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 September 30, 2021

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	**27-0907024**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
1165 Eastlake Avenue East Seattle, Washington	**98109**
(Address of principal executive offices)	**(Zip Code)**

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

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
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	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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

As of October 29, 2021, the registrant had 141,131,844 shares of common stock, $0.0001 par value per share, outstanding.

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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, which include but are not limited to, statements about:

- our ability to leverage and extend our immune medicine platform to discover, develop and commercialize our products and services, including further commercialization and development of clonoSEQ and T-Detect products, particularly in light of the novelty of immune medicine and our methods;
- our ability to obtain regulatory clearance, authorization and approval for such products and services;
- our collaboration with Genentech, Inc. ("Genentech") and ability to develop and commercialize cellular therapeutics, including our ability to achieve milestones and realize the intended benefits of the collaboration;
- our ability to develop a map of the interaction between the immune system and disease ("TCR-Antigen Map") and yield insights from it that are commercially viable as we expand the T-Detect product line;
- our expected reliance on collaborators for development and clinical testing of potential diagnostic, therapeutic and drug development product candidates, which may fail at any time due to a number of possible unforeseen events;
- our ability to develop and commercialize products related to COVID-19, such as our ability to develop a map of the T cell response to the SARS-CoV-2 virus, the commercialization of a T cell-based clinical diagnostic product for COVID-19 ("T-Detect COVID"), the development of neutralizing antibody products or processes and the development of COVID-19 vaccines together with Vaccibody; and
- the potential adverse effect on our business, operations and plans or timelines (including those plans and timelines related to expansion initiatives and clinical development) resulting from the ongoing COVID-19 pandemic, including potential impacts to our supply chain, human capital and corporate culture.

The forward-looking statements in this report also include 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 ("SEC") 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.

PART I—FINANCIAL INFORMATION

Item 1. Financial Statements (Unaudited)

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

	September 30, 2021 (unaudited)	December 31, 2020
Assets		
Current assets		
Cash and cash equivalents	$ 122,401	$ 123,436
Short-term marketable securities (amortized cost of $292,556 and $564,036, respectively)	292,639	564,833
Accounts receivable, net	17,122	10,047
Inventory	18,231	14,063
Prepaid expenses and other current assets	16,634	14,535
Total current assets	467,027	726,914
Long-term assets		
Property and equipment, net	87,820	39,692
Operating lease right-of-use assets	89,446	99,350
Long-term marketable securities (amortized cost of $217,455 and $118,429, respectively)	217,379	118,525
Restricted cash	2,138	2,138
Intangible assets, net	8,955	10,225
Goodwill	118,972	118,972
Other assets	870	598
Total assets	$ 992,607	$ 1,116,414
Liabilities and shareholders' equity		
Current liabilities		
Accounts payable	$ 8,252	$ 3,237
Accrued liabilities	17,034	13,162
Accrued compensation and benefits	12,034	11,950
Current portion of operating lease liabilities	5,108	3,529
Current portion of deferred revenue	79,954	73,319
Total current liabilities	122,382	105,197
Long-term liabilities		
Operating lease liabilities, less current portion	108,044	104,333
Deferred revenue, less current portion	110,638	163,618
Total liabilities	341,064	373,148
Commitments and contingencies (Note 9)		
Shareholders' equity		
Preferred stock: $0.0001 par value, 10,000,000 shares authorized at September 30, 2021 and December 31, 2020; no shares issued and outstanding at September 30, 2021 and December 31, 2020	—	—
Common stock: $0.0001 par value, 340,000,000 shares authorized at September 30, 2021 and December 31, 2020; 141,027,487 and 137,646,896 shares issued and outstanding at September 30, 2021 and December 31, 2020, respectively	14	14
Additional paid-in capital	1,308,946	1,253,971
Accumulated other comprehensive gain	7	893
Accumulated deficit	(657,458)	(511,612)
Total Adaptive Biotechnologies Corporation shareholders' equity	651,509	743,266
Noncontrolling interest	34	—
Total shareholders' equity	651,543	743,266
Total liabilities and shareholders' equity	$ 992,607	$ 1,116,414

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

Condensed Consolidated Statements of Operations
(in thousands, except share and per share amounts)
(unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Revenue				
Sequencing revenue	$ 22,106	$ 11,276	$ 55,835	$ 28,730
Development revenue	17,361	15,023	60,579	39,467
Total revenue	39,467	26,299	116,414	68,197
Operating expenses				
Cost of revenue	14,189	6,053	34,945	16,308
Research and development	36,072	30,314	107,644	80,241
Sales and marketing	24,949	14,474	68,769	42,813
General and administrative	20,154	12,079	51,156	36,138
Amortization of intangible assets	428	428	1,270	1,275
Total operating expenses	95,792	63,348	263,784	176,775
Loss from operations	(56,325)	(37,049)	(147,370)	(108,578)
Interest and other income, net	327	1,018	1,429	5,805
Income tax (expense) benefit	—	(688)	—	1,116
Net loss	(55,998)	(36,719)	(145,941)	(101,657)
Add: Net loss attributable to noncontrolling interest	95	—	95	—
Net loss attributable to Adaptive Biotechnologies Corporation	$ (55,903)	$ (36,719)	$ (145,846)	$ (101,657)
Net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	$ (0.40)	$ (0.27)	$ (1.04)	$ (0.79)
Weighted-average shares used in computing net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	140,833,564	134,372,026	140,060,379	129,289,948

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

Condensed Consolidated Statements of Comprehensive Loss
(in thousands)
(unaudited)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Net loss	$ (55,998)	$ (36,719)	$ (145,941)	$ (101,657)
Other comprehensive (loss) income:				
Change in unrealized gains and losses on investments	(209)	(726)	(886)	756
Comprehensive loss	(56,207)	(37,445)	(146,827)	(100,901)
Add: Comprehensive loss attributable to noncontrolling interest	95	—	95	—
Comprehensive loss attributable to Adaptive Biotechnologies Corporation	$ (56,112)	$ (37,445)	$ (146,732)	$ (100,901)

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

Condensed Consolidated Statements of Shareholders' Equity
(in thousands, except share amounts)
(unaudited)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Gain	Accumulated Deficit	Noncontrolling Interest	Total Shareholders' Equity
	Shares	Amount					
Balance at June 30, 2020	128,233,842	$ 12	$ 958,097	$ 2,153	$ (430,323)	$ —	$ 529,939
Issuance of common stock upon public offering, after deducting underwriters' discounts and net offering costs payable by us	7,200,000	1	271,838	—	—	—	271,839
Issuance of common stock for cash upon exercise of stock options	958,414	—	4,244	—	—	—	4,244
Common stock option and restricted stock unit share-based compensation	—	—	6,470	—	—	—	6,470
Other comprehensive loss	—	—	—	(726)	—	—	(726)
Net loss	—	—	—	—	(36,719)	—	(36,719)
Balance at September 30, 2020	136,392,256	$ 13	$ 1,240,649	$ 1,427	$ (467,042)	$ —	$ 775,047
Balance at June 30, 2021	140,663,755	$ 14	$ 1,294,506	$ 216	$ (601,555)	$ 129	$ 693,310
Issuance of common stock for cash upon exercise of stock options	360,607	—	2,797	—	—	—	2,797
Vesting of restricted stock units	3,125	—	—	—	—	—	—
Common stock option and restricted stock unit share-based compensation	—	—	11,643	—	—	—	11,643
Other comprehensive loss	—	—	—	(209)	—	—	(209)
Net loss	—	—	—	—	(55,903)	(95)	(55,998)
Balance at September 30, 2021	141,027,487	$ 14	$ 1,308,946	$ 7	$ (657,458)	$ 34	$ 651,543

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

Adaptive Biotechnologies Corporation

Condensed Consolidated Statements of Shareholders' Equity (Continued)
(in thousands, except share amounts)
(unaudited)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Gain	Accumulated Deficit	Noncontrolling Interest	Total Shareholders' Equity
	Shares	Amount					
Balance at December 31, 2019	125,238,142	$ 12	$ 935,834	$ 671	$ (365,478)	$ —	$ 571,039
Issuance of common stock upon public offering, after deducting underwriters' discounts and net offering costs payable by us	7,200,000	1	271,838	—	—	—	271,839
Adjustments to accumulated deficit for adoption of guidance on accounting for leases	—	—	—	—	93	—	93
Issuance of common stock for cash upon exercise of stock options	3,949,614	—	15,459	—	—	—	15,459
Vesting of restricted stock units	4,500	—	—	—	—	—	—
Common stock option and restricted stock unit share-based compensation	—	—	17,518	—	—	—	17,518
Other comprehensive income	—	—	—	756	—	—	756
Net loss	—	—	—	—	(101,657)	—	(101,657)
Balance at September 30, 2020	136,392,256	$ 13	$ 1,240,649	$ 1,427	$ (467,042)	$ —	$ 775,047
Balance at December 31, 2020	137,646,896	$ 14	$ 1,253,971	$ 893	$ (511,612)	$ —	$ 743,266
Issuance of common stock upon exercise of common stock warrant	54,162	—	—	—	—	—	—
Issuance of common stock for cash upon exercise of stock options	3,310,804	—	23,299	—	—	—	23,299
Vesting of restricted stock units	15,625	—	—	—	—	—	—
Common stock option and restricted stock unit share-based compensation	—	—	31,376	—	—	—	31,376
Capital contributions for Spin Technologies, Inc.	—	—	300	—	—	129	429
Other comprehensive loss	—	—	—	(886)	—	—	(886)
Net loss	—	—	—	—	(145,846)	(95)	(145,941)
Balance at September 30, 2021	141,027,487	$ 14	$ 1,308,946	$ 7	$ (657,458)	$ 34	$ 651,543

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

Condensed Consolidated Statements of Cash Flows
(in thousands)
(unaudited)

	Nine Months Ended September 30,	
	2021	2020
Operating activities		
Net loss	$ (145,941)	$ (101,657)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation expense	7,834	4,845
Noncash lease expense	5,259	2,217
Share-based compensation expense	31,376	17,518
Intangible assets amortization	1,270	1,275
Investment amortization	5,956	(484)
Benefit from income tax	—	(1,116)
Other	(9)	62
Changes in operating assets and liabilities:		
Accounts receivable, net	(7,075)	802
Inventory	(4,168)	(1,667)
Prepaid expenses and other current assets	(2,239)	(3,886)
Accounts payable and accrued liabilities	5,518	30
Operating lease liabilities	9,935	(282)
Deferred revenue	(46,345)	(27,281)
Other	(272)	(215)
Net cash used in operating activities	(138,901)	(109,839)
Investing activities		
Purchases of property and equipment	(52,501)	(9,433)
Purchases of marketable securities	(238,001)	(299,786)
Proceeds from sales and maturities of marketable securities	404,500	532,224
Net cash provided by investing activities	113,998	223,005
Financing activities		
Proceeds from exercise of stock options	23,439	15,495
Proceeds from public offering of common stock, net of underwriting discounts and commissions	—	272,160
Payment of public offering costs, net	—	(321)
Proceeds from initial capital contributions for Spin Technologies, Inc.	429	—
Net cash provided by financing activities	23,868	287,334
Net (decrease) increase in cash, cash equivalents and restricted cash	(1,035)	400,500
Cash, cash equivalents and restricted cash at beginning of year	125,574	98,714
Cash, cash equivalents and restricted cash at end of period	$ 124,539	$ 499,214
Noncash investing and financing activities		
Purchases of equipment included in accounts payable and accrued liabilities	$ 8,133	$ 3,582
Derecognition of lease financing arrangements upon adoption of guidance on accounting for leases	$ —	$ 36,607

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

Notes to Unaudited Condensed Consolidated Financial Statements
(unaudited)

1. Organization and Description of Business

Adaptive Biotechnologies Corporation ("we," "us" or "our") is a commercial-stage company advancing the field of immune 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 applies our proprietary technologies to read the diverse genetic code of a patient's immune system and aims to understand precisely how the immune system 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 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.

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.

Spin Technologies, Inc.

In 2021, we formed a corporate subsidiary, Spin Technologies, Inc. ("SpinTech"), to facilitate the development of a potential new early-stage sequencing technology that is ancillary to our core business. We have a 70% ownership interest in SpinTech. All intercompany transactions and balances between us and this majority-owned subsidiary have been eliminated in consolidation. The remaining interest, held by certain of our related parties and related family trusts, was reported as noncontrolling interest in our unaudited condensed consolidated financial statements.

2. Significant Accounting Policies

Basis of Presentation and Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America ("GAAP") requires management to make 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, 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 Consolidated Financial Statements

In our opinion, the accompanying unaudited condensed consolidated financial statements have been prepared in accordance with GAAP for interim financial information. These unaudited condensed consolidated 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. All such adjustments were of a normal, recurring nature. 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 unaudited condensed consolidated financial statements should be read in conjunction with our audited financial statements and notes included in our Annual Report on Form 10-K for the year ended December 31, 2020 filed with the SEC on February 24, 2021.

Restricted Cash

We are required to maintain certain balances under lease arrangements for some of our property and facility leases. We had restricted cash of $2.1 million as of September 30, 2021 and December 31, 2020.

Leases

We determine if an arrangement contains a lease at inception. We have operating lease agreements for the laboratory, office and warehouse facilities that we occupy, as well as server space. Operating lease right-of-use ("ROU") assets and operating lease liabilities are recognized at the date the underlying asset becomes available for our use and are based on the present value of the future minimum lease payments over the lease term. ROU assets also include any initial direct costs incurred and any lease payments made at or before the lease commencement date, less lease incentives received. As our leases generally do not provide an implicit interest rate, the present value of our future minimum lease payments is determined using our incremental borrowing rate. This rate is an estimate of the collateralized borrowing rate we would incur on our future lease payments over a similar term and is based on the information available to us at the lease commencement date, or as of January 1, 2020 for commenced leases that existed as of our adoption of the new lease standard.

Certain of our leases contain options to extend or terminate the lease; lease terms are adjusted for these options only when it is reasonably certain we will exercise these options. Our lease agreements do not contain residual value guarantees or covenants.

We have made a policy election regarding our real estate leases not to separate nonlease components from lease components, to the extent they are fixed. Nonlease components that are not fixed are expensed as incurred as variable lease expense. Our leases for laboratory, office and warehouse facilities typically include variable nonlease components, such as common-area maintenance costs. We have also elected not to record on the balance sheet a lease that has a lease term of twelve months or less and does not contain a purchase option that we are reasonably certain to exercise.

Lease expense is recognized on a straight-line basis over the terms of the leases. Incentives granted under our facilities leases, including rent holidays, are recognized as adjustments to lease expense on a straight-line basis over the terms of the leases.

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, United States ("U.S.") government debt securities, U.S. government agency securities, commercial paper and corporate bonds with high-quality accredited financial institutions.

Significant customers are those that represent more than 10% of our total revenue or accounts receivable, net balances for the periods and as of each balance sheet date presented, respectively. Revenue from these customers reflects their purchase of our products and services and our collaboration efforts with Genentech.

For each significant customer, revenue as a percentage of total revenue for the periods presented and accounts receivable, net as a percentage of total accounts receivable, net as of the dates presented were as follows:

	Revenue				Accounts Receivable, Net	
	Three Months Ended September 30,		Nine Months Ended September 30,			
	2021	2020	2021	2020	September 30, 2021	December 31, 2020
Customer A	*%	*%	*%	*%	16.1%	19.1%
Customer B	*	*	*	*	*	12.2
Customer C	*	10.3	*	*	*	*
Customer D	*	*	*	*	14.8	*
Genentech, Inc. and Roche Group	39.8	48.1	42.6	55.1	*	*

* 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: (1) identify the contract or contracts; (2) determine whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (3) measure the transaction price, including the constraint on variable consideration; (4) allocate the transaction price to the performance obligations based on estimated selling prices; and (5) 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 classify revenue based on the nature of the performance obligation and the allocated transaction price.

Sequencing Revenue

Sequencing revenue reflects the amounts generated from providing testing services through clonoSEQ to clinical and research customers, from providing our T-Detect COVID test to clinical customers and from providing sequencing services through immunoSEQ to research customers.

For clinical customers, we primarily derive revenue from providing our clonoSEQ report to ordering physicians. In these transactions, we have identified one performance obligation, the delivery of a clonoSEQ report, and we bill and receive payments from medical institutions and commercial and government third-party payors. 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 and expected reimbursement rates with the various payors, which are monitored in subsequent periods and adjusted as necessary based on actual collection experience.

For our clonoSEQ coverage under Medicare, we bill 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 recognition commences at the time the initial billable test result is delivered and is based upon cumulative tests delivered to date. We estimate the number of tests we expect to deliver over a patient's treatment cycle based on historical testing frequencies for patients by indication. These estimates are subject to change as we develop more information about utilization over time. Any unrecognized revenue from the initial billable test is recorded as deferred revenue and is recognized either as we deliver our estimate of the remaining tests in a patient's treatment cycle or when the likelihood becomes remote that a patient will receive additional testing.

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 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. In periods where our sample estimates are reduced or a customer project is cancelled and, in either case, we have remaining related deferred revenue, we recognize revenue using a cumulative catch-up approach based on the proportion of samples delivered to date relative to the remaining samples expected to be delivered.

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 immunoSEQ and our minimal residual disease ("MRD") product 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 include single or multiple performance obligations, depending on the contract. For certain contracts, we perform services to support the biopharmaceutical customers' regulatory submissions as part of their registrational trials. These services may 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 scientific, clinical, regulatory and other risks, as well as the level of effort and investment required to achieve the respective milestone.

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.

During the three months ended September 30, 2021, we executed an intellectual property license agreement that includes variable consideration related to sales-based royalties. Any consideration related to such royalties will be recognized as development revenue at the later of when (i) the related sales occur or (ii) the performance obligation to which some or all of the sales-based royalty has been allocated has been satisfied (or partially satisfied).

Net Loss Per Share Attributable to Adaptive Biotechnologies Corporation Common Shareholders

We calculate basic net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders by dividing net loss attributable to Adaptive Biotechnologies Corporation by the weighted-average number of shares of common stock outstanding for the period. The diluted net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders is computed by giving effect to all potential dilutive common stock equivalents outstanding for the period determined using the treasury stock method. For purposes of this calculation, common stock warrants, stock options and nonvested restricted stock units are considered common stock equivalents but have been excluded from the calculation of diluted net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, as their effect is anti-dilutive.

3. Revenue

MRD Development Agreements

We have entered into agreements with biopharmaceutical customers to further develop and commercialize our MRD product 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-based milestones or achieving certain regulatory milestones pertaining to the customers' therapeutics and our MRD product.

Under the contracts, we identify performance obligations, which may include: (1) obligations to provide services supporting the customer's regulatory submission activities as they relate to our MRD product; and (2) sequencing services related to 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 constrain any consideration related to 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 related to the sequencing services as sequencing revenue 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, 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 using a cost-based model based on estimates of effort completed.

We recognized $3.2 million in revenue during the nine months ended September 30, 2021 due to changes in estimates of total samples to be provided under certain of our MRD development agreements for which we had previously received upfront consideration, of which $0.3 million was recognized as development revenue in the respective period.

We earned $1.5 million and $10.0 million during the three and nine months ended September 30, 2021, respectively, and $2.5 million during the three and nine months ended September 30, 2020 upon the achievement of certain regulatory milestones by our respective customers' therapeutics. We recognized these earnings as development revenue within the respective periods, as we determined that the amounts were consistent with our estimated standalone selling prices and the respective performance obligations were complete.

In total, we recognized $1.9 million and $11.4 million in development revenue related to our MRD development agreements during the three and nine months ended September 30, 2021, respectively, and $2.6 million and $3.1 million in development revenue related to our MRD development agreements during the three and nine months ended September 30, 2020, respectively.

As of September 30, 2021, in future periods we could receive up to an additional $333.5 million in milestone payments if certain regulatory approvals are obtained by our customers' therapeutics in connection with MRD data generated from our MRD product.

Genentech Collaboration Agreement

In December 2018, we entered into a worldwide collaboration and license agreement with Genentech ("Genentech Agreement") 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 Agreement.

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.

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 resulting from 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 given 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 September 30, 2021. 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 Products and Personalized Product pathways. When any of the potential regulatory and development milestones are no longer fully constrained and included in the transaction price, such amounts will be recognized using the cumulative catch-up method based on proportional performance at such time. 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 Products 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 $15.0 million and $12.3 million during the three months ended September 30, 2021 and 2020, respectively, and $47.8 million and $35.9 million during the nine months ended September 30, 2021 and 2020, respectively, related to the Genentech Agreement. Costs related to the Genentech Agreement are included in research and development expenses.

4. Fair Value Measurements

The following tables set forth the fair value of financial assets as of September 30, 2021 and December 31, 2020 that were measured at fair value on a recurring basis (in thousands):

	September 30, 2021			
	Level 1	Level 2	Level 3	Total
Financial assets				
Money market funds	$ 113,486	$ —	$ —	$ 113,486
U.S. government debt securities	—	482,044	—	482,044
Corporate bonds	—	27,974	—	27,974
Total financial assets	$ 113,486	$ 510,018	$ —	$ 623,504

	December 31, 2020			
	Level 1	Level 2	Level 3	Total
Financial assets				
Money market funds	$ 103,283	$ —	$ —	$ 103,283
U.S. government debt securities	—	671,777	—	671,777
Corporate bonds	—	11,581	—	11,581
Total financial assets	$ 103,283	$ 683,358	$ —	$ 786,641

Level 1 securities include highly liquid money market funds, for 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 and corporate bonds, and are valued based on recent trades of securities in inactive markets or on quoted market prices of similar instruments and other significant inputs derived from or corroborated by observable market data.

5. Investments

Available-for-sale investments consisted of the following as of September 30, 2021 and December 31, 2020 (in thousands):

	September 30, 2021			
	Amortized Cost	Unrealized Gain	Unrealized Loss	Estimated Fair Value
Short-term marketable securities				
U.S. government debt securities	$ 277,331	$ 87	$ —	$ 277,418
Corporate bonds	15,225	1	(5)	15,221
Total short-term marketable securities	$ 292,556	$ 88	$ (5)	$ 292,639
Long-term marketable securities				
U.S. government debt securities	$ 204,694	$ 6	$ (74)	$ 204,626
Corporate bonds	12,761	—	(8)	12,753
Total long-term marketable securities	$ 217,455	$ 6	$ (82)	$ 217,379

	December 31, 2020			
	Amortized Cost	Unrealized Gain	Unrealized Loss	Estimated Fair Value
Short-term marketable securities				
U.S. government debt securities	$ 552,539	$ 723	$ (10)	$ 553,252
Corporate bonds	11,497	86	(2)	11,581
Total short-term marketable securities	$ 564,036	$ 809	$ (12)	$ 564,833
Long-term marketable securities				
U.S. government debt securities	$ 118,429	$ 98	$ (2)	$ 118,525
Total long-term marketable securities	$ 118,429	$ 98	$ (2)	$ 118,525

All the U.S. government debt securities and corporate bonds designated as short-term marketable securities have an effective maturity date that is equal to or less than one year from the respective balance sheet date. Those that are designated as long-term marketable securities have an effective maturity date that is more than one year from the respective balance sheet date.

Accrued interest receivable is excluded from the amortized cost and estimated fair value of our marketable securities. Accrued interest receivable of $2.0 million and $2.5 million were presented separately within the prepaid expenses and other current assets line item on our unaudited condensed consolidated balance sheet as of September 30, 2021 and on our condensed consolidated balance sheet as of December 31, 2020, respectively.

The following table presents the gross unrealized holding losses and fair value for investments in an unrealized loss position, and the length of time individual securities have been in a continuous loss position, as of September 30, 2021 (in thousands):

	Less Than 12 Months		12 Months Or Greater	
	Fair Value	Unrealized Loss	Fair Value	Unrealized Loss
U.S. government debt securities	$ 163,664	$ (74)	$ —	$ —
Corporate bonds	22,888	(13)	—	—
Total available-for-sale securities	$ 186,552	$ (87)	$ —	$ —

We periodically review our available-for-sale securities to assess for credit impairment. Some of the factors considered in assessing impairment include the extent to which the fair value is less than the amortized cost basis, adverse conditions related to the security, an industry or geographic area, changes to security ratings or sector credit ratings and other relevant market data.

As of September 30, 2021, we did not intend, nor were we more likely than not to be required, to sell our available-for-sale investments before the recovery of their amortized cost basis, which may be maturity. Based on our assessment, we concluded all impairment as of September 30, 2021 to be due to factors other than credit loss, such as changes in interest rates. A credit allowance was not recognized and the impairment of our available-for-sale securities was recorded in other comprehensive loss.

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 September 30, 2021 and December 31, 2020 consisted of the following (in thousands):

	September 30, 2021		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Acquired developed technology	$ 20,000	$ (11,217)	$ 8,783
Purchased intellectual property	325	(153)	172
Balance at September 30, 2021	$ 20,325	$ (11,370)	$ 8,955

	December 31, 2020		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Acquired developed technology	$ 20,000	$ (9,972)	$ 10,028
Purchased intellectual property	325	(128)	197
Balance at December 31, 2020	$ 20,325	$ (10,100)	$ 10,225

The developed technology was acquired in connection with our acquisition of Sequenta, Inc. in 2015. The remaining balance of the acquired technology and the purchased intellectual property is expected to be amortized over the next 5.3 years.

As of September 30, 2021, expected future amortization expense for intangible assets was as follows (in thousands):

2021 (excluding the nine months ended September 30, 2021)	$ 429
2022	1,699
2023	1,699
2024	1,703
2025	1,699
Thereafter	1,726
Total future amortization expense	$ 8,955

7. Deferred Revenue

Deferred revenue by revenue classification as of September 30, 2021 and December 31, 2020 was as follows (in thousands):

	September 30, 2021	December 31, 2020
Current deferred revenue		
Sequencing	$ 18,912	$ 15,463
Development	61,042	57,856
Total current deferred revenue	79,954	73,319
Non-current deferred revenue		
Sequencing	126	724
Development	110,512	162,894
Total non-current deferred revenue	110,638	163,618
Total current and non-current deferred revenue	$ 190,592	$ 236,937

Deferred revenue from our Genentech Agreement represents $57.5 million and $106.7 million of the current and non-current development deferred revenue balances, respectively, as of September 30, 2021 and $55.1 million and $157.0 million of the current and non-current development deferred revenue balances, respectively, as of December 31, 2020. In general, we expect that the current amounts will be recognized as revenue within 12 months and the non-current amounts will be recognized as revenue over a period of approximately five to six years from September 30, 2021. 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.

During the nine months ended September 30, 2021, we recognized $3.4 million in revenue as a result of changes in estimates of total samples to be provided under certain of our agreements and cancelled biopharmaceutical customer sequencing contracts for which we had received upfront consideration. Additionally, we recognized $1.4 million and $2.0 million of sequencing revenue during the three and nine months ended September 30, 2021, respectively, related to Medicare reimbursements resulting from our determination that the likelihood of additional testing for specific patients was remote and a change in our estimate of expected cumulative tests per patient for one of our covered indications.

Changes in deferred revenue during the nine months ended September 30, 2021 were as follows (in thousands):

Deferred revenue balance at December 31, 2020	$	236,937
Additions to deferred revenue during the period		26,720
Revenue recognized during the period		(73,065)
Deferred revenue balance at September 30, 2021	$	190,592

As of September 30, 2021, $36.7 million was recognized as revenue that was included in the deferred revenue balance at December 31, 2020.

8. Leases

We have operating lease agreements for laboratory and office facilities in Seattle, Washington, South San Francisco, California and New York City, New York, as well as server space. Additionally, in March 2021, we executed a lease to rent approximately 27,000 square feet of a warehouse in Bothell, Washington, which we classified as an operating lease upon commencement during the nine months ended September 30, 2021. Rent obligations commenced in October 2021 and the lease expires 120 months thereafter, subject to an early termination option after the seventh year and an option to twice extend the lease for five years. Furthermore, the landlord agreed to fund $1.2 million in improvements in connection with this lease. For the nine months ended September 30, 2021, ROU assets obtained in exchange for operating lease liabilities was $5.4 million.

As of September 30, 2021, we were not party to any finance leases. Our leases have remaining terms of 0.6 years to 11.9 years and include options to extend certain of the leases for up to 10.0 years and terminate certain of the leases after as few as 3.0 years. We adjust lease terms for these options only when it is reasonably certain we will exercise these options. As of September 30, 2021, it was reasonably certain that we would exercise our option to terminate two of our leases after 3.0 years.

We previously entered into a $2.1 million letter of credit with one of our financial institutions in connection with one of our leases.

Other information related to our operating leases as of September 30, 2021 was as follows:

Weighted-average remaining lease term (in years)	10.75
Weighted-average discount rate	4.6%

The following table reconciles our undiscounted operating lease cash flows to our operating lease liabilities as of September 30, 2021 (in thousands):

2021 (excluding the nine months ended September 30, 2021)	$	2,757
2022		14,184
2023		13,964
2024		13,692
2025		14,098
Thereafter		93,518
Total undiscounted lease payments		152,213
Less:		
Imputed interest rate		(33,755)
Tenant improvement receivables		(5,306)
Total operating lease liabilities	$	113,152
Less: current portion		(5,108)
Operating lease liabilities, less current portion	$	108,044

Operating lease expense was $3.1 million and $1.4 million for the three months ended September 30, 2021 and 2020, respectively, and $9.3 million and $3.7 million for the nine months ended September 30, 2021 and 2020, respectively. Variable lease expense for operating leases was $0.8 million and $0.7 million for the three months ended September 30, 2021 and 2020, respectively, and $2.3 million and $1.8 million for the nine months ended September 30, 2021 and 2020, respectively.

Cash paid for amounts included in the measurement of lease liabilities was $5.6 million and cash received for tenant improvement allowances was $11.5 million during the nine months ended September 30, 2021. Cash paid during the nine months ended September 30, 2020 for amounts included in the measurement of lease liabilities was $1.8 million, net of $1.8 million of cash received for tenant improvement allowances.

9. Commitments and Contingencies

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 were not party to any material legal proceedings as of September 30, 2021.

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.

10. Shareholders' Equity

Preferred Stock

We are authorized to issue 10,000,000 shares of preferred stock, par value $0.0001 per share. As of September 30, 2021, no shares of preferred stock were outstanding.

Common Stock

We are authorized to issue 340,000,000 shares of common stock. Our common stock has a par value of $0.0001 per share, 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. The holders of record of outstanding shares of common stock shall be entitled to receive, when, as and if declared, out of funds legally available, such cash and other dividends as may be declared from time to time. As of September 30, 2021, we had 141,027,487 shares of common stock outstanding.

As of September 30, 2021, we have reserved shares of common stock for the following:

Shares issuable upon the exercise of outstanding common stock options and the vesting of outstanding common restricted stock units granted	13,645,411
Shares available for future grant under the 2019 Equity Incentive Plan	23,011,065
Shares available for future grant under the Employee Stock Purchase Plan	2,804,298
Total shares of common stock reserved for future issuance	39,460,774

Our 2019 Equity Incentive Plan ("2019 Plan") provides for annual increases in the number of shares that may be issued under the 2019 Plan on January 1, 2020 and on each subsequent January 1, thereafter, by a number of shares equal to the lesser of (a) 5% of the number of shares of common stock issued and outstanding on the immediately preceding December 31, or (b) an amount determined by our board of directors.

Furthermore, our Employee Stock Purchase Plan ("ESPP") provides for annual increases in the number of shares available for issuance under our ESPP on January 1, 2020 and on each January 1, thereafter, by a number of shares equal to the smallest of (a) 1% of the number of shares of common stock issued and outstanding on the immediately preceding December 31, or (b) an amount determined by our board of directors.

Effective January 1, 2021, our 2019 Plan reserve increased by 6,882,344 shares. Our board of directors determined not to increase the ESPP reserve in 2021.

Common Stock Warrant

In 2014, we issued a warrant to purchase 56,875 shares of Series C convertible preferred stock at an exercise price of $2.64. The warrant was exercisable for a period of seven years from the date of issuance. Immediately prior to and in connection with the completion of our initial public offering on July 1, 2019, this convertible preferred stock warrant was converted to a warrant to purchase the same number of shares of common stock. The warrant was exercised on February 25, 2021 through a cashless exercise, resulting in the issuance of 54,162 shares of our common stock. The impact of this cashless exercise was immaterial to our unaudited condensed consolidated financial statements. As of September 30, 2021, there were no outstanding warrants to purchase common stock.

11. Equity Incentive Plans

Adaptive 2009 Equity Incentive Plan

We adopted an equity incentive plan in 2009 ("2009 Plan") that provided 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 were not to be less than the fair market value of our common stock at the date of grant. Options granted under this plan expire no later than ten years from the grant date and vesting was established at the time of grant. Pursuant to the terms of the 2019 Plan, any shares subject to outstanding options originally granted under the 2009 Plan that terminate, expire or lapse for any reason without the delivery of shares to the holder thereof shall become available for issuance pursuant to awards granted under the 2019 Plan. While no shares are available for future issuance under the 2009 Plan, it continues to govern outstanding equity awards granted thereunder.

2019 Equity Incentive Plan

The 2019 Plan became effective immediately prior to the closing of our initial public offering in July 2019. The 2019 Plan provides for the issuance of awards in the form of options and other share-based awards for employees, directors and consultants. Under the 2019 Plan, the option exercise price per share shall not be less than the fair market value of a share of stock on the effective date of grant, as defined by the 2019 Plan, unless explicitly qualified under the provisions of Section 409A or Section 424(a) of the Internal Revenue Code of 1986. Additionally, unless otherwise specified, options granted under this plan expire no later than ten years from the grant date and vesting is established at the time of grant. Except for certain option and restricted stock unit grants made to non-employee directors, stock options and restricted stock units granted under the 2019 Plan generally vest over a four-year period, subject to continuous service through each applicable vesting date. As of September 30, 2021, we have authorized 29,118,513 shares of common stock for issuance under the 2019 Plan.

Changes in shares available for grant during the nine months ended September 30, 2021 were as follows:

	Shares Available for Grant
Shares available for grant at December 31, 2020	18,617,001
2019 Equity Incentive Plan reserve increase effective January 1, 2021	6,882,344
Options and restricted stock units granted	(3,295,903)
Options and restricted stock units forfeited, cancelled or expired	807,623
Shares available for grant at September 30, 2021	23,011,065

Stock option activity under the 2009 Plan and 2019 Plan during the nine months ended September 30, 2021 was as follows:

	Shares Subject to Outstanding Options	Weighted-Average Exercise Price per Share	Aggregate Intrinsic Value (in thousands)
Options outstanding at December 31, 2020	14,433,560	$ 12.82	$ 668,458
Options granted	2,407,629	41.21	
Options forfeited or cancelled	(744,501)	24.48	
Options expired	(21,452)	18.98	
Options exercised	(3,310,804)	7.04	
Options outstanding at September 30, 2021	12,764,432	$ 18.98	$ 218,168
Options vested and exercisable at September 30, 2021	7,080,906	$ 10.29	$ 170,535

The weighted-average remaining contractual life for options outstanding as of September 30, 2021 was 7.1 years. The weighted-average remaining contractual life for vested and exercisable options as of September 30, 2021 was 5.9 years.

As of September 30, 2021, $0.1 million was included in the prepaid expenses and other current assets line item on our unaudited condensed consolidated balance sheet for unsettled cash proceeds related to options exercised during the nine months ended September 30, 2021. Of the $23.4 million proceeds from exercise of stock options included on our unaudited condensed consolidated statements of cash flows for the nine months ended September 30, 2021, $0.3 million related to options exercised prior to but settled during the nine months ended September 30, 2021. Of the $15.5 million proceeds from exercise of stock options included on our unaudited condensed consolidated statements of cash flows for the nine months ended September 30, 2020, $0.5 million related to options exercised prior to but settled during the nine months ended September 30, 2020. Furthermore, as of September 30, 2020, there was $0.4 million in unsettled cash proceeds related to options exercised during the nine months ended September 30, 2020.

Restricted stock unit activity under the 2019 Plan during the nine months ended September 30, 2021 was as follows:

	Restricted Stock Units Outstanding	Weighted-Average Grant Date Fair Value per Share
Nonvested outstanding restricted stock units at December 31, 2020	50,000	$ 28.10
Restricted stock units granted	888,274	40.21
Restricted stock units forfeited or cancelled	(41,670)	45.06
Restricted stock units vested	(15,625)	28.10
Nonvested outstanding restricted stock units at September 30, 2021	880,979	$ 39.51

Grant Date Fair Value of Options and Restricted Stock Units Granted

The estimated grant date fair value of options granted during the nine months ended September 30, 2021 and 2020 was estimated using the Black-Scholes option-pricing model with the following assumptions:

	Nine Months Ended September 30,	
	2021	2020
Fair value of common stock	$30.86 - $66.50	$17.68 - $48.54
Expected term (in years)	5.27 - 6.08	5.27 - 6.08
Risk-free interest rate	0.5% - 1.1%	0.4% - 1.7%
Expected volatility	67.1% - 70.0%	70.5% - 73.0%
Expected dividend yield	—	—

The weighted-average volatility used in the grant date fair value calculation of options granted during the nine months ended September 30, 2021 and 2020 was 68.6% and 71.2%, respectively.

The determination of the grant date fair value of stock options using a Black-Scholes option-pricing model is affected by the 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 fair value of each share of common stock is 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 term of options granted to employees and non-employee directors 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 based on the midpoint between the vesting date and the end of 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 terms 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 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.

The grant date fair value of restricted stock units granted is 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.

The compensation costs related to stock options and restricted stock units for the three and nine months ended September 30, 2021 and 2020, respectively, are included on our unaudited condensed consolidated statements of operations as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Cost of revenue	$ 650	$ 206	$ 1,386	$ 587
Research and development	3,637	2,216	10,311	5,912
Sales and marketing	3,369	1,759	9,166	4,583
General and administrative	3,987	2,289	10,513	6,436
Total share-based compensation expense	$ 11,643	$ 6,470	$ 31,376	$ 17,518

As of September 30, 2021, unrecognized share-based compensation expense related to unvested stock options was $97.6 million, which is expected to be recognized over a remaining weighted-average period of 2.9 years. Additionally, as of September 30, 2021, unrecognized share-based compensation expense related to unvested restricted stock units was $30.3 million, which is expected to be recognized over a remaining weighted-average period of 3.4 years.

12. Net Loss Per Share Attributable to Adaptive Biotechnologies Corporation Common Shareholders

The following table sets forth the computation of the basic and diluted net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders for the three and nine months ended September 30, 2021 and 2020, respectively (in thousands, except share and per share amounts):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Net loss attributable to Adaptive Biotechnologies Corporation	$ (55,903)	$ (36,719)	$ (145,846)	$ (101,657)
Weighted-average shares used in computing net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	140,833,564	134,372,026	140,060,379	129,289,948
Net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	$ (0.40)	$ (0.27)	$ (1.04)	$ (0.79)

Since we were in a loss position for all periods presented, basic net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders is the same as diluted net loss per share attributable to Adaptive Biotechnologies Corporation 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 Adaptive Biotechnologies Corporation common shareholders for the three and nine months ended September 30, 2021 and 2020, respectively, as they had an anti-dilutive effect:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Stock options issued and outstanding	12,901,028	15,718,821	13,205,328	16,484,334
Nonvested restricted stock units	795,469	50,000	572,194	34,138
Common stock warrant	—	56,875	11,458	56,875
Total	13,696,497	15,825,696	13,788,980	16,575,347

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 consolidated 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 relating to our future plans, objectives, expectations, intentions and financial performance and the assumptions that underlie these statements.

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 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 applies our proprietary technologies to read the diverse genetic code of a patient's immune system and aims to understand precisely how the immune system 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 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 biopharmaceutical and academic customers. Our first clinical diagnostic product, clonoSEQ, is the first test authorized by the Food and Drug Administration for the detection and monitoring of MRD in patients with multiple myeloma ("MM"), B cell acute lymphoblastic leukemia ("ALL") and chronic lymphocytic leukemia ("CLL"), and is also available as a CLIA-validated laboratory developed test for patients with other lymphoid cancers. Since our inception, we have devoted a majority of our resources to research and development activities to develop our immune medicine platform.

We are using the TCR-Antigen Map to develop research solutions and diagnostic products, such as immunoSEQ T-MAP and T-Detect. T-Detect COVID, for which we have received emergency use authorization, confirms past SARS-CoV-2 infection, the virus that causes COVID-19, and is also the first indication for the T-Detect product line. We expect to launch T-Detect Lyme during the 2022 Lyme season, have discovered signals in both ileal Crohn's and multiple sclerosis and continue to pursue signals for other disease states, including in autoimmune disease.

Our therapeutic product candidates, being developed under the Genentech Agreement, leverage our platform to identify specific receptors on immune cells to develop into cellular therapies in oncology. We also extended our platform to identify highly potent neutralizing antibodies against SARS-CoV-2 and we believe this differentiated approach may be leveraged across multiple disease states.

For our life sciences research customers, we provide two categories of products and services using immunoSEQ. 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 receive nonrefundable upfront or recurring payments. We may receive additional payments upon those customers achieving specified milestones. Revenue related to these activities are recorded as development revenue.

For our clinical diagnostics customers, we sell our clonoSEQ diagnostic test and T-Detect COVID test, which include our immunosequencing services and are thus recorded as sequencing revenue. In the future, we intend to sell other diagnostic products and services, including other indications for T-Detect, 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. These research offerings have comprised the 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 T-Detect 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, 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. We continue to seek expanded coverage of our clonoSEQ diagnostic test and have successfully expanded coverage through contractual agreements or positive medical policies with Medicare and several of the largest national private health insurers in the United States.

We recognized revenue of $39.5 million and $26.3 million for the three months ended September 30, 2021 and 2020, respectively, and $116.4 million and $68.2 million for the nine months ended September 30, 2021 and 2020, respectively. Net loss attributable to Adaptive Biotechnologies Corporation was $55.9 million and $36.7 million for the three months ended September 30, 2021 and 2020, respectively, and $145.8 million and $101.7 million for the nine months ended September 30, 2021 and 2020, respectively. We have funded our operations to date principally from the sale of convertible preferred stock and common stock and, to a lesser extent, sequencing and development revenue. As of September 30, 2021 and December 31, 2020, we had cash, cash equivalents and marketable securities of $632.4 million and $806.8 million, respectively.

Components of Results of Operations

Revenue

We derive our revenue from two sources: (1) sequencing revenue and (2) development revenue.

Sequencing revenue. Sequencing revenue reflects the amounts generated from providing testing services through clonoSEQ to clinical and research customers, from providing our T-Detect COVID test to clinical customers and from providing sequencing services through immunoSEQ to research customers.

For our clinical customers, we primarily derive revenue from providing our clonoSEQ report to ordering physicians. We bill medical institutions and commercial and government payors based on tests delivered to ordering physicians. Amounts paid for clonoSEQ diagnostic tests by medical institutions and commercial and government payors vary based on respective reimbursement rates and patient responsibilities, which may differ 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, contracted reimbursement rates, if applicable, and other adjustments to estimate the amount of revenue that is collectible.

For our clonoSEQ coverage under Medicare, we bill 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 recognition commences 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 either as we deliver our estimate of the remaining tests in a patient's treatment cycle or when the likelihood becomes remote that a patient will receive additional testing.

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 research 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. In periods where our sample estimates are reduced or a customer project is cancelled and, in either case, we have remaining related deferred revenue, we recognize revenue using a cumulative catch-up approach based on the proportion of samples delivered to date relative to the remaining samples expected to be delivered.

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. 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. Additionally, we generate development revenue from the achievement of regulatory milestones.

During the three months ended September 30, 2021, we executed an intellectual property license agreement that includes variable consideration related to sales-based royalties. Any consideration related to such royalties will be recognized as development revenue at the later of when (i) the related sales occur or (ii) the performance obligation to which some or all of the sales-based royalty has been allocated has been satisfied (or partially satisfied).

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. Our revenue may fluctuate from period to period due to the uncertain nature of delivery of our products and services, the achievement of milestones by us or our customers, timing of expenses incurred, changes in estimates of total anticipated costs related to our Genentech Agreement and other events not within our control, such as the delivery of customer samples or customer decisions to no longer pursue their development initiatives.

Due to the ongoing uncertainties related to the COVID-19 pandemic, we may experience variability in revenue in the near term as our customers' abilities to procure samples for their research initiatives change, as customer initiatives evolve and as clinical testing is impacted by the pandemic.

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 and 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. Additionally, costs to support our Genentech Agreement are a component of our research and development activities.

We expect cost of revenue to increase in absolute dollars as we grow our sequencing volume and make increased investments in laboratory automation and facilities, 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. If our sample volume throughput is reduced as a result of the COVID-19 pandemic or otherwise, cost of revenue as a percentage of total revenue may be adversely impacted due to fixed overhead costs.

Research and Development Expenses

Research and development expenses consist of laboratory materials costs, personnel-related expenses, equipment costs, allocated facility costs, information technology expenses and contract service expenses. Research and development activities support further development and refinement of existing assays and products, discovery of new technologies and investments in our immune medicine platform. We also include in research and development expenses the costs associated with software development of applications to support future commercial opportunities, as well as development activities to support laboratory scaling and workflow. 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. Additionally, the costs to support our Genentech Agreement are a component of our research and development activities. 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, although the percentage may fluctuate from period to period due to the timing and extent of our development and commercialization efforts.

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, subject to fluctuations 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 insurance costs, external legal costs, accounting and tax service expenses, consulting fees and allocated facility costs.

We expect our general and administrative expenses to continue to increase in absolute dollars as we increase headcount. Though expected to increase in absolute dollars, we expect these expenses to decrease as a percentage of revenue in the long term as revenue increases.

Statements of Operations Data and Other Financial and Operating Data

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
	(in thousands, except share and per share amounts)			
Statements of Operations Data:				
Revenue				
Sequencing revenue	$ 22,106	$ 11,276	$ 55,835	$ 28,730
Development revenue	17,361	15,023	60,579	39,467
Total revenue	39,467	26,299	116,414	68,197
Operating expenses				
Cost of revenue	14,189	6,053	34,945	16,308
Research and development	36,072	30,314	107,644	80,241
Sales and marketing	24,949	14,474	68,769	42,813
General and administrative	20,154	12,079	51,156	36,138
Amortization of intangible assets	428	428	1,270	1,275
Total operating expenses	95,792	63,348	263,784	176,775
Loss from operations	(56,325)	(37,049)	(147,370)	(108,578)
Interest and other income, net	327	1,018	1,429	5,805
Income tax (expense) benefit	—	(688)	—	1,116
Net loss	(55,998)	(36,719)	(145,941)	(101,657)
Add: Net loss attributable to noncontrolling interest	95	—	95	—
Net loss attributable to Adaptive Biotechnologies Corporation	$ (55,903)	$ (36,719)	$ (145,846)	$ (101,657)
Net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	$ (0.40)	$ (0.27)	$ (1.04)	$ (0.79)
Weighted-average shares used in computing net loss per share attributable to Adaptive Biotechnologies Corporation common shareholders, basic and diluted	140,833,564	134,372,026	140,060,379	129,289,948
Other Financial and Operating Data:				
Adjusted EBITDA(1)	$ (41,059)	$ (28,435)	$ (106,795)	$ (84,940)

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

Comparison of the Three Months Ended September 30, 2021 and 2020

Revenue

(in thousands, except percentages)	Three Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Revenue						
Sequencing revenue	$ 22,106	$ 11,276	$ 10,830	96%	56%	43%
Development revenue	17,361	15,023	2,338	16	44	57
Total revenue	$ 39,467	$ 26,299	$ 13,168	50	100%	100%

The $10.8 million increase in sequencing revenue was primarily attributable to a $5.8 million increase in revenue generated from biopharmaceutical customers and a $5.4 million increase in revenue generated from clinical customers, inclusive of a $1.4 million increase related to Medicare reimbursements resulting from our determination that the likelihood of additional testing for specific patients was remote and a change in our estimate of expected cumulative tests per patient for one of our covered indications.

Research sequencing volume increased by 33% to 8,710 sequences delivered in the three months ended September 30, 2021 from 6,541 sequences delivered in the three months ended September 30, 2020. Clinical sequencing volume, excluding T-Detect COVID volume, increased by 47% to 5,928 clinical tests delivered in the three months ended September 30, 2021 from 4,023 clinical tests delivered in the three months ended September 30, 2020.

The $2.3 million increase in development revenue was primarily attributable to a $2.7 million increase in revenue generated from the Genentech Agreement, partially offset by a $0.7 million decrease in revenue recognized from MRD development agreements, inclusive of a $1.0 million decrease in revenue recognized upon the achievement of certain regulatory milestones by our customers' therapeutics.

Cost of Revenue

(in thousands, except percentages)	Three Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Cost of revenue	$ 14,189	$ 6,053	$ 8,136	134%	36%	23%

The $8.1 million increase in cost of revenue was primarily attributable to a $3.6 million increase in materials costs resulting from increased revenue sample volume and a $3.0 million increase in labor and overhead costs. Additionally, there was a $0.9 million increase in sample collection costs, a $0.3 million increase in shipping costs and a $0.3 million increase related to higher usage of our production laboratory to process revenue samples versus research and development samples. These increases were partially offset by a $0.3 million decrease in materials cost due to product mix.

Research and Development

(in thousands, except percentages)	Three Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Research and development	$ 36,072	$ 30,314	$ 5,758	19%	91%	115%

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

(in thousands)	Three Months Ended September 30, 2021	2020	Change
Research and development materials and allocated production laboratory expenses	$ 12,620	$ 13,095	$ (475)
Personnel expenses	16,184	11,447	4,737
Allocable facilities and information technology expenses	1,560	1,468	92
Software and cloud services expenses	825	976	(151)
Depreciation and other expenses	4,883	3,328	1,555
Total	$ 36,072	$ 30,314	$ 5,758

The $5.8 million increase in research and development expenses was primarily attributable to a $4.7 million increase in personnel costs and a $1.6 million increase in depreciation and other expenses, which included a $0.8 million increase in consultant costs.

Sales and Marketing

(in thousands, except percentages)	Three Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Sales and marketing	$ 24,949	$ 14,474	$ 10,475	72%	63%	55%

The $10.5 million increase in sales and marketing expenses was primarily attributable to $6.1 million in additional personnel costs, $3.1 million in additional marketing expenses, a $0.7 million increase in travel and customer event related expenses and a $0.3 million increase in consultant costs. Our clonoSEQ marketing efforts were the largest driver of the $3.1 million increase in marketing expenses.

General and Administrative

(in thousands, except percentages)	Three Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
General and administrative	$ 20,154	$ 12,079	$ 8,075	67%	51%	46%

The $8.1 million increase in general and administrative expenses was primarily attributable to a $3.8 million increase in personnel costs, a $2.6 million increase in building, facility and depreciation related expenses, $0.7 million in additional consultant costs and a $0.6 million increase in computer and software expenses. There was also a $0.2 million increase in insurance costs and a $0.2 million increase in travel and entertainment expenses. These increases were partially offset by a $0.6 million decrease in legal, accounting and tax fees.

Interest and Other Income, Net

(in thousands, except percentages)	Three Months Ended September 30,		Change	
	2021	2020	$	%
Interest and other income, net	$ 327	$ 1,018	$ (691)	(68)%

The $0.7 million decrease in interest and other income, net was attributable to a decrease in net interest income and investment amortization resulting from reductions in interest rates and related yields.

Comparison of the Nine Months Ended September 30, 2021 and 2020

Revenue

(in thousands, except percentages)	Nine Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Revenue						
Sequencing revenue	$ 55,835	$ 28,730	$ 27,105	94%	48%	42%
Development revenue	60,579	39,467	21,112	53	52	58
Total revenue	$ 116,414	$ 68,197	$ 48,217	71	100%	100%

The $27.1 million increase in sequencing revenue was primarily attributable to a $17.1 million increase in revenue generated from biopharmaceutical and academic customers, inclusive of a $2.9 million increase due to changes in estimates of total samples to be provided under certain of our MRD development agreements and a $0.7 million decrease in revenue recognized from customer project cancellations. Additionally, there was a $9.9 million increase in revenue generated from clinical customers, inclusive of a $2.0 million increase related to Medicare reimbursements resulting from our determination that the likelihood of additional testing for specific patients was remote and a change in our estimate of expected cumulative tests per patient for one of our covered indications.

Research sequencing volume increased by 35% to 22,636 sequences delivered in the nine months ended September 30, 2021 from 16,756 sequences delivered in the nine months ended September 30, 2020. Clinical sequencing volume, excluding T-Detect COVID volume, increased by 51% to 16,160 clinical tests delivered in the nine months ended September 30, 2021 from 10,677 clinical tests delivered in the nine months ended September 30, 2020.

The $21.1 million increase in development revenue was primarily attributable to an $11.9 million increase in revenue generated from the Genentech Agreement and an $8.3 million increase in revenue recognized from MRD development agreements, inclusive of a $7.5 million increase in revenue recognized upon the achievement of certain regulatory milestones by our customers' therapeutics and a $0.3 million increase resulting from a change in estimate of total samples to be provided under certain of our agreements.

Cost of Revenue

(in thousands, except percentages)	Nine Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Cost of revenue	$ 34,945	$ 16,308	$ 18,637	114%	30%	24%

The $18.6 million increase in cost of revenue was primarily attributable to an $11.5 million increase in labor, overhead and facility costs and a $6.5 million increase in materials costs resulting from increased revenue sample volume. Additionally, there was a $1.2 million increase in sample collection costs and a $0.9 million increase in shipping costs. These increases were partially offset by a $2.0 million decrease related to higher usage of our production laboratory to process research and development samples versus revenue samples.

Research and Development

(in thousands, except percentages)	Nine Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Research and development	$ 107,644	$ 80,241	$ 27,403	34%	92%	118%

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

(in thousands)	Nine Months Ended September 30, 2021	2020	Change
Research and development materials and allocated production laboratory expenses	$ 40,453	$ 34,351	$ 6,102
Personnel expenses	46,107	32,343	13,764
Allocable facilities and information technology expenses	4,750	3,742	1,008
Software and cloud services expenses	2,682	2,617	65
Depreciation and other expenses	13,652	7,188	6,464
Total	$ 107,644	$ 80,241	$ 27,403

The $27.4 million increase in research and development expenses was primarily attributable to a $13.8 million increase in personnel costs, a $6.5 million increase in depreciation and other expenses, which included a $2.3 million increase in collaboration and medical advisory costs and a $1.6 million increase in consultant costs, and a $6.1 million increase in cost of materials and allocated production laboratory expenses. The increase in cost of materials and allocated production laboratory expenses was primarily driven by increased investments in our drug discovery efforts and T-Detect and TCR-Antigen Map development.

Sales and Marketing

(in thousands, except percentages)	Nine Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
Sales and marketing	$ 68,769	$ 42,813	$ 25,956	61%	59%	63%

The $26.0 million increase in sales and marketing expenses was primarily attributable to $18.1 million in additional personnel costs, $5.5 million in additional marketing expenses, a $1.2 million increase in consultant costs and a $0.5 million increase in computer and software expenses. Our clonoSEQ and T-Detect marketing efforts were the largest drivers of the $5.5 million increase in marketing expenses.

General and Administrative

(in thousands, except percentages)	Nine Months Ended September 30,		Change		Percent of Revenue	
	2021	2020	$	%	2021	2020
General and administrative	$ 51,156	$ 36,138	$ 15,018	42%	44%	53%

The $15.0 million increase in general and administrative expenses was primarily attributable to a $9.9 million increase in personnel costs, as well as a $3.6 million increase in building, facility and depreciation related expenses. Additionally, there was a $1.5 million increase in computer and software expenses, a $1.2 million increase in consultant costs and a $0.7 million increase in insurance costs. These increases were partially offset by a $1.8 million decrease in legal, accounting and tax fees.

Interest and Other Income, Net

(in thousands, except percentages)	Nine Months Ended September 30,		Change	
	2021	2020	$	%
Interest and other income, net	$ 1,429	$ 5,805	$ (4,376)	(75)%

The $4.4 million decrease in interest and other income, net was primarily attributable to a $4.2 million decrease in net interest income and investment amortization resulting from reductions in interest rates and related yields.

Adjusted EBITDA

Adjusted EBITDA is a non-GAAP financial measure that we define as net loss attributable to Adaptive Biotechnologies Corporation adjusted for interest and other income, net, income tax (expense) benefit, 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.

The following is a reconciliation of net loss attributable to Adaptive Biotechnologies Corporation to Adjusted EBITDA for the periods presented (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2020	2021	2020
Net loss attributable to Adaptive Biotechnologies Corporation	$ (55,903)	$ (36,719)	$ (145,846)	$ (101,657)
Interest and other income, net	(327)	(1,018)	(1,429)	(5,805)
Income tax expense (benefit)	—	688	—	(1,116)
Depreciation and amortization expense	3,528	2,144	9,104	6,120
Share-based compensation expense (1)	11,643	6,470	31,376	17,518
Adjusted EBITDA	$ (41,059)	$ (28,435)	$ (106,795)	$ (84,940)

(1) Represents share-based compensation expense related to option and restricted stock unit awards. See Note 11 of the accompanying notes to our unaudited condensed consolidated financial statements included 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 since inception through September 30, 2021, with the exception of certain 2019 periods for which we had positive cash flows from operations. As of September 30, 2021, we had an accumulated deficit of $657.5 million.

We have funded our operations to date principally from the sale of convertible preferred stock and common stock and, to a lesser extent, sequencing and development revenue. As of September 30, 2021, we had cash, cash equivalents and marketable securities of $632.4 million.

We believe our existing cash, cash equivalents and marketable securities 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.

If our available cash, cash equivalents and marketable securities balances and anticipated cash flows 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. This additional capital may not be available on reasonable terms, or at all.

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 and ongoing investments in our immune medicine platform. We also expect to make increased capital expenditures in the near term related to the expansion of our office and laboratory space and expect to increase investment in laboratory equipment and operations to support our anticipated growth. Cash in excess of immediate requirements is invested in accordance with our investment policy, primarily with a view to capital preservation and liquidity. Currently, our funds are held in money market funds and marketable securities consisting of U.S. government debt securities and corporate bonds.

There have been no material changes outside the ordinary course of business to our contractual obligations and commitments as previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2020. See Note 8 of the accompanying notes to our unaudited condensed consolidated financial statements included elsewhere in this report for more information regarding our contractual obligations relating to lease agreements.

While we may experience variability in revenue in the near term, as long-term revenue from sales of our current and future products and services 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.

Cash Flows

The following table summarizes our uses and sources of cash for the nine months ended September 30, 2021 and 2020 (in thousands):

	Nine Months Ended September 30,	
	2021	2020
Net cash used in operating activities	$ (138,901)	$ (109,839)
Net cash provided by investing activities	113,998	223,005
Net cash provided by financing activities	23,868	287,334

Operating Activities

Cash used in operating activities during the nine months ended September 30, 2021 was $138.9 million, which was primarily attributable to a net loss of $145.9 million and a net change in operating assets and liabilities of $44.6 million, partially offset by noncash share-based compensation of $31.4 million, noncash depreciation and amortization of $15.1 million and noncash lease expense of $5.3 million. The net change in operating assets and liabilities was primarily due to a $46.3 million reduction in deferred revenue primarily related to revenue recognized from the Genentech Agreement, an increase in accounts receivable, net of $7.1 million, an increase in inventory of $4.2 million and increases in prepaid expenses and other current assets of $2.2 million, all of which were partially offset by an increase in operating lease liabilities of $9.9 million and increases in accounts payable and accrued liabilities of $5.5 million.

Cash used in operating activities during the nine months ended September 30, 2020 was $109.8 million, which was primarily attributable to a net loss of $101.7 million, a net change in our operating assets and liabilities of $32.5 million and a benefit from income tax of $1.1 million, which were partially offset by noncash share-based compensation of $17.5 million, noncash depreciation and amortization of $5.6 million and noncash lease expense of $2.2 million. The net change in our operating assets and liabilities was primarily due to a $27.3 million reduction in deferred revenue primarily related to revenue recognized from the Genentech Agreement, a $3.9 million increase in prepaid expenses and other current assets and a $1.7 million increase in inventory. These changes were partially offset by a reduction in accounts receivable, net of $0.8 million.

Investing Activities

Cash provided by investing activities during the nine months ended September 30, 2021 was $114.0 million, which was primarily attributable to proceeds from maturities of marketable securities of $404.5 million, partially offset by purchases of marketable securities of $238.0 million and purchases of property and equipment of $52.5 million.

Cash provided by investing activities during the nine months ended September 30, 2020 was $223.0 million, which was primarily attributable to proceeds from sales and maturities of marketable securities of $532.2 million, partially offset by purchases of marketable securities of $299.8 million and purchases of property and equipment of $9.4 million.

Financing Activities

Cash provided by financing activities during the nine months ended September 30, 2021 was $23.9 million, which was primarily attributable to proceeds from the exercise of stock options.

Cash provided by financing activities during the nine months ended September 30, 2020 was $287.3 million, which was primarily attributable to $271.8 million in proceeds, after deducting underwriting discounts and net offering expenses payable by us, received from our underwritten public offering completed in July 2020, as well as $15.5 million in proceeds from the exercise of stock options.

Net Operating Loss Carryforwards

Utilization of our net operating loss ("NOL") carryforwards and credits may be subject to a substantial annual limitation due to the ownership change limitations provided by Section 382 of the Internal Revenue Code of 1986 ("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 for changes in ownership through December 31, 2020. Based on this analysis, we do not expect to have any permanent limitations on the utilization of our federal NOLs. Under the Tax Cuts and Jobs Act of 2017, federal net operating losses incurred in 2018 and future years may be carried forward indefinitely, but the deductibility of such federal NOL is subject to an annual limitation. Net operating losses generated prior to 2018 are eligible to be carried forward up to 20 years. 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, 2020. Accordingly, management applied a full valuation allowance against net deferred tax assets as of December 31, 2020. In March 2020, under the newly enacted Coronavirus Aid, Relief, and Economic Security Act ("CARES Act"), NOLs arising in tax years beginning after December 31, 2017 and before January 1, 2021 may be carried back to each of the five tax years preceding the tax year of the loss. Additionally, the CARES Act temporarily removes the 80% limitation, reinstating it for tax years beginning after 2020. However, none of these provisions have an impact on our tax provision.

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 the transaction price for certain contracts with customers, share-based compensation, 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 Annual Report on Form 10-K for the year ended December 31, 2020, as well as in Note 2 of the accompanying notes to our unaudited condensed consolidated 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; and
- goodwill.

There have been no material changes to our critical accounting policies and estimates as previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2020.

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, cash equivalents and marketable securities. As of September 30, 2021, there have been no material changes to our market risks as previously disclosed in our Annual Report on Form 10-K for the year ended December 31, 2020. We do not enter into investments for trading purposes and have not used any derivative financial instruments to manage our interest rate risk exposure.

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 Securities Exchange Act of 1934, as amended (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 September 30, 2021. There was not any change in our internal control over financial reporting (as such term is defined in Rule 13a-15(f) under the Exchange Act) during the three months ended September 30, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings

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. We operate in a rapidly changing environment that involves a number of risks that could materially affect our business, financial condition or future results, some of which are beyond our control. In addition to the other information set forth in this report, the risks and uncertainties that we believe are most important for you to consider are discussed in Part I, Item 1A under the caption "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2020. The risk factors may be important to understanding other statements in this report and should be read in conjunction with the unaudited condensed consolidated financial statements and related notes in this report. The occurrence of any single risk or any combination of risks could materially and adversely affect our business, operations, product pipeline, operating results, financial condition or liquidity, and consequently, the value of our securities. Further, 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.

There have been no material changes to the risk factors described in the Annual Report on Form 10-K for the year ended December 31, 2020.

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

Not applicable.

Item 3. Defaults Upon Senior Securities

Not applicable.

Item 4. Mine Safety Disclosures

Not applicable**.**

Item 5. Other Information

Not applicable**.**

Item 6. Exhibits

Exhibit Number	Exhibit Title	Incorporated by Reference				Filed/ Furnished with This Report
		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	
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) and Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002					X
32.1	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
32.2	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002					X
101.INS	Inline 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	Inline XBRL Taxonomy Extension Schema Document					X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					X
104	Cover Page Interactive Data File (formatted in Inline XBRL and included in Exhibit 101)					X

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: November 3, 2021

By: ***/s/ Chad Robins***

Chad Robins
Chief Executive Officer and Director (Principal Executive Officer)

Date: November 3, 2021

By: ***/s/ Chad Cohen***

Chad Cohen
Chief Financial Officer (Principal Financial Officer)

Exhibit 31.1

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: November 3, 2021

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

Exhibit 31.2

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: November 3, 2021

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

Exhibit 32.1

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

In connection with the Quarterly Report of Adaptive Biotechnologies Corporation (the "Company") on Form 10-Q for the quarterly period ended September 30, 2021 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: November 3, 2021

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.

Exhibit 32.2

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

In connection with the Quarterly Report of Adaptive Biotechnologies Corporation (the "Company") on Form 10-Q for the quarterly period ended September 30, 2021 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: November 3, 2021

By: /s/ Chad Cohen
Chad Cohen
Chief Financial Officer
(Principal Financial 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.