance of any Stock, the Company may require the Participant to satisfy any qualifications that may be necessary or appropriate, to evidence compliance with any applicable law or regulation and to make any representation or warranty with respect thereto as may be requested by the Company.

15. **Compliance with Section 409A.**

15.1 **Awards Subject to Section 409A.** The Company intends that Awards granted pursuant to the Plan shall either be exempt from or comply with Section 409A, and the Plan shall be so construed. The provisions of this Section 15 shall apply to any Award or portion thereof that constitutes or provides for payment of Section 409A Deferred Compensation. Such Awards may include, without limitation:

(a) A Nonstatutory Stock Option or SAR that includes any feature for the deferral of compensation other than the deferral of recognition of income until the later of (i) the exercise or disposition of the Award or (ii) the time the stock acquired pursuant to the exercise of the Award first becomes substantially vested.

(b) Any Restricted Stock Unit Award, Performance Award, Cash-Based Award or Other Stock-Based Award that either (i) provides by its terms for settlement of all or any portion of the Award at a time or upon an event that will or may occur later than the end of the Short-Term Deferral Period (as defined below) or (ii) permits the Participant granted the Award to elect one or more dates or events upon which the Award will be settled after the end of the Short-Term Deferral Period.

Subject to the provisions of Section 409A, the term "**Short-Term Deferral Period**" means the 2½ month period ending on the later of (i) the 15th day of the third month following the end of the Participant's taxable year in which the right to payment under the applicable portion of the Award is no longer subject to a substantial risk of forfeiture or (ii) the 15th day of the third month following the end of the Company's taxable year in which the right to payment under the applicable portion of the Award is no longer subject to a substantial risk of forfeiture. For this purpose, the term "substantial risk of forfeiture" shall have the meaning provided by Section 409A.

15.2 **Deferral and/or Distribution Elections.** Except as otherwise permitted or required by Section 409A, the following rules shall apply to any compensation deferral and/or payment elections (each, an "**Election**") that may be permitted or required by the Committee pursuant to an Award providing Section 409A Deferred Compensation:

(a) Elections must be in writing and specify the amount of the payment in settlement of an Award being deferred, as well as the time and form of payment as permitted by this Plan.

(b) Elections shall be made by the end of the Participant's taxable year prior to the year in which services commence for which an Award may be granted to the Participant.

(c) Elections shall continue in effect until a written revocation or change in Election is received by the Company, except that a written revocation or change in Election must be received by the Company prior to the last day for making the Election determined in accordance with paragraph (b) above or as permitted by Section 15.3.

15.3 **Subsequent Elections.** Except as otherwise permitted or required by Section 409A, any Award providing Section 409A Deferred Compensation which permits a subsequent Election to delay the payment or change the form of payment in settlement of such Award shall comply with the following requirements:

(a) No subsequent Election may take effect until at least twelve (12) months after the date on which the subsequent Election is made.

(b) Each subsequent Election related to a payment in settlement of an Award not described in Section 15.4(a)(ii), 15.4(a)(iii) or 15.4(a)(vi) must result in a delay of the payment for a period of not less than five (5) years from the date on which such payment would otherwise have been made.

(c) No subsequent Election related to a payment pursuant to Section 15.4(a)(iv) shall be made less than twelve (12) months before the date on which such payment would otherwise have been made.

(d) Subsequent Elections shall continue in effect until a written revocation or change in the subsequent Election is received by the Company, except that a written revocation or change in a subsequent Election must be received by the Company prior to the last day for making the subsequent Election determined in accordance the preceding paragraphs of this Section 15.3.

15.4 **Payment of Section 409A Deferred Compensation.**

(a) **Permissible Payments.** Except as otherwise permitted or required by Section 409A, an Award providing Section 409A Deferred Compensation must provide for payment in settlement of the Award only upon one or more of the following: (i) the Participant's "separation from service" (as defined by Section 409A); (ii) the Participant's becoming "disabled" (as defined by Section 409A); (iii) the Participant's death; (iv) a time or fixed schedule that is either (A) specified by the Committee upon the grant of an Award and set forth in the Award Agreement evidencing such Award or (B) specified by the Participant in an Election complying with the requirements of Section 15.2 or 15.3, as applicable; (v) a change in the ownership or effective control of the Company or in the ownership of a substantial portion of

the assets of the Company determined in accordance with Section 409A; or (vi) the occurrence of an “unforeseeable emergency” (as defined by Section 409A).

(b) **Installment Payments.** It is the intent of this Plan that any right of a Participant to receive installment payments (within the meaning of Section 409A) shall, for all purposes of Section 409A, be treated as a right to a series of separate payments.

(c) **Required Delay in Payment to Specified Employee Pursuant to Separation from Service.** Notwithstanding any provision of the Plan or an Award Agreement to the contrary, except as otherwise permitted by Section 409A, no payment pursuant to Section 15.4(a)(i) in settlement of an Award providing for Section 409A Deferred Compensation may be made to a Participant who is a “specified employee” (as defined by Section 409A) as of the date of the Participant’s separation from service before the date (the “**Delayed Payment Date**”) that is six (6) months after the date of such Participant’s separation from service, or, if earlier, the date of the Participant’s death. All such amounts that would, but for this paragraph, become payable prior to the Delayed Payment Date shall be accumulated and paid on the Delayed Payment Date.

(d) **Payment Upon Disability.** All distributions of Section 409A Deferred Compensation payable pursuant to Section 15.4(a)(ii) by reason of a Participant becoming disabled shall be paid in a lump sum or in periodic installments as established by the Participant’s Election. If the Participant has made no Election with respect to distributions of Section 409A Deferred Compensation upon becoming disabled, all such distributions shall be paid in a lump sum upon the determination that the Participant has become disabled.

(e) **Payment Upon Death.** If a Participant dies before complete distribution of amounts payable upon settlement of an Award subject to Section 409A, such undistributed amounts shall be distributed to his or her beneficiary under the distribution method for death established by the Participant’s Election upon receipt by the Committee of satisfactory notice and confirmation of the Participant’s death. If the Participant has made no Election with respect to distributions of Section 409A Deferred Compensation upon death, all such distributions shall be paid in a lump sum upon receipt by the Committee of satisfactory notice and confirmation of the Participant’s death.

(f) **Payment Upon Change in Control.** Notwithstanding any provision of the Plan or an Award Agreement to the contrary, to the extent that any amount constituting Section 409A Deferred Compensation would become payable under this Plan by reason of a Change in Control, such amount shall become payable only if the event constituting a Change in Control would also constitute a change in ownership or effective control of the Company or a change in the ownership of a substantial portion of the assets of the Company within the meaning of Section 409A. Any Award which constitutes Section 409A Deferred Compensation and which would vest and otherwise become payable upon a Change in Control as a result of the failure of the Acquiror to assume, continue or substitute for such Award in accordance with Section 13.1(b) shall vest to the extent provided by such Award but shall be converted automatically at the effective time of such Change in Control into a right to receive, in cash on the date or dates such award would have been settled in accordance with its then existing

settlement schedule (or as required by Section 15.4(c)), an amount or amounts equal in the aggregate to the intrinsic value of the Award at the time of the Change in Control.

(g) **Payment Upon Unforeseeable Emergency.** The Committee shall have the authority to provide in the Award Agreement evidencing any Award providing for Section 409A Deferred Compensation for payment pursuant to Section 15.4(a)(vi) in settlement of all or a portion of such Award in the event that a Participant establishes, to the satisfaction of the Committee, the occurrence of an unforeseeable emergency. In such event, the amount(s) distributed with respect to such unforeseeable emergency cannot exceed the amounts reasonably necessary to satisfy the emergency need plus amounts necessary to pay taxes reasonably anticipated as a result of such distribution(s), after taking into account the extent to which such emergency need is or may be relieved through reimbursement or compensation by insurance or otherwise, by liquidation of the Participant's assets (to the extent the liquidation of such assets would not itself cause severe financial hardship) or by cessation of deferrals under the Award. All distributions with respect to an unforeseeable emergency shall be made in a lump sum upon the Committee's determination that an unforeseeable emergency has occurred. The Committee's decision with respect to whether an unforeseeable emergency has occurred and the manner in which, if at all, the payment in settlement of an Award shall be altered or modified, shall be final, conclusive, and not subject to approval or appeal.

(h) **Prohibition of Acceleration of Payments.** Notwithstanding any provision of the Plan or an Award Agreement to the contrary, this Plan does not permit the acceleration of the time or schedule of any payment under an Award providing Section 409A Deferred Compensation, except as permitted by Section 409A.

(i) **No Representation Regarding Section 409A Compliance.** Notwithstanding any other provision of the Plan, the Company makes no representation that Awards shall be exempt from or comply with Section 409A. No Participating Company shall be liable for any tax, penalty or interest imposed on a Participant by Section 409A.

16. **Tax Withholding.**

16.1 **Tax Withholding in General.** The Company shall have the right to deduct from any and all payments made under the Plan, or to require the Participant, through payroll withholding, cash payment or otherwise, to make adequate provision for, the federal, state, local and foreign taxes (including social insurance), if any, required by law to be withheld by any Participating Company with respect to an Award or the shares acquired pursuant thereto. The Company shall have no obligation to deliver shares of Stock, to release shares of Stock from an escrow established pursuant to an Award Agreement, or to make any payment in cash under the Plan until the Participating Company Group's tax withholding obligations have been satisfied by the Participant.

16.2 **Withholding in or Directed Sale of Shares.** The Company shall have the right, but not the obligation, to deduct from the shares of Stock issuable to a Participant upon the exercise or settlement of an Award, or to accept from the Participant the tender of, a number of whole shares of Stock having a Fair Market Value, as determined by the Company, equal to all or any part of the tax withholding obligations of any Participating Company. The Fair Market

Value of any shares of Stock withheld or tendered to satisfy any such tax withholding obligations shall not exceed the amount determined by the applicable minimum statutory withholding rates (or the maximum individual statutory withholding rates for the applicable jurisdiction if use of such rates would not result in adverse accounting consequences or cost). The Company may require a Participant to direct a broker, upon the vesting, exercise or settlement of an Award, to sell a portion of the shares subject to the Award determined by the Company in its discretion to be sufficient to cover the tax withholding obligations of any Participating Company and to remit an amount equal to such tax withholding obligations to such Participating Company in cash.

17. **Amendment, Suspension or Termination of Plan.**

The Committee may amend, suspend or terminate the Plan at any time. However, without the approval of the Company's shareholders, there shall be (a) no increase in the maximum aggregate number of shares of Stock that may be issued under the Plan (except by operation of the provisions of Sections 4.2, 4.3, 4.4 and 4.5), (b) no change in the class of persons eligible to receive Incentive Stock Options, and (c) no other amendment of the Plan that would require approval of the Company's shareholders under any applicable law, regulation or rule, including the rules of any stock exchange or quotation system upon which the Stock may then be listed or quoted. No amendment, suspension or termination of the Plan shall affect any then outstanding Award unless expressly provided by the Committee. Except as provided by the next sentence, no amendment, suspension or termination of the Plan may have a materially adverse effect on any then outstanding Award without the consent of the Participant. Notwithstanding any other provision of the Plan or any Award Agreement to the contrary, the Committee may, in its sole and absolute discretion and without the consent of any Participant, amend the Plan or any Award Agreement, to take effect retroactively or otherwise, as it deems necessary or advisable for the purpose of conforming the Plan or such Award Agreement to any present or future law, regulation or rule applicable to the Plan, including, but not limited to, Section 409A.

18. **Miscellaneous Provisions.**

18.1 **Repurchase Rights.** Shares issued under the Plan may be subject to one or more repurchase options, or other conditions and restrictions as determined by the Committee in its discretion at the time the Award is granted. The Company shall have the right to assign at any time any repurchase right it may have, whether or not such right is then exercisable, to one or more persons as may be selected by the Company. Upon request by the Company, each Participant shall execute any agreement evidencing such transfer restrictions prior to the receipt of shares of Stock hereunder and shall promptly present to the Company any and all certificates representing shares of Stock acquired hereunder for the placement on such certificates of appropriate legends evidencing any such transfer restrictions.

18.2 **Forfeiture Events.**

(a) The Committee may specify in an Award Agreement that the Participant's rights, payments, and benefits with respect to an Award shall be subject to reduction, cancellation, forfeiture, or recoupment upon the occurrence of specified events, in addition to any otherwise applicable vesting or performance conditions of an Award. Such

events may include, but shall not be limited to, termination of Service for Cause or any act by a Participant, whether before or after termination of Service, that would constitute Cause for termination of Service, or any accounting restatement due to material noncompliance of the Company with any financial reporting requirements of securities laws as a result of which, and to the extent that, such reduction, cancellation, forfeiture, or recoupment is required by applicable securities laws. In addition, to the extent that claw-back or similar provisions applicable to Awards are required by applicable law, listing standards and/or policies adopted by the Company, Awards granted under the Plan shall be subject to such provisions.

(b) If the Company is required to prepare an accounting restatement due to the material noncompliance of the Company, as a result of misconduct, with any financial reporting requirement under the securities laws, any Participant who knowingly or through gross negligence engaged in the misconduct, or who knowingly or through gross negligence failed to prevent the misconduct, and any Participant who is one of the individuals subject to automatic forfeiture under Section 304 of the Sarbanes-Oxley Act of 2002, shall reimburse the Company for (i) the amount of any payment in settlement of an Award received by such Participant during the twelve- (12-) month period following the first public issuance or filing with the United States Securities and Exchange Commission (whichever first occurred) of the financial document embodying such financial reporting requirement, and (ii) any profits realized by such Participant from the sale of securities of the Company during such twelve- (12-) month period.

18.3 **Provision of Information.** Each Participant shall be given access to information concerning the Company equivalent to that information generally made available to the Company's common shareholders.

18.4 **Rights as Employee, Consultant or Director.** No person, even though eligible pursuant to Section 5, shall have a right to be selected as a Participant, or, having been so selected, to be selected again as a Participant. Nothing in the Plan or any Award granted under the Plan shall confer on any Participant a right to remain an Employee, Consultant or Director or interfere with or limit in any way any right of a Participating Company to terminate the Participant's Service at any time. To the extent that an Employee of a Participating Company other than the Company receives an Award under the Plan, that Award shall in no event be understood or interpreted to mean that the Company is the Employee's employer or that the Employee has an employment relationship with the Company.

18.5 **Rights as a Shareholder.** A Participant shall have no rights as a shareholder with respect to any shares covered by an Award until the date of the issuance of such shares (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). No adjustment shall be made for dividends, distributions or other rights for which the record date is prior to the date such shares are issued, except as provided in Section 4.5 or another provision of the Plan.

18.6 **Delivery of Title to Shares.** Subject to any governing rules or regulations, the Company shall issue or cause to be issued the shares of Stock acquired pursuant to an Award and shall deliver such shares to or for the benefit of the Participant by means of one or more of the following: (a) by delivering to the Participant evidence of book entry shares of Stock credited to the account of the Participant, (b) by depositing such shares of Stock for the

benefit of the Participant with any broker with which the Participant has an account relationship, or (c) by delivering such shares of Stock to the Participant in certificate form.

18.7 **Fractional Shares.** The Company shall not be required to issue fractional shares upon the exercise or settlement of any Award.

18.8 **Retirement and Welfare Plans.** Neither Awards made under this Plan nor shares of Stock or cash paid pursuant to such Awards may be included as “compensation” for purposes of computing the benefits payable to any Participant under any Participating Company’s retirement plans (both qualified and non-qualified) or welfare benefit plans unless such other plan expressly provides that such compensation shall be taken into account in computing a Participant’s benefit. In addition, unless a written employment agreement or other service agreement specifically references Awards, a general reference to “benefits” or a similar term in such agreement shall not be deemed to refer to Awards granted hereunder.

18.9 **Beneficiary Designation.** Subject to local laws and procedures, each Participant may file with the Company a written designation of a beneficiary who is to receive any benefit under the Plan to which the Participant is entitled in the event of such Participant’s death before he or she receives any or all of such benefit. Each designation will revoke all prior designations by the same Participant, shall be in a form prescribed by the Company, and will be effective only when filed by the Participant in writing with the Company during the Participant’s lifetime. If a married Participant designates a beneficiary other than the Participant’s spouse, the effectiveness of such designation may be subject to the consent of the Participant’s spouse. If a Participant dies without an effective designation of a beneficiary who is living at the time of the Participant’s death, the Company will pay any remaining unpaid benefits to the Participant’s legal representative.

18.10 **Severability.** If any one or more of the provisions (or any part thereof) of this Plan shall be held invalid, illegal or unenforceable in any respect, such provision shall be modified so as to make it valid, legal and enforceable, and the validity, legality and enforceability of the remaining provisions (or any part thereof) of the Plan shall not in any way be affected or impaired thereby.

18.11 **No Constraint on Corporate Action.** Nothing in this Plan shall be construed to: (a) limit, impair, or otherwise affect the Company’s or another Participating Company’s right or power to make adjustments, reclassifications, reorganizations, or changes of its capital or business structure, or to merge or consolidate, or dissolve, liquidate, sell, or transfer all or any part of its business or assets; or (b) limit the right or power of the Company or another Participating Company to take any action which such entity deems to be necessary or appropriate.

18.12 **Unfunded Obligation.** Participants shall have the status of general unsecured creditors of the Company. Any amounts payable to Participants pursuant to the Plan shall be considered unfunded and unsecured obligations for all purposes, including, without limitation, Title I of the Employee Retirement Income Security Act of 1974. No Participating Company shall be required to segregate any monies from its general funds, or to create any trusts, or establish any special accounts with respect to such obligations. The Company shall

PLAN HISTORY AND NOTES TO COMPANY¹

June 10, 2019 Board adopts Plan with a reserve of 15,519,170 shares (subject to increases and other adjustments as provided by the Plan), subject to approval by the shareholders of the Company.

June 13, 2019 Plan approved by the shareholders of the Company.

IMPORTANT NOTE – Additional S-8 registration required for evergreen additions to share reserve:

If this Plan includes an annual evergreen addition to the share reserve (Section 4.2), an annual Form S-8 registration statement must be filed with the SEC before any shares may be offered or sold from the annual increase to the share reserve. The sole exception is that options may be granted (but not exercised) before the S-8 registration statement is filed.

¹ *These notes are for the Company's information. They are not part of the Plan and should not be publicly filed.*

ADAPTIVE BIOTECHNOLOGIES CORPORATION
STOCK OPTION AGREEMENT
(For U.S. Participants)

Adaptive Biotechnologies Corporation (the “*Company*”) has granted to the Participant named in the *Notice of Grant of Stock Option* (the “*Grant Notice*”) to which this Stock Option Agreement (the “*Option Agreement*”) is attached an option (the “*Option*”) to purchase certain shares of Stock upon the terms and conditions set forth in the Grant Notice and this Option Agreement. The Option has been granted pursuant to and shall in all respects be subject to the terms and conditions of the Adaptive Biotechnologies Corporation 2019 Equity Incentive Plan (the “*Plan*”), as amended to the Date of Grant, the provisions of which are incorporated herein by reference. By signing the Grant Notice, the Participant: (a) acknowledges receipt of, and represents that the Participant has read and is familiar with, the Grant Notice, this Option Agreement, the Plan and a prospectus for the Plan prepared in connection with the registration with the Securities and Exchange Commission of shares issuable pursuant to the Option (the “*Plan Prospectus*”), (b) accepts the Option subject to all of the terms and conditions of the Grant Notice, this Option Agreement and the Plan and (c) agrees to accept as binding, conclusive and final all decisions or interpretations of the Committee upon any questions arising under the Grant Notice, this Option Agreement or the Plan.

1. **Definitions and Construction.**

1.1 **Definitions.** Unless otherwise defined herein, capitalized terms shall have the meanings assigned to such terms in the Grant Notice or the Plan.

1.2 **Construction.** Captions and titles contained herein are for convenience only and shall not affect the meaning or interpretation of any provision of this Option Agreement. Except when otherwise indicated by the context, the singular shall include the plural and the plural shall include the singular. Use of the term “or” is not intended to be exclusive, unless the context clearly requires otherwise.

2. **Tax Consequences.**

2.1 **Tax Status of Option.** This Option is intended to have the tax status designated in the Grant Notice.

(a) ***Incentive Stock Option.*** If the Grant Notice so designates, this Option is intended to be an Incentive Stock Option within the meaning of Section 422(b) of the Code, but the Company does not represent or warrant that this Option qualifies as such. The Participant should consult with the Participant’s own tax advisor regarding the tax effects of this Option and the requirements necessary to obtain favorable income tax treatment under Section 422 of the Code, including, but not limited to, holding period requirements. (NOTE TO PARTICIPANT: If the Option is exercised more than three (3) months after the date on which you cease to be an Employee (other than by reason of your death or permanent and total disability as defined in Section 22(e)(3) of the Code), the Option will be treated as a Nonstatutory Stock Option and not as an Incentive Stock Option to the extent required by Section 422 of the Code.)

(b) **Nonstatutory Stock Option.** If the Grant Notice so designates, this Option is intended to be a Nonstatutory Stock Option and shall not be treated as an Incentive Stock Option within the meaning of Section 422(b) of the Code.

2.2 **ISO Fair Market Value Limitation.** *If the Grant Notice designates this Option as an Incentive Stock Option, then to the extent that the Option (together with all Incentive Stock Options granted to the Participant under all stock option plans of the Participating Company Group, including the Plan) becomes exercisable for the first time during any calendar year for shares having a Fair Market Value greater than One Hundred Thousand Dollars (\$100,000), the portion of such options which exceeds such amount will be treated as Nonstatutory Stock Options. For purposes of this Section 2.2, options designated as Incentive Stock Options are taken into account in the order in which they were granted, and the Fair Market Value of stock is determined as of the time the option with respect to such stock is granted. If the Code is amended to provide for a different limitation from that set forth in this Section 2.2, such different limitation shall be deemed incorporated herein effective as of the date required or permitted by such amendment to the Code. If the Option is treated as an Incentive Stock Option in part and as a Nonstatutory Stock Option in part by reason of the limitation set forth in this Section 2.2, the Participant may designate which portion of such Option the Participant is exercising. In the absence of such designation, the Participant shall be deemed to have exercised the Incentive Stock Option portion of the Option first. Separate certificates representing each such portion shall be issued upon the exercise of the Option. (NOTE TO PARTICIPANT: If the aggregate Exercise Price of the Option (that is, the Exercise Price multiplied by the Number of Option Shares) plus the aggregate exercise price of any other Incentive Stock Options you hold (whether granted pursuant to the Plan or any other stock option plan of the Participating Company Group) is greater than \$100,000, you should contact the Chief Financial Officer of the Company to ascertain whether the entire Option qualifies as an Incentive Stock Option.)*

3. **Administration.**

All questions of interpretation concerning the Grant Notice, this Option Agreement, the Plan or any other form of agreement or other document employed by the Company in the administration of the Plan or the Option shall be determined by the Committee. All such determinations by the Committee shall be final, binding and conclusive upon all persons having an interest in the Option, unless fraudulent or made in bad faith. Any and all actions, decisions and determinations taken or made by the Committee in the exercise of its discretion pursuant to the Plan or the Option or other agreement thereunder (other than determining questions of interpretation pursuant to the preceding sentence) shall be final, binding and conclusive upon all persons having an interest in the Option. Any Officer shall have the authority to act on behalf of the Company with respect to any matter, right, obligation, or election which is the responsibility of or which is allocated to the Company herein, provided the Officer has apparent authority with respect to such matter, right, obligation, or election.

4. **Exercise of the Option.**

4.1 **Right to Exercise.** Except as otherwise provided herein, the Option shall be exercisable on and after the Initial Vesting Date and prior to the termination of the Option (as

provided in Section 6) in an amount not to exceed the number of Vested Shares less the number of shares previously acquired upon exercise of the Option. In no event shall the Option be exercisable for more shares than the Number of Option Shares, as adjusted pursuant to Section 9.

4.2 **Method of Exercise.** Exercise of the Option shall be by means of electronic or written notice (the “*Exercise Notice*”) in a form authorized by the Company. An electronic Exercise Notice must be digitally signed or authenticated by the Participant in such manner as required by the notice and transmitted to the Company or an authorized representative of the Company (including a third-party administrator designated by the Company). In the event that the Participant is not authorized or is unable to provide an electronic Exercise Notice, the Option shall be exercised by a written Exercise Notice addressed to the Company, which shall be signed by the Participant and delivered in person, by certified or registered mail, return receipt requested, by confirmed facsimile transmission, or by such other means as the Company may permit, to the Company, or an authorized representative of the Company (including a third-party administrator designated by the Company). Each Exercise Notice, whether electronic or written, must state the Participant’s election to exercise the Option, the number of whole shares of Stock for which the Option is being exercised and such other representations and agreements as to the Participant’s investment intent with respect to such shares as may be required pursuant to the provisions of this Option Agreement. Further, each Exercise Notice must be received by the Company prior to the termination of the Option as set forth in Section 6 and must be accompanied by full payment of the aggregate Exercise Price for the number of shares of Stock being purchased. The Option shall be deemed to be exercised upon receipt by the Company of such electronic or written Exercise Notice and the aggregate Exercise Price.

4.3 **Payment of Exercise Price.**

(a) **Forms of Consideration Authorized.** Except as otherwise provided below, payment of the aggregate Exercise Price for the number of shares of Stock for which the Option is being exercised shall be made (i) in cash, by check or in cash equivalent; (ii) if permitted by the Company and subject to the limitations contained in Section 4.3(b), by means of (1) a Cashless Exercise, (2) a Net-Exercise, or (3) a Stock Tender Exercise; or (iii) by any combination of the foregoing.

(b) **Limitations on Forms of Consideration.** The Company reserves, at any and all times, the right, in the Company’s sole and absolute discretion, to establish, decline to approve or terminate any program or procedure providing for payment of the Exercise Price through any of the means described below, including with respect to the Participant notwithstanding that such program or procedures may be available to others.

(i) **Cashless Exercise.** A “*Cashless Exercise*” means the delivery of a properly executed Exercise Notice together with irrevocable instructions to a broker in a form acceptable to the Company providing for the assignment to the Company of the proceeds of a sale or loan with respect to shares of Stock acquired upon the exercise of the Option in an amount not less than the aggregate Exercise Price for such shares (including, without limitation, through an exercise complying with the provisions of Regulation T as promulgated from time to time by the Board of Governors of the Federal Reserve System).

(ii) **Net-Exercise.** A “*Net-Exercise*” means the delivery of a properly executed Exercise Notice electing a procedure pursuant to which (1) the Company will reduce the number of shares otherwise issuable to the Participant upon the exercise of the Option by the largest whole number of shares having a Fair Market Value that does not exceed the aggregate Exercise Price for the shares with respect to which the Option is exercised, and (2) the Participant shall pay to the Company in cash the remaining balance of such aggregate Exercise Price not satisfied by such reduction in the number of whole shares to be issued. Following a Net-Exercise, the number of shares remaining subject to the Option, if any, shall be reduced by the sum of (1) the net number of shares issued to the Participant upon such exercise, and (2) the number of shares deducted by the Company for payment of the aggregate Exercise Price.

(iii) **Stock Tender Exercise.** A “*Stock Tender Exercise*” means the delivery of a properly executed Exercise Notice accompanied by (1) the Participant’s tender to the Company, or attestation to the ownership, in a form acceptable to the Company of whole shares of Stock having a Fair Market Value that does not exceed the aggregate Exercise Price for the shares with respect to which the Option is exercised, and (2) the Participant’s payment to the Company in cash of the remaining balance of such aggregate Exercise Price not satisfied by such shares’ Fair Market Value. A Stock Tender Exercise shall not be permitted if it would constitute a violation of the provisions of any law, regulation or agreement restricting the redemption of the Company’s stock. If required by the Company, the Option may not be exercised by tender to the Company, or attestation to the ownership, of shares of Stock unless such shares either have been owned by the Participant for a period of time required by the Company (and not used for another option exercise by attestation during such period) or were not acquired, directly or indirectly, from the Company.

4.4 **Tax Withholding.**

(a) ***In General.*** At the time the Option is exercised, in whole or in part, or at any time thereafter as requested by a Participating Company, the Participant hereby authorizes withholding from payroll and any other amounts payable to the Participant, and otherwise agrees to make adequate provision for (including by means of a Cashless Exercise to the extent permitted by the Company), any sums required to satisfy the federal, state, local and foreign tax (including any social insurance) withholding obligations of the Participating Company Group, if any, which arise in connection with the Option. The Company shall have no obligation to deliver shares of Stock until the tax withholding obligations of the Participating Company Group have been satisfied by the Participant.

(b) ***Withholding in Shares.*** The Company shall have the right, but not the obligation, to require the Participant to satisfy all or any portion of a Participating Company’s tax withholding obligations upon exercise of the Option by deducting from the shares of Stock otherwise issuable to the Participant upon such exercise a number of whole shares having a fair market value, as determined by the Company as of the date of exercise, not in excess of the amount of such tax withholding obligations determined by the applicable minimum statutory withholding rates if required to avoid liability classification of the Option under generally accepted accounting principles in the United States.

4.5 **Beneficial Ownership of Shares; Certificate Registration.** The Participant hereby authorizes the Company, in its sole discretion, to deposit for the benefit of the Participant with any broker with which the Participant has an account relationship of which the Company has notice any or all shares acquired by the Participant pursuant to the exercise of the Option. Except as provided by the preceding sentence, a certificate for the shares as to which the Option is exercised shall be registered in the name of the Participant, or, if applicable, in the names of the heirs of the Participant.

4.6 **Restrictions on Grant of the Option and Issuance of Shares.** The grant of the Option and the issuance of shares of Stock upon exercise of the Option shall be subject to compliance with all applicable requirements of federal, state or foreign law with respect to such securities. The Option may not be exercised if the issuance of shares of Stock upon exercise would constitute a violation of any applicable federal, state or foreign securities laws or other law or regulations or the requirements of any stock exchange or market system upon which the Stock may then be listed. In addition, the Option may not be exercised unless (i) a registration statement under the Securities Act shall at the time of exercise of the Option be in effect with respect to the shares issuable upon exercise of the Option or (ii) in the opinion of legal counsel to the Company, the shares issuable upon exercise of the Option may be issued in accordance with the terms of an applicable exemption from the registration requirements of the Securities Act. **THE PARTICIPANT IS CAUTIONED THAT THE OPTION MAY NOT BE EXERCISED UNLESS THE FOREGOING CONDITIONS ARE SATISFIED. ACCORDINGLY, THE PARTICIPANT MAY NOT BE ABLE TO EXERCISE THE OPTION WHEN DESIRED EVEN THOUGH THE OPTION IS VESTED.** The inability of the Company to obtain from any regulatory body having jurisdiction the authority, if any, deemed by the Company's legal counsel to be necessary to the lawful issuance and sale of any shares subject to the Option shall relieve the Company of any liability in respect of the failure to issue or sell such shares as to which such requisite authority shall not have been obtained. As a condition to the exercise of the Option, the Company may require the Participant to satisfy any qualifications that may be necessary or appropriate, to evidence compliance with any applicable law or regulation and to make any representation or warranty with respect thereto as may be requested by the Company.

4.7 **Fractional Shares.** The Company shall not be required to issue fractional shares upon the exercise of the Option.

5. **Nontransferability of the Option.**

During the lifetime of the Participant, the Option shall be exercisable only by the Participant or the Participant's guardian or legal representative. The Option shall not be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. Following the death of the Participant, the Option, to the extent provided in Section 7, may be exercised by the Participant's legal representative or by any person empowered to do so under the deceased Participant's will or under the then applicable laws of descent and distribution.

6. **Termination of the Option.**

The Option shall terminate and may no longer be exercised after the first to occur of (a) the close of business on the Option Expiration Date, (b) the close of business on the last date for exercising the Option following termination of the Participant's Service as described in Section 7, or (c) a Change in Control to the extent provided in Section 8.

7. **Effect of Termination of Service.**

7.1 **Option Exercisability.** The Option shall terminate immediately upon the Participant's termination of Service to the extent that it is then unvested and shall be exercisable after the Participant's termination of Service to the extent it is then vested only during the applicable time period as determined below and thereafter shall terminate.

(a) **Disability.** If the Participant's Service terminates because of the Disability of the Participant, the Option, to the extent unexercised and exercisable for Vested Shares on the date on which the Participant's Service terminated, may be exercised by the Participant (or the Participant's guardian or legal representative) at any time prior to the expiration of twelve (12) months after the date on which the Participant's Service terminated, but in any event no later than the Option Expiration Date.

(b) **Death.** If the Participant's Service terminates because of the death of the Participant, the Option, to the extent unexercised and exercisable for Vested Shares on the date on which the Participant's Service terminated, may be exercised by the Participant's legal representative or other person who acquired the right to exercise the Option by reason of the Participant's death at any time prior to the expiration of twelve (12) months after the date on which the Participant's Service terminated, but in any event no later than the Option Expiration Date. The Participant's Service shall be deemed to have terminated on account of death if the Participant dies within three (3) months after the Participant's termination of Service.

(c) **Termination for Cause.** Notwithstanding any other provision of this Option Agreement to the contrary, if the Participant's Service is terminated for Cause or if, following the Participant's termination of Service and during any period in which the Option otherwise would remain exercisable, the Participant engages in any act that would constitute Cause, the Option shall terminate in its entirety and cease to be exercisable immediately upon such termination of Service or act.

(d) **Other Termination of Service.** If the Participant's Service terminates for any reason, except Disability, death or Cause, the Option, to the extent unexercised and exercisable for Vested Shares by the Participant on the date on which the Participant's Service terminated, may be exercised by the Participant at any time prior to the expiration of three (3) months after the date on which the Participant's Service terminated, but in any event no later than the Option Expiration Date.

7.2 **Extension if Exercise Prevented by Law.** Notwithstanding the foregoing, other than termination of the Participant's Service for Cause, if the exercise of the Option within the applicable time periods set forth in Section 7.1 is prevented by the provisions of Section 4.6, the Option shall remain exercisable until the later of (a) thirty (30) days after the date such

exercise first would no longer be prevented by such provisions, or (b) the end of the applicable time period under Section 7.1, but in any event no later than the Option Expiration Date.

8. **Effect of Change in Control.**

In the event of a Change in Control, the Option shall be subject to the definitive agreement entered into by the Company in connection with the Change in Control. Except to the extent that the Committee determines to cash out the Option in accordance with Section 13.1(c) of the Plan, the surviving, continuing, successor, or purchasing entity or parent thereof, as the case may be (the “*Acquiror*”), may, without the consent of the Participant, assume or continue in full force and effect the Company’s rights and obligations under all or any portion of the Option or substitute for all or any portion of the Option a substantially equivalent option for the Acquiror’s stock. For purposes of this Section, the Option or any portion thereof shall be deemed assumed if, following the Change in Control, the Option confers the right to receive, subject to the terms and conditions of the Plan and this Option Agreement, for each share of Stock subject to such portion of the Option immediately prior to the Change in Control, the consideration (whether stock, cash, other securities or property or a combination thereof) to which a holder of a share of Stock on the effective date of the Change in Control was entitled (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Stock); provided, however, that if such consideration is not solely common stock of the Acquiror, the Committee may, with the consent of the Acquiror, provide for the consideration to be received upon the exercise of the Option, for each share of Stock subject to the Option, to consist solely of common stock of the Acquiror equal in Fair Market Value to the per share consideration received by holders of Stock pursuant to the Change in Control. The Option shall terminate and cease to be outstanding effective as of the time of consummation of the Change in Control to the extent that the Option is neither assumed or continued by the Acquiror in connection with the Change in Control nor exercised as of the time of the Change in Control.

9. **Adjustments for Changes in Capital Structure.**

Subject to any required action by the shareholders of the Company and the requirements of Sections 409A and 424 of the Code to the extent applicable, in the event of any change in the Stock effected without receipt of consideration by the Company, whether through merger, consolidation, reorganization, reincorporation, recapitalization, reclassification, stock dividend, stock split, reverse stock split, split-up, split-off, spin-off, combination of shares, exchange of shares, or similar change in the capital structure of the Company, or in the event of payment of a dividend or distribution to the shareholders of the Company in a form other than Stock (excepting normal cash dividends) that has a material effect on the Fair Market Value of shares of Stock, appropriate and proportionate adjustments shall be made in the number, Exercise Price and kind of shares subject to the Option, in order to prevent dilution or enlargement of the Participant’s rights under the Option. For purposes of the foregoing, conversion of any convertible securities of the Company shall not be treated as “effected without receipt of consideration by the Company.” Any fractional share resulting from an adjustment pursuant to this Section shall be rounded down to the nearest whole number and the Exercise Price shall be rounded up to the nearest whole cent. In no event may the Exercise Price be decreased to an amount less than the par value, if any, of the stock subject to the Option. The

Committee in its sole discretion, may also make such adjustments in the terms of the Option to reflect, or related to, such changes in the capital structure of the Company or distributions as it deems appropriate. All adjustments pursuant to this Section shall be determined by the Committee, and its determination shall be final, binding and conclusive.

10. **Rights as a Shareholder, Director, Employee or Consultant.**

The Participant shall have no rights as a shareholder with respect to any shares covered by the Option until the date of the issuance of the shares for which the Option has been exercised (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). No adjustment shall be made for dividends, distributions or other rights for which the record date is prior to the date the shares are issued, except as provided in Section 9. If the Participant is an Employee, the Participant understands and acknowledges that, except as otherwise provided in a separate, written employment agreement between a Participating Company and the Participant, the Participant's employment is "at will" and is for no specified term. Nothing in this Option Agreement shall confer upon the Participant any right to continue in the Service of a Participating Company or interfere in any way with any right of the Participating Company Group to terminate the Participant's Service as a Director, an Employee or Consultant, as the case may be, at any time.

11. **Notice of Sales Upon Disqualifying Disposition.**

The Participant shall dispose of the shares acquired pursuant to the Option only in accordance with the provisions of this Option Agreement. In addition, *if the Grant Notice designates this Option as an Incentive Stock Option*, the Participant shall (a) promptly notify the Chief Financial Officer of the Company if the Participant disposes of any of the shares acquired pursuant to the Option within one (1) year after the date the Participant exercises all or part of the Option or within two (2) years after the Date of Grant and (b) provide the Company with a description of the circumstances of such disposition. Until such time as the Participant disposes of such shares in a manner consistent with the provisions of this Option Agreement, unless otherwise expressly authorized by the Company, the Participant shall hold all shares acquired pursuant to the Option in the Participant's name (and not in the name of any nominee) for the one-year period immediately after the exercise of the Option and the two-year period immediately after Date of Grant. At any time during the one-year or two-year periods set forth above, the Company may place a legend on any certificate representing shares acquired pursuant to the Option requesting the transfer agent for the Company's stock to notify the Company of any such transfers. The obligation of the Participant to notify the Company of any such transfer shall continue notwithstanding that a legend has been placed on the certificate pursuant to the preceding sentence.

12. **Legends.**

The Company may at any time place legends referencing any applicable federal, state or foreign securities law restrictions on all certificates representing shares of stock subject to the provisions of this Option Agreement. The Participant shall, at the request of the Company, promptly present to the Company any and all certificates representing shares acquired pursuant to the Option in the possession of the Participant in order to carry out the provisions of this

Section. Unless otherwise specified by the Company, legends placed on such certificates may include, but shall not be limited to, the following:

“THE SHARES EVIDENCED BY THIS CERTIFICATE WERE ISSUED BY THE CORPORATION TO THE REGISTERED HOLDER UPON EXERCISE OF AN INCENTIVE STOCK OPTION AS DEFINED IN SECTION 422 OF THE INTERNAL REVENUE CODE OF 1986, AS AMENDED (“ISO ”). IN ORDER TO OBTAIN THE PREFERENTIAL TAX TREATMENT AFFORDED TO ISOS, THE SHARES SHOULD NOT BE TRANSFERRED PRIOR TO TWO YEARS FROM THE GRANT DATE AND ONE YEAR FROM THE DATE OF EXERCISE. SHOULD THE REGISTERED HOLDER ELECT TO TRANSFER ANY OF THE SHARES PRIOR TO THIS DATE AND FOREGO ISO TAX TREATMENT, THE TRANSFER AGENT FOR THE SHARES SHALL NOTIFY THE CORPORATION IMMEDIATELY. THE REGISTERED HOLDER SHALL HOLD ALL SHARES PURCHASED UNDER THE INCENTIVE STOCK OPTION IN THE REGISTERED HOLDER’S NAME (AND NOT IN THE NAME OF ANY NOMINEE) PRIOR TO THIS DATE OR UNTIL TRANSFERRED AS DESCRIBED ABOVE.”

13. **Miscellaneous Provisions.**

13.1 **Termination or Amendment.** The Committee may terminate or amend the Plan or the Option at any time; provided, however, that except as provided in Section 8 in connection with a Change in Control, no such termination or amendment may have a materially adverse effect on the Option or any unexercised portion thereof without the consent of the Participant unless such termination or amendment is necessary to comply with any applicable law or government regulation. No amendment or addition to this Option Agreement shall be effective unless in writing.

13.2 **Further Instruments.** The parties hereto agree to execute such further instruments and to take such further action as may reasonably be necessary to carry out the intent of this Option Agreement.

13.3 **Binding Effect.** This Option Agreement shall inure to the benefit of the successors and assigns of the Company and, subject to the restrictions on transfer set forth herein, be binding upon the Participant and the Participant’s heirs, executors, administrators, successors and assigns.

13.4 **Delivery of Documents and Notices.** Any document relating to participation in the Plan or any notice required or permitted hereunder shall be given in writing and shall be deemed effectively given (except to the extent that this Option Agreement provides for effectiveness only upon actual receipt of such notice) upon personal delivery, electronic delivery at the e-mail address, if any, provided for the Participant by a Participating Company, or upon deposit in the U.S. Post Office or foreign postal service, by registered or certified mail, or with a nationally recognized overnight courier service, with postage and fees prepaid, addressed to the other party at the address of such party set forth in the Grant Notice or at such other address as such party may designate in writing from time to time to the other party.

(a) **Description of Electronic Delivery and Signature.** The Plan documents, which may include but do not necessarily include: the Plan, the Grant Notice, this Option Agreement, the Plan Prospectus, and any reports of the Company provided generally to the Company's shareholders, may be delivered to the Participant electronically. In addition, if permitted by the Company, the Participant may deliver electronically the Grant Notice and Exercise Notice called for by Section 4.2 to the Company or to such third party involved in administering the Plan as the Company may designate from time to time. Such means of electronic delivery may include but do not necessarily include the delivery of a link to a Company intranet or the Internet site of a third party involved in administering the Plan, the delivery of the document via e-mail or such other means of electronic delivery specified by the Company. Any and all such documents and notices may be electronically signed.

(b) **Consent to Electronic Delivery and Signature.** The Participant acknowledges that the Participant has read Section 13.4(a) of this Option Agreement and consents to the electronic delivery of the Plan documents and, if permitted by the Company, the delivery of the Grant Notice and Exercise Notice, as described in Section 13.4(a). The Participant agrees that any and all such documents requiring a signature may be electronically signed and that such electronic signature shall have the same effect as handwritten signature for the purposes of validity, enforceability and admissibility. The Participant acknowledges that he or she may receive from the Company a paper copy of any documents delivered electronically at no cost to the Participant by contacting the Company by telephone or in writing. The Participant further acknowledges that the Participant will be provided with a paper copy of any documents if the attempted electronic delivery of such documents fails. Similarly, the Participant understands that the Participant must provide the Company or any designated third party administrator with a paper copy of any documents if the attempted electronic delivery of such documents fails. The Participant may revoke his or her consent to the electronic delivery of documents described in Section 13.4(a) or may change the electronic mail address to which such documents are to be delivered (if the Participant has provided an electronic mail address) at any time by notifying the Company of such revoked consent or revised e-mail address by telephone, postal service or electronic mail. Finally, the Participant understands that he or she is not required to consent to electronic delivery of documents described in Section 13.4(a).

13.5 **Integrated Agreement.** The Grant Notice, this Option Agreement and the Plan, together with any Superseding Agreement and any change of control agreement, shall constitute the entire understanding and agreement of the Participant and the Participating Company Group with respect to the subject matter contained herein or therein and supersede any prior agreements, understandings, restrictions, representations, or warranties among the Participant and the Participating Company Group with respect to such subject matter. To the extent contemplated herein or therein, the provisions of the Grant Notice, the Option Agreement and the Plan shall survive any exercise of the Option and shall remain in full force and effect.

13.6 **Applicable Law.** This Option Agreement shall be governed by the laws of the State of Washington as such laws are applied to agreements between Washington residents entered into and to be performed entirely within the State of Washington.

ADAPTIVE BIOTECHNOLOGIES CORPORATION
RESTRICTED STOCK UNITS AGREEMENT
(For U.S. Participants)

Adaptive Biotechnologies Corporation has granted to the Participant named in the *Notice of Grant of Restricted Stock Units* (the “**Grant Notice**”) to which this Restricted Stock Units Agreement (the “**Agreement**”) is attached an Award consisting of Restricted Stock Units (each a “**Unit**”) subject to the terms and conditions set forth in the Grant Notice and this Agreement. The Award has been granted pursuant to and shall in all respects be subject to the terms and conditions of the Adaptive Biotechnologies Corporation 2019 Equity Incentive Plan (the “**Plan**”), as amended to the Date of Grant, the provisions of which are incorporated herein by reference. By signing the Grant Notice, the Participant: (a) acknowledges receipt of and represents that the Participant has read and is familiar with the Grant Notice, this Agreement, the Plan and a prospectus for the Plan prepared in connection with the registration with the Securities and Exchange Commission of the shares issuable pursuant to the Award (the “**Plan Prospectus**”), (b) accepts the Award subject to all of the terms and conditions of the Grant Notice, this Agreement and the Plan and (c) agrees to accept as binding, conclusive and final all decisions or interpretations of the Committee upon any questions arising under the Grant Notice, this Agreement or the Plan.

1. **Definitions and Construction.**

1.1 **Definitions.** Unless otherwise defined herein, capitalized terms shall have the meanings assigned to such terms in the Grant Notice or the Plan.

1.2 **Construction.** Captions and titles contained herein are for convenience only and shall not affect the meaning or interpretation of any provision of this Agreement. Except when otherwise indicated by the context, the singular shall include the plural and the plural shall include the singular. Use of the term “or” is not intended to be exclusive, unless the context clearly requires otherwise.

2. **Administration.**

All questions of interpretation concerning the Grant Notice, this Agreement, the Plan or any other form of agreement or other document employed by the Company in the administration of the Plan or the Award shall be determined by the Committee. All such determinations by the Committee shall be final, binding and conclusive upon all persons having an interest in the Award, unless fraudulent or made in bad faith. Any and all actions, decisions and determinations taken or made by the Committee in the exercise of its discretion pursuant to the Plan or the Award or other agreement thereunder (other than determining questions of interpretation pursuant to the preceding sentence) shall be final, binding and conclusive upon all persons having an interest in the Award. Any Officer shall have the authority to act on behalf of the Company with respect to any matter, right, obligation, or election which is the responsibility of or which is allocated to the Company herein, provided the Officer has apparent authority with respect to such matter, right, obligation, or election.

3. **The Award.**

3.1 **Grant of Units.** On the Date of Grant, the Participant shall acquire, subject to the provisions of this Agreement, the Total Number of Units set forth in the Grant Notice, subject to adjustment as provided in Section 9. Each Unit represents a right to receive on a date determined in accordance with the Grant Notice and this Agreement one (1) share of Stock.

3.2 **No Monetary Payment Required.** The Participant is not required to make any monetary payment (other than applicable tax withholding, if any) as a condition to receiving the Units or shares of Stock issued upon settlement of the Units, the consideration for which shall be past services actually rendered or future services to be rendered to a Participating Company or for its benefit. Notwithstanding the foregoing, if required by applicable law, the Participant shall furnish consideration in the form of cash or past services rendered to a Participating Company or for its benefit having a value not less than the par value of the shares of Stock issued upon settlement of the Units.

4. **Vesting of Units.**

Units acquired pursuant to this Agreement shall become Vested Units as provided in the Grant Notice. For purposes of determining the number of Vested Units following an Ownership Change Event, credited Service shall include all Service with any corporation which is a Participating Company at the time the Service is rendered, whether or not such corporation is a Participating Company both before and after the Ownership Change Event.

5. **Company Reacquisition Right.**

5.1 **Grant of Company Reacquisition Right.** Except to the extent otherwise provided by the Superseding Agreement, if any, in the event that the Participant's Service terminates for any reason or no reason, with or without cause, the Participant shall forfeit and the Company shall automatically reacquire all Units which are not, as of the time of such termination, Vested Units ("***Unvested Units***"), and the Participant shall not be entitled to any payment therefor (the "***Company Reacquisition Right***").

5.2 **Ownership Change Event, Non-Cash Dividends, Distributions and Adjustments.** Upon the occurrence of an Ownership Change Event, a dividend or distribution to the shareholders of the Company paid in shares of Stock or other property, or any other adjustment upon a change in the capital structure of the Company as described in Section 9, any and all new, substituted or additional securities or other property (other than regular, periodic cash dividends paid on Stock pursuant to the Company's dividend policy) to which the Participant is entitled by reason of the Participant's ownership of Unvested Units shall be immediately subject to the Company Reacquisition Right and included in the terms "Units" and "Unvested Units" for all purposes of the Company Reacquisition Right with the same force and effect as the Unvested Units immediately prior to the Ownership Change Event, dividend, distribution or adjustment, as the case may be. For purposes of determining the number of Vested Units following an Ownership Change Event, dividend, distribution or adjustment, credited Service shall include all Service with any corporation which is a Participating Company

at the time the Service is rendered, whether or not such corporation is a Participating Company both before and after any such event.

6. **Settlement of the Award.**

6.1 **Issuance of Shares of Stock.** Subject to the provisions of Section 6.3, the Company shall issue to the Participant on the Settlement Date with respect to each Vested Unit to be settled on such date one (1) share of Stock. The Settlement Date with respect to a Unit shall be the date on which such Unit becomes a Vested Unit as provided by the Grant Notice (an “*Original Settlement Date*”); provided, however, that if the tax withholding obligations of a Participating Company, if any, will not be satisfied by the share withholding method described in Section 7.3 and the Original Settlement Date would occur on a date on which a sale by the Participant of the shares to be issued in settlement of the Vested Units would violate the Trading Compliance Policy of the Company, then the Settlement Date for such Vested Units shall be deferred until the next day on which the sale of such shares would not violate the Trading Compliance Policy, but in any event on or before the 15th day of the third calendar month following calendar year of the Original Settlement Date. Shares of Stock issued in settlement of Units shall not be subject to any restriction on transfer other than any such restriction as may be required pursuant to Section 6.3, Section 7 or the Company’s Trading Compliance Policy.

6.2 **Beneficial Ownership of Shares; Certificate Registration.** The Participant hereby authorizes the Company, in its sole discretion, to deposit any or all shares acquired by the Participant pursuant to the settlement of the Award with the Company’s transfer agent, including any successor transfer agent, to be held in book entry form, or to deposit such shares for the benefit of the Participant with any broker with which the Participant has an account relationship of which the Company has notice. Except as provided by the foregoing, a certificate for the shares acquired by the Participant shall be registered in the name of the Participant, or, if applicable, in the names of the heirs of the Participant.

6.3 **Restrictions on Grant of the Award and Issuance of Shares.** The grant of the Award and issuance of shares of Stock upon settlement of the Award shall be subject to compliance with all applicable requirements of federal, state or foreign law with respect to such securities. No shares of Stock may be issued hereunder if the issuance of such shares would constitute a violation of any applicable federal, state or foreign securities laws or other law or regulations or the requirements of any stock exchange or market system upon which the Stock may then be listed. The inability of the Company to obtain from any regulatory body having jurisdiction the authority, if any, deemed by the Company’s legal counsel to be necessary to the lawful issuance of any shares subject to the Award shall relieve the Company of any liability in respect of the failure to issue such shares as to which such requisite authority shall not have been obtained. As a condition to the settlement of the Award, the Company may require the Participant to satisfy any qualifications that may be necessary or appropriate, to evidence compliance with any applicable law or regulation and to make any representation or warranty with respect thereto as may be requested by the Company.

6.4 **Fractional Shares.** The Company shall not be required to issue fractional shares upon the settlement of the Award.

7. **Tax Withholding.**

7.1 **In General.** At the time the Grant Notice is executed, or at any time thereafter as requested by a Participating Company, the Participant hereby authorizes withholding from payroll and any other amounts payable to the Participant, and otherwise agrees to make adequate provision for, any sums required to satisfy the federal, state, local and foreign tax (including any social insurance) withholding obligations of the Participating Company, if any, which arise in connection with the Award, the vesting of Units or the issuance of shares of Stock in settlement thereof. The Company shall have no obligation to deliver shares of Stock until the tax withholding obligations of the Participating Company have been satisfied by the Participant.

7.2 **Assignment of Sale Proceeds.** Subject to compliance with applicable law and the Company's Trading Compliance Policy, if permitted by the Company, the Participant may satisfy the Participating Company's tax withholding obligations in accordance with procedures established by the Company providing for delivery by the Participant to the Company or a broker approved by the Company of properly executed instructions, in a form approved by the Company, providing for the assignment to the Company of the proceeds of a sale with respect to some or all of the shares being acquired upon settlement of Units.

7.3 **Withholding in Shares.** The Company shall have the right, but not the obligation, to require the Participant to satisfy all or any portion of a Participating Company's tax withholding obligations by deducting from the shares of Stock otherwise deliverable to the Participant in settlement of the Award a number of whole shares having a fair market value, as determined by the Company as of the date on which the tax withholding obligations arise, not in excess of the amount of such tax withholding obligations determined by the applicable minimum statutory withholding rates if required to avoid liability classification of the Award under generally accepted accounting principles in the United States.

8. **Effect of Change in Control.**

In the event of a Change in Control, the Award shall be subject to the definitive agreement entered into by the Company in connection with the Change in Control. Except to the extent that the Committee determines to cash out the Award in accordance with Section 13.1(c) of the Plan, the surviving, continuing, successor, or purchasing entity or parent thereof, as the case may be (the "**Acquiror**"), may, without the consent of the Participant, assume or continue in full force and effect the Company's rights and obligations under all or any portion of the outstanding Units or substitute for all or any portion of the outstanding Units substantially equivalent rights with respect to the Acquiror's stock. For purposes of this Section, a Unit shall be deemed assumed if, following the Change in Control, the Unit confers the right to receive, subject to the terms and conditions of the Plan and this Agreement, the consideration (whether stock, cash, other securities or property or a combination thereof) to which a holder of a share of Stock on the effective date of the Change in Control was entitled (and if holders were offered a choice of consideration, the type of consideration chosen by the holders of a majority of the outstanding shares of Stock); provided, however, that if such consideration is not solely common stock of the Acquiror, the Committee may, with the consent of the Acquiror, provide for the consideration to be received upon settlement of the Unit to consist solely of common stock of the

Acquiror equal in Fair Market Value to the per share consideration received by holders of Stock pursuant to the Change in Control. The Award shall terminate and cease to be outstanding effective as of the time of consummation of the Change in Control to the extent that Units subject to the Award are neither assumed or continued by the Acquiror in connection with the Change in Control nor settled as of the time of the Change in Control.

9. **Adjustments for Changes in Capital Structure.**

Subject to any required action by the shareholders of the Company and the requirements of Section 409A of the Code to the extent applicable, in the event of any change in the Stock effected without receipt of consideration by the Company, whether through merger, consolidation, reorganization, reincorporation, recapitalization, reclassification, stock dividend, stock split, reverse stock split, split-up, split-off, spin-off, combination of shares, exchange of shares, or similar change in the capital structure of the Company, or in the event of payment of a dividend or distribution to the shareholders of the Company in a form other than Stock (other than regular, periodic cash dividends paid on Stock pursuant to the Company's dividend policy) that has a material effect on the Fair Market Value of shares of Stock, appropriate and proportionate adjustments shall be made in the number of Units subject to the Award and/or the number and kind of shares or other property to be issued in settlement of the Award, in order to prevent dilution or enlargement of the Participant's rights under the Award. For purposes of the foregoing, conversion of any convertible securities of the Company shall not be treated as "effected without receipt of consideration by the Company." Any and all new, substituted or additional securities or other property (other than regular, periodic cash dividends paid on Stock pursuant to the Company's dividend policy) to which the Participant is entitled by reason of ownership of Units acquired pursuant to this Award will be immediately subject to the provisions of this Award on the same basis as all Units originally acquired hereunder. Any fractional Unit or share resulting from an adjustment pursuant to this Section shall be rounded down to the nearest whole number. Such adjustments shall be determined by the Committee, and its determination shall be final, binding and conclusive.

10. **Rights as a Shareholder, Director, Employee or Consultant.**

The Participant shall have no rights as a shareholder with respect to any shares which may be issued in settlement of this Award until the date of the issuance of such shares (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company). No adjustment shall be made for dividends, distributions or other rights for which the record date is prior to the date the shares are issued, except as provided in Section 9. If the Participant is an Employee, the Participant understands and acknowledges that, except as otherwise provided in a separate, written employment agreement between a Participating Company and the Participant, the Participant's employment is "at will" and is for no specified term. Nothing in this Agreement shall confer upon the Participant any right to continue in the Service of a Participating Company or interfere in any way with any right of the Participating Company Group to terminate the Participant's Service at any time.

11. **Legends.**

The Company may at any time place legends referencing any applicable federal, state or foreign securities law restrictions on all certificates representing shares of stock issued pursuant to this Agreement. The Participant shall, at the request of the Company, promptly present to the Company any and all certificates representing shares acquired pursuant to this Award in the possession of the Participant in order to carry out the provisions of this Section.

12. **Compliance with Section 409A.**

It is intended that any election, payment or benefit which is made or provided pursuant to or in connection with this Award that may result in Section 409A Deferred Compensation shall comply in all respects with the applicable requirements of Section 409A (including applicable regulations or other administrative guidance thereunder, as determined by the Committee in good faith) to avoid the unfavorable tax consequences provided therein for non-compliance. In connection with effecting such compliance with Section 409A, the following shall apply:

12.1 **Separation from Service; Required Delay in Payment to Specified Employee.** Notwithstanding anything set forth herein to the contrary, no amount payable pursuant to this Agreement on account of the Participant's termination of Service which constitutes a "deferral of compensation" within the meaning of the Treasury Regulations issued pursuant to Section 409A of the Code (the "*Section 409A Regulations*") shall be paid unless and until the Participant has incurred a "separation from service" within the meaning of the Section 409A Regulations. Furthermore, to the extent that the Participant is a "specified employee" within the meaning of the Section 409A Regulations as of the date of the Participant's separation from service, no amount that constitutes a deferral of compensation which is payable on account of the Participant's separation from service shall be paid to the Participant before the date (the "*Delayed Payment Date*") which is first day of the seventh month after the date of the Participant's separation from service or, if earlier, the date of the Participant'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.

12.2 **Other Changes in Time of Payment.** Neither the Participant nor the Company shall take any action to accelerate or delay the payment of any benefits under this Agreement in any manner which would not be in compliance with the Section 409A Regulations.

12.3 **Amendments to Comply with Section 409A; Indemnification.** Notwithstanding any other provision of this Agreement to the contrary, the Company is authorized to amend this Agreement, to void or amend any election made by the Participant under this Agreement and/or to delay the payment of any monies and/or provision of any benefits in such manner as may be determined by the Company, in its discretion, to be necessary or appropriate to comply with the Section 409A Regulations without prior notice to or consent of the Participant. The Participant hereby releases and holds harmless the Company, its directors, officers and shareholders from any and all claims that may arise from or relate to any tax liability, penalties, interest, costs, fees or other liability incurred by the Participant in connection with the Award, including as a result of the application of Section 409A.

12.4 **Advice of Independent Tax Advisor.** The Company has not obtained a tax ruling or other confirmation from the Internal Revenue Service with regard to the application of Section 409A to the Award, and the Company does not represent or warrant that this Agreement will avoid adverse tax consequences to the Participant, including as a result of the application of Section 409A to the Award. The Participant hereby acknowledges that he or she has been advised to seek the advice of his or her own independent tax advisor prior to entering into this Agreement and is not relying upon any representations of the Company or any of its agents as to the effect of or the advisability of entering into this Agreement.

13. **Miscellaneous Provisions.**

13.1 **Termination or Amendment.** The Committee may terminate or amend the Plan or this Agreement at any time; provided, however, that except as provided in Section 8 in connection with a Change in Control, no such termination or amendment may have a materially adverse effect on the Participant's rights under this Agreement without the consent of the Participant unless such termination or amendment is necessary to comply with applicable law or government regulation, including, but not limited to, Section 409A. No amendment or addition to this Agreement shall be effective unless in writing.

13.2 **Nontransferability of the Award.** Prior to the issuance of shares of Stock on the applicable Settlement Date, neither this Award nor any Units subject to this Award shall be subject in any manner to anticipation, alienation, sale, exchange, transfer, assignment, pledge, encumbrance, or garnishment by creditors of the Participant or the Participant's beneficiary, except transfer by will or by the laws of descent and distribution. All rights with respect to the Award shall be exercisable during the Participant's lifetime only by the Participant or the Participant's guardian or legal representative.

13.3 **Further Instruments.** The parties hereto agree to execute such further instruments and to take such further action as may reasonably be necessary to carry out the intent of this Agreement.

13.4 **Binding Effect.** This Agreement shall inure to the benefit of the successors and assigns of the Company and, subject to the restrictions on transfer set forth herein, be binding upon the Participant and the Participant's heirs, executors, administrators, successors and assigns.

13.5 **Delivery of Documents and Notices.** Any document relating to participation in the Plan or any notice required or permitted hereunder shall be given in writing and shall be deemed effectively given (except to the extent that this Agreement provides for effectiveness only upon actual receipt of such notice) upon personal delivery, electronic delivery at the e-mail address, if any, provided for the Participant by a Participating Company, or upon deposit in the U.S. Post Office or foreign postal service, by registered or certified mail, or with a nationally recognized overnight courier service, with postage and fees prepaid, addressed to the other party at the address of such party set forth in the Grant Notice or at such other address as such party may designate in writing from time to time to the other party.

(a) **Description of Electronic Delivery and Signature.** The Plan documents, which may include but do not necessarily include: the Plan, the Grant Notice, this Agreement, the Plan Prospectus, and any reports of the Company provided generally to the Company's shareholders, may be delivered to the Participant electronically. In addition, if permitted by the Company, the Participant may deliver electronically the Grant Notice to the Company or to such third party involved in administering the Plan as the Company may designate from time to time. Such means of electronic delivery may include but do not necessarily include the delivery of a link to a Company intranet or the Internet site of a third party involved in administering the Plan, the delivery of the document via e-mail or such other means of electronic delivery specified by the Company. Any and all such documents and notices may be electronically signed.

(b) **Consent to Electronic Delivery and Signature.** The Participant acknowledges that the Participant has read Section 13.5(a) of this Agreement and consents to the electronic delivery of the Plan documents and, if permitted by the Company, the delivery of the Grant Notice, as described in Section 13.5(a). The Participant agrees that any and all such documents requiring a signature may be electronically signed and that such electronic signature shall have the same effect as handwritten signature for the purposes of validity, enforceability and admissibility. The Participant acknowledges that he or she may receive from the Company a paper copy of any documents delivered electronically at no cost to the Participant by contacting the Company by telephone or in writing. The Participant further acknowledges that the Participant will be provided with a paper copy of any documents if the attempted electronic delivery of such documents fails. Similarly, the Participant understands that the Participant must provide the Company or any designated third party administrator with a paper copy of any documents if the attempted electronic delivery of such documents fails. The Participant may revoke his or her consent to the electronic delivery of documents described in Section 13.5(a) or may change the electronic mail address to which such documents are to be delivered (if Participant has provided an electronic mail address) at any time by notifying the Company of such revoked consent or revised e-mail address by telephone, postal service or electronic mail. Finally, the Participant understands that he or she is not required to consent to electronic delivery of documents described in Section 13.5(a).

13.6 **Integrated Agreement.** The Grant Notice, this Agreement and the Plan, together with any Superseding Agreement and any change of control agreement, shall constitute the entire understanding and agreement of the Participant and the Participating Company Group with respect to the subject matter contained herein or therein and supersede any prior agreements, understandings, restrictions, representations, or warranties among the Participant and the Participating Company Group with respect to such subject matter. To the extent contemplated herein or therein, the provisions of the Grant Notice, this Agreement and the Plan shall survive any settlement of the Award and shall remain in full force and effect.

13.7 **Applicable Law.** This Agreement shall be governed by the laws of the State of Washington as such laws are applied to agreements between Washington residents entered into and to be performed entirely within the State of Washington.

**CERTIFICATION OF THE CHIEF EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Chad Robins, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Adaptive Biotechnologies Corporation;
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. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 13, 2019

By: _____ /s/ Chad Robins
Chad Robins
Chief Executive Officer
(Principal Executive Officer)

**CERTIFICATION OF THE CHIEF FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Chad Cohen, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Adaptive Biotechnologies Corporation;
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. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: August 13, 2019

By: _____
/s/ Chad Cohen
Chad Cohen
Chief Financial Officer
(Principal Financial Officer and
Principal Accounting Officer)

**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 of Adaptive Biotechnologies Corporation (the "Company") on Form 10-Q for the quarterly period ended June 30, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

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

Date: August 13, 2019

By: _____ /s/ Chad Robins
Chad Robins
Chief Executive Officer
(Principal Executive Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. § 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

**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 of Adaptive Biotechnologies Corporation (the "Company") on Form 10-Q for the quarterly period ended June 30, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

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

Date: August 13, 2019

By: _____ /s/ Chad Cohen
Chad Cohen
Chief Financial Officer
(Principal Financial Officer and
Principal Accounting Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. § 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.