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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

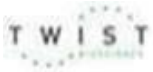
(Mark One)

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

For the quarterly period ended June 30, 2022
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: 001-38720



Twist Bioscience Corporation
(Exact Name of Registrant as Specified in its Charter)

Delaware	**46-2058888**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

681 Gateway Blvd, South San Francisco, CA 94080
(Address of principal executive offices and zip code)
(800) 719-0671
(Registrant's telephone number, including area code)

Title of each class	**Trading Symbol(s)**	**Name of each exchange on which registered**
Common Stock	**TWST**	**The Nasdaq Global Select Market**

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. (Check one):

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 ☒

APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PRECEDING FIVE YEARS:

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Section 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes ☐ No ☐

APPLICABLE ONLY TO CORPORATE ISSUERS

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

The number of shares of the Registrant's common stock outstanding as of August 4, 2022, was 56,363,518.

TWIST BIOSCIENCE CORPORATION
QUARTERLY REPORT ON FORM 10-Q
FOR THE QUARTER ENDED JUNE 30, 2022

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Forward-looking statements

This Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, or Form 10-Q, contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. These statements relate to, among other matters, plans for product development and licensing to third parties, plans and timeframe for the commercial development of DNA data storage capabilities, expectations regarding market penetration, anticipated customer conversions to our products, plans to expand in the international markets, identification and development of potential antibody candidates for the treatment of COVID-19 and other diseases, and the anticipated timeframe for remediating the material weakness in internal control over financial reporting. Forward-looking statements are also identified by the words “believe,” “will,” “may,” “estimate,” “continue,” “anticipate,” “intend,” “should,” “plan,” “expect,” “predict,” “could,” “potentially” and variations of such words and similar expressions. You should not rely upon forward-looking statements as predictions of future events. Such statements are based on management’s expectations as of the date of this filing and involve many risks and uncertainties that could cause our actual results, events or circumstances to differ materially from those expressed or implied in our forward-looking statements. Such risks and uncertainties include:

- our ability to increase our revenue and our revenue growth rate;
- our ability to accurately estimate capital requirements and our needs for additional financing;
- our estimates of the size of our market opportunities;
- our ability to increase DNA production, reduce turnaround times and drive cost reductions for our customers;
- our ability to effectively manage our growth;
- our ability to successfully enter new markets and manage our international expansion;
- our ability to protect our intellectual property, including our proprietary DNA synthesis platform;
- costs associated with defending intellectual property infringement and other claims;
- the effects of increased competition in our business;
- our ability to keep pace with changes in technology and our competitors;
- our ability to successfully identify, evaluate and manage any future acquisitions of businesses, solutions or technologies;
- the success of our marketing efforts;
- a significant disruption in, or breach in security of our information technology systems and resultant interruptions in service and any related impact on our reputation;
- our ability to attract and retain qualified employees and key personnel;
- the effects of natural or man-made catastrophic events including those resulting from the novel strain of coronavirus that causes coronavirus disease 2019, or COVID-19;
- the effectiveness of our internal controls;
- changes in government regulation affecting our business;
- uncertainty as to economic and market conditions and the impact of adverse economic conditions, including inflationary pressures and rising interest rates; and
- other risk factors included under the section titled “Risk Factors.”

You should not rely upon forward-looking statements as predictions of future events. Such statements are based on management's expectations as of the date of this filing and involve many risks and uncertainties that could cause our actual results, events or circumstances to differ materially from those expressed or implied in our forward-looking statements.

Readers are urged to carefully review and consider all of the information in this Form 10-Q and in other documents we file from time to time with the Securities and Exchange Commission, or SEC. We undertake no obligation to update any forward-looking statements made in this Form 10-Q to reflect events or circumstances after the date of this filing or to reflect new information or the occurrence of unanticipated events, except as required by law. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

When we use the terms "Twist," "Twist Bioscience," the "Company," "we," "us" or "our" in this report, we are referring to Twist Bioscience Corporation and its consolidated subsidiaries unless the context requires otherwise. Sequence space and the Twist logo are trademarks of Twist Bioscience Corporation. All other company and product names may be trademarks of the respective companies with which they are associated.

PART I. Financial information

Item 1. *Financial statements*

Twist Bioscience Corporation
Condensed Consolidated Balance Sheets (unaudited)

(In thousands)	June 30, 2022	September 30, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 376,249	$ 465,829
Short-term investments	151,342	12,034
Accounts receivable, net	41,195	28,549
Inventories	43,022	31,800
Prepaid expenses and other current assets	12,309	8,283
Total current assets	$ 624,117	$ 546,495
Property and equipment, net	127,011	44,122
Operating lease right-of-use assets	76,165	61,580
Goodwill	85,811	22,434
Intangible assets, net	61,115	18,262
Restricted cash, non-current	1,572	1,530
Other non-current assets	3,872	7,674
Total assets [1]	$ 979,663	$ 702,097
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 21,014	$ 14,900
Accrued expenses	9,499	6,437
Accrued compensation	27,698	22,327
Current portion of operating lease liability	14,352	8,213
Current portion of long-term debt	—	1,552
Other current liabilities	20,123	9,623
Total current liabilities	$ 92,686	$ 63,052
Operating lease liability, net of current portion	64,244	53,156
Other non-current liabilities	2,056	5,068
Total liabilities [1]	$ 158,986	$ 121,276
Commitments and contingencies (Note 6)		
Stockholders' equity		
Common stock, $0.00001 par value—100,000 and 100,000 shares authorized at June 30, 2022 and September 30, 2021, respectively; 56,344 and 49,499 shares issued and outstanding at June 30, 2022 and September 30, 2021, respectively	$ —	$ —
Additional paid-in capital	1,599,355	1,190,828
Accumulated other comprehensive income	(1,377)	546
Accumulated deficit	(777,301)	(610,553)
Total stockholders' equity	$ 820,677	$ 580,821
Total liabilities and stockholders' equity	$ 979,663	$ 702,097

[1] The Company's consolidated assets as of June 30, 2022 include $7,429 in assets of the variable interest entity, or "VIE", that can only be used to settle obligations of the VIE. Cash as of June 30, 2022 was $6,989; prepaid expenses as of June 30, 2022 were $433 and deposits as of June 30, 2022 were $7. The Company's consolidated liabilities as of June 30, 2022 were $10,494 in liabilities of the VIE who creditors have no recourse to the Company. These liabilities include accounts payable of $6,412 as of June 30, 2022; accrued expenses and other current liabilities of $2,082 as of June 30, 2022; and other non-current liabilities of $2,000 as of June 30, 2022.

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

Twist Bioscience Corporation
Condensed Consolidated Statements of Operations and Comprehensive Loss (unaudited)

	Three months ended June 30,		Nine months ended June 30,	
(In thousands, except per share data)	**2022**	**2021**	**2022**	**2021**
Revenues	$ 56,113	$ 35,018	$ 146,259	$ 94,382
Operating expenses:				
Cost of revenues	$ 30,974	$ 20,933	$ 87,744	$ 58,123
Research and development	36,840	19,838	90,701	49,629
Selling, general and administrative	53,693	34,478	158,790	97,658
Change in fair value of contingent considerations and holdbacks	(4,231)	$ 1,887	$ (13,071)	$ 1,887
Total operating expenses	$ 117,276	$ 77,136	$ 324,164	$ 207,297
Loss from operations	$ (61,163)	$ (42,118)	$ (177,905)	$ (112,915)
Interest income	722	86	1,134	377
Interest expense	—	(70)	(54)	(284)
Other income (expense), net	(225)	(312)	(626)	(305)
Loss before income taxes	$ (60,666)	$ (42,414)	$ (177,451)	$ (113,127)
Benefit from income taxes	149	$ 2,377	$ 10,703	$ 2,271
Net loss attributable to common stockholders	$ (60,517)	$ (40,037)	$ (166,748)	$ (110,856)
Other comprehensive loss:				
Change in unrealized loss on investments	$ (404)	(12)	$ (1,794)	(10)
Foreign currency translation adjustment	(498)	250	(129)	351
Comprehensive loss	(61,419)	(39,799)	(168,671)	(110,515)
Net loss per share attributable to common stockholders—basic and diluted	$ (1.08)	$ (0.82)	$ (3.15)	$ (2.32)
Weighted average shares used in computing net loss per share attributable to common stockholders—basic and diluted	56,287	48,963	53,005	47,881

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

Twist Bioscience Corporation
Condensed Consolidated Statements of Stockholders' Equity (unaudited)

(In thousands)	Common stock Shares	Common stock Amount	Additional paid-in capital	Accumulated Other comprehensive income	Accumulated deficit	Total stockholders' equity
Balances as of March 31, 2022	56,234	$ —	$ 1,580,620	$ (475)	$ (716,784)	$ 863,361
Issuance of common stock in public offering, net of underwriting discounts and commissions and offering expenses of $17,676	—	—	6	—	—	6
Vesting of restricted stock units	100	—	—	—	—	—
Exercise of stock options	48	—	766	—	—	766
Repurchases of common stock for income tax withholding	(38)	—	(2,080)	—	—	(2,080)
Stock-based compensation	—	—	20,043	—	—	20,043
Other comprehensive income	—	—	—	(902)	—	(902)
Net loss	—	—	—	—	(60,517)	(60,517)
Balances as of June 30, 2022	56,344	$ —	$ 1,599,355	$ (1,377)	$ (777,301)	$ 820,677

(In thousands)	Common stock Shares	Common stock Amount	Additional paid-in capital	Accumulated Other comprehensive income	Accumulated deficit	Total stockholders' equity
Balances as of March 31, 2021	48,860	$ —	$ 1,143,265	$ 190	$ (529,274)	$ 614,181
Public offering expense adjustment	—	—	(26)	—	—	(26)
Vesting of restricted stock units	57	—	—	—	—	—
Exercise of stock options	132	—	2,619	—	—	2,619
Business acquisitions	237	—	26,773	—	—	26,773
Repurchases of common stock for income tax withholding	(23)	—	(2,476)	—	—	(2,476)
Stock-based compensation	—	—	9,176	—	—	9,176
Other comprehensive income	—	—	—	238	—	238
Net loss	—	—	—	—	(40,037)	(40,037)
Balances as of June 30, 2021	49,263	$ —	$ 1,179,331	$ 428	$ (569,311)	$ 610,448

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

Twist Bioscience Corporation
Condensed Consolidated Statements of Stockholders' Equity (unaudited)

(In thousands)	Common stock Shares	Common stock Amount	Additional paid-in capital	Accumulated Other comprehensive income	Accumulated deficit	Total stockholders' equity
Balances as of September 30, 2021	49,499	$ —	$ 1,190,828	$ 546	$ (610,553)	$ 580,821
Issuance of common stock in public offering, net of underwriting discounts and commissions and offering expenses of $17,676	5,227	—	269,824	—	—	269,824
Vesting of restricted stock units	263	—	—	—	—	—
Exercise of stock options	417	—	4,701	—	—	4,701
Issuance of shares under the employee stock purchase plan	50	—	2,394	—	—	2,394
Repurchases of common stock for income tax withholding	(101)	—	(6,130)	—	—	(6,130)
Issuance of shares from business acquisition	989	—	77,122	—	—	77,122
Stock-based compensation	—	—	60,616	—	—	60,616
Other comprehensive income	—	—	—	(1,923)	—	(1,923)
Net loss	—	—	—	—	(166,748)	(166,748)
Balances as of June 30, 2022	56,344	$ —	$ 1,599,355	$ (1,377)	$ (777,301)	$ 820,677

(In thousands)	Common stock Shares	Common stock Amount	Additional paid-in capital	Accumulated Other comprehensive income	Accumulated deficit	Total stockholders' equity
Balances as of September 30, 2020	45,083	$ —	$ 794,630	$ 87	$ (458,455)	$ 336,262
Issuance of common stock in public offering, net of underwriting discounts and commissions and offering expenses of $21,139	3,136	—	323,861	—	—	323,861
Net exercise of stock warrants	22	—	—	—	—	—
Vesting of restricted stock units	178	—	—	—	—	—
Exercise of stock options	629	—	11,756	—	—	11,756
Issuance of shares under the employee stock purchase plan	49	—	2,787	—	—	2,787
Repurchases of early exercised stock options	(2)	—	—	—	—	—
Business acquisitions	237	—	26,773	—	—	26,773
Repurchases of common stock for income tax withholding	(69)	—	(8,227)	—	—	(8,227)
Stock-based compensation	—	—	27,751	—	—	27,751
Other comprehensive income	—	—	—	341	—	341
Net loss	—	—	—	—	(110,856)	(110,856)
Balances as of June 30, 2021	49,263	$ —	$ 1,179,331	$ 428	$ (569,311)	$ 610,448

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

Twist Bioscience Corporation
Condensed Consolidated Statements of Cash Flows (unaudited)

(in thousands)	Nine months ended June 30, 2022	2021
Cash flows from operating activities		
Net loss	$ (166,748)	$ (110,856)
Adjustments to reconcile net loss to net cash used in operating activities		
Depreciation and amortization	11,562	7,319
Deferred tax liability	(11,177)	—
Loss on disposal of property and equipment	—	2
Non-cash lease expense	2,594	1,044
Stock-based compensation	60,616	27,751
Discount accretion on investment securities	1,056	501
Realized gain on investments	—	(5)
Change in fair value of acquisition consideration	(13,071)	1,887
Non-cash interest expense	3	58
Bad debt expense	(146)	183
Amortization of debt discount	4	70
Write off property and equipment	70	—
Changes in assets and liabilities:		
Accounts receivable, net	(10,284)	(1,912)
Inventories	(11,237)	(8,914)
Prepaid expenses and other current assets	(2,736)	(1,617)
Other non-current assets	6,829	(2,333)
Accounts payable	466	5,194
Accrued expenses	608	1,546
Accrued compensation	5,519	4,588
Other liabilities	2,954	(1,947)
Net cash used in operating activities	$ (123,118)	$ (77,441)
Cash flows from investing activities		
Purchases of property and equipment	$ (85,395)	$ (18,972)
Business acquisition, net of cash acquired	(8,160)	(483)
Purchases of investments	(217,639)	(58,795)
Proceeds from maturity of investments	75,481	210,494
Net cash (used in) provided by investing activities	$ (235,713)	$ 132,244
Cash flows from financing activities		
Proceeds from exercise of stock options	$ 4,764	$ 11,686
Proceeds from public offerings, net of underwriting discounts, commissions and offering expenses	269,824	323,861
Proceeds from issuance of common stock under employee stock purchase plan	2,394	2,787
Repayments of long-term debt	(1,558)	(2,500)
Repurchases of common stock for income tax withholding	(6,130)	(8,227)
Net cash provided by financing activities	$ 269,294	$ 327,607
Effect of exchange rates on cash, cash equivalents and restricted cash	$ (1)	$ 153
Net increase (decrease) in cash, cash equivalents, and restricted cash	(89,538)	382,563
Cash, cash equivalents, and restricted cash at beginning of period	467,359	94,246
Cash, cash equivalents, and restricted cash at end of period	$ 377,821	$ 476,809
Supplemental disclosure of cash flow information		
Interest paid	$ 9	$ 145
Income taxes paid, net of refunds	130	47
Non-cash investing and financing activities		
Property and equipment additions included in accounts payable and accrued expenses	$ 6,562	$ 1,777
Operating lease right-of-use assets obtained in exchange for operating lease liabilities	19,494	33,617
Issuance of common stock in connection with the business acquisition	77,122	26,773

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

Twist Bioscience Corporation
Notes to Unaudited Condensed Consolidated Financial Statements

1. The Company

Twist Bioscience Corporation (the Company) was incorporated in the state of Delaware on February 4, 2013. The Company is a synthetic biology company that has developed a disruptive DNA synthesis platform. DNA is used in many applications across different industries: industrial chemicals/materials, academic, healthcare and food/agriculture. The Company's fiscal year ends on September 30.

The Company has generated net losses in all periods since its inception. As of June 30, 2022, the Company had an accumulated deficit of $777.3 million and has not generated positive cash flows from operations since inception. Losses are expected to continue as the Company continues to invest in product development, manufacturing, and sales and marketing.

Since its inception, the Company has received an aggregate of $1,333.7 million in net proceeds from the issuance of equity securities and an aggregate of $13.8 million from debt. Management believes that these proceeds combined with existing cash balances on hand will be sufficient to fund operations for at least one year from the issuance of these consolidated financial statements. However, if the Company needs to obtain additional financing to fund operations beyond this period, there can be no assurance that it will be successful in raising additional financing on terms which are acceptable to the Company.

If the Company requires but is unable to obtain additional funding, the Company could be forced to delay, reduce or eliminate some or all of its research and development programs, product portfolio expansion or commercialization efforts, which could adversely affect its business prospects, or the Company may be unable to continue operations.

During the three and nine months ended June 30, 2022, financial results of the Company were not significantly affected by the COVID-19 pandemic, which continues to have global impact. The Company has considered all information available as of the date of issuance of these financial statements and the Company is not aware of any specific events or circumstances that would require an update to its estimates or judgments, or a revision to the carrying value of its assets or liabilities. These estimates may change as new events occur and additional information becomes available. The extent to which the COVID-19 outbreak affects the Company's future financial results and operations will depend on future developments which continue to evolve and are difficult to predict, including mutations in the SARS-CoV-2 virus, which have resulted and may in the future result in strains that are more contagious and less responsive to current treatment methods, and current or future domestic and international actions to contain it and treat it.

2. Summary of significant accounting policies

Basis of presentation and use of estimates

The accompanying unaudited condensed consolidated financial statements were prepared in accordance with accounting principles generally accepted in the United States of America (GAAP) for interim financial information. Certain information and disclosures normally included in the consolidated financial statements prepared in accordance with GAAP have been condensed or omitted. Accordingly, these unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and the related notes included in the Annual Report on Form 10-K for the fiscal year ended September 30, 2021 (the Annual Report on Form 10-K) filed with the Securities and Exchange Commission on November 23, 2021. The condensed consolidated financial statements are unaudited and have been prepared on a basis consistent with that used to prepare the audited annual consolidated financial statements and include, in the opinion of management, all adjustments, consisting of normal and recurring items, necessary for the fair statement of the condensed consolidated financial statements. The condensed consolidated balance sheet at September 30, 2021 is derived from audited consolidated financial statements but does not include all disclosures required by GAAP. The operating results for the three and nine months ended June 30, 2022 are not necessarily indicative of the results expected for the full year ending September 30, 2022 or any interim period.

The presentation of unaudited condensed consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities as of the date of the condensed consolidated financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates. The Company's unaudited condensed consolidated financial statements include its wholly owned subsidiaries. The Company consolidates Revelar Biotherapeutics, Inc. ("Revelar") as a variable interest entity ("VIE") for which it is the primary beneficiary (see Note 14 "Investment in variable interest entity" for further information). All intercompany balances and accounts are eliminated in consolidation.

The following table provides a reconciliation of the Company's cash and cash equivalents and non-current portion of restricted cash reported within the unaudited condensed consolidated balance sheets that sum to the total cash, cash equivalents and restricted cash shown in the Company's condensed consolidated statements of cash flows:

(in thousands)	June 30, 2022	September 30, 2021
Cash and cash equivalents	$ 376,249	$ 465,829
Restricted cash, non-current	1,572	1,530
Total cash, cash equivalents and restricted cash	$ 377,821	$ 467,359

Significant accounting policies

There have been no material changes in the accounting policies from those disclosed in the audited consolidated financial statements and the related notes included in the Annual Report on Form 10-K other than the following variable interest entities policy.

Variable interest entities

The Company consolidates a VIE in which the Company is deemed to be the primary beneficiary. An entity is generally a VIE if it meets any of the following criteria: (i) the entity has insufficient equity to finance its activities without additional subordinated financial support from other parties, (ii) the equity investors cannot make significant decisions about the entity's operations or (iii) the voting rights of some investors are not proportional to their obligations to absorb the expected losses of the entity or receive the expected returns of the entity and substantially all of the entity's activities involve or are conducted on behalf of the investor with disproportionately few voting rights. The Company periodically makes judgments in determining whether its investees are VIEs and, for each reporting period, the Company assesses whether it is the primary beneficiary of its VIE. As of June 30, 2022, the Company was deemed the primary beneficiary of Revelar. See Note 14 "Investment in variable interest entity."

Recent accounting pronouncements

Changes to GAAP are established by the Financial Accounting Standards Board ("FASB") in the form of accounting standards updates ("ASUs") to the FASB's Accounting Standards Codification ("ASC"). The Company considered the applicability and impact of all recent ASUs. ASUs not listed below were assessed and determined to be not applicable to the Company's consolidated financial position and results of operations.

Recent accounting pronouncements adopted

In December 2019, the FASB issued ASU 2019 12, Simplifying the Accounting for Income Taxes. The ASU simplifies the accounting for income taxes by eliminating certain exceptions to the guidance in ASC 740, Income Taxes, related to the approach for allocating income tax expense or benefit for the year to continuing operations, discontinued operations, other comprehensive income, and other charges or credits recorded directly to shareholders' equity; the methodology for calculating income taxes in an interim period; and the recognition of deferred tax liabilities for outside basis differences. The Company adopted this standard effective October 1, 2021. The adoption of ASU 2019 12 did not have an impact on the Company's consolidated financial statements for either period presented.

Recently issued accounting pronouncement not yet adopted

In November 2021, the FASB issued ASU 2021 10, Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance. The amendments in this update require the following annual disclosures about transactions with a government that are accounted for by applying a grant or contribution accounting model. The amendments in this update are effective for all entities within their scope for financial statements issued for annual periods beginning after December 15, 2021. Early application is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

In June 2016, the FASB issued ASU 2016 13, Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments. The new standard requires entities to use the new "expected credit loss" impairment model for most financial assets measured at amortized cost, including trade and other receivables and held-to-maturity debt securities, and modifies the impairment model for available-for-sale debt securities. The standard is effective for the

Company for the fiscal year ending September 30, 2024, including interim periods within that fiscal year. Early application is permitted. The Company is currently evaluating the impact that the adoption of this standard will have on its consolidated financial statements.

3. Fair value measurement

The Company assesses the fair value of financial instruments based on the provisions of ASC 820, *Fair Value Measurements*. ASC 820 defines fair value as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. ASC 820 also establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1—Quoted prices in active markets for identical assets or liabilities.

Level 2—Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. The Company short-term and long-term investments primarily utilize broker quotes in a non-active market for valuation of its investments.

Level 3—Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

In determining fair value, the Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs to the extent possible as well as considers counterparty credit risk in its assessment of fair value.

As of June 30, 2022, financial assets and liabilities measured and recognized at fair value are as follows:

(in thousands)	Level 1	Level 2	Level 3	Fair value
Assets				
Money market funds	$ 324,824	$ —	$ —	$ 324,824
Commercial paper	—	39,977	—	39,977
U.S. government treasury bills	111,365	—	—	111,365
Total financial assets	$ 436,189	$ 39,977	$ —	$ 476,166
Liabilities				
Contingent consideration and holdbacks	$ —	$ 9,567	$ 3,300	$ 12,867
Total financial liabilities	$ —	$ 9,567	$ 3,300	$ 12,867

As of September 30, 2021, financial assets and liabilities measured and recognized at fair value are as follows:

(in thousands)	Level 1	Level 2	Level 3	Fair value
Assets				
Money market funds	$ 430,438	$ —	$ —	$ 430,438
U.S. government treasury bills	12,034	—	—	12,034
Total financial assets	$ 442,472	$ —	$ —	$ 442,472
Liabilities				
Contingent consideration and indemnity holdback	$ —	$ 9,856	$ —	$ 9,856
Total financial liabilities	$ —	$ 9,856	$ —	$ 9,856

As of June 30, 2022 gross unrealized losses for cash equivalents and investments was $1.8 million. As of September 30, 2021, gross unrealized gains and unrealized losses for cash equivalents and investments were not material. As of June 30, 2022 and September 30, 2021, all marketable securities had a contractual maturity of less than one year.

The following table provides a reconciliation of beginning and ending balances of the Level 3 financial liabilities during the three months ended June 30, 2022:

(in thousands)	Total
Balance as of September 30, 2021	$ —
Contingent consideration – additions	8,500
Change in fair value	(5,200)
Balance as of June 30, 2022	$ 3,300

4. Balance sheet components

The Company's accounts receivable, net balance consists of the following:

(in thousands)	June 30, 2022	September 30, 2021
Trade receivables	$ 36,615	$ 26,549
Other receivables	4,758	2,337
Allowance for doubtful accounts	(178)	(337)
Accounts receivable, net	$ 41,195	$ 28,549

Inventories consist of the following:

(in thousands)	June 30, 2022	September 30, 2021
Raw materials	$ 30,909	$ 18,778
Work-in-process	3,879	4,837
Finished goods	8,234	8,185
	$ 43,022	$ 31,800

The work-in-process inventory included gross consigned inventory of $1.5 million and $1.9 million as of June 30, 2022 and September 30, 2021, respectively.

Other non-current assets

The other non-current assets consist of the following:

(in thousands)	June 30, 2022	September 30, 2021
Convertible note receivable	$ —	$ 3,021
Other non-current assets	3,872	4,653
	$ 3,872	$ 7,674

Accrued expenses

The accrued expenses consist of the following:

(in thousands)	June 30, 2022	September 30, 2021
Professional services fees payable	$ 5,044	$ 5,057
Other accrued expenses	4,455	1,380
	$ 9,499	$ 6,437

Accrued compensation

The accrued compensation consists of the following:

(in thousands)	June 30, 2022	September 30, 2021
Accrued vacation	$ 6,285	$ 4,643
Accrued bonus	9,091	8,584
Accrued commissions	4,257	3,330
Accrued payroll and related taxes	5,932	4,676
Other accrued compensation	2,133	1,094
	$ 27,698	$ 22,327

Other current liabilities

The other current liabilities consist of the following:

(in thousands)	June 30, 2022	September 30, 2021
Contingent consideration and holdbacks	$ 12,867	$ 5,186
Income and sales taxes payable	3,851	2,440
Other current liabilities	3,405	1,997
	$ 20,123	$ 9,623

Other non-current liabilities

The other non-current liabilities consist of the following:

(in thousands)	June 30, 2022	September 30, 2021
Holdback	$ —	$ 4,671
Other non current liabilities	2,056	397
	$ 2,056	$ 5,068

5. Goodwill and intangible assets

During the nine months ended June 30, 2022, goodwill and intangible assets increased by $63.4 million and $46.5 million, respectively, as a result of a business acquisition. See Note 13, “Business acquisition”. Total amortization expense related to intangible assets was $1.4 million for the three months ended June 30, 2022 and less than $0.1 million for the three months ended June 30, 2021. Total amortization expense related to intangible assets was $3.6 million and $0.2 million for the nine months ended June 30, 2022 and 2021, respectively.

The intangible assets balances are presented below:

	June 30, 2022			
(in thousands, except for years)	Weighted average Amortization period in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	15	$ 50,020	$ (3,560)	$ 46,460
Customer Relationships	10	15,210	(1,280)	13,930
Tradenames & Trademarks	3	900	(175)	725
Total indefinite-lived intangible assets		$ 66,130	$ (5,015)	$ 61,115

	September 30, 2021			
(in thousands, except for years)	Weighted average Amortization period in years	Gross carrying amount	Accumulated amortization	Net book value
Developed Technology	16	$ 19,120	$ (1,361)	$ 17,759
Customer Relationships	2	510	(7)	503
Total indefinite-lived intangible assets		$ 19,630	$ (1,368)	$ 18,262

6. Commitments and contingencies

The Company may be subject to litigation, claims and disputes in the ordinary course of business. There is an inherent risk in any litigation or dispute and no assurance can be given as to the outcome of any claims.

Indemnifications

In the ordinary course of business, the Company enters into agreements that may include indemnification provisions. Pursuant to such agreements, the Company may indemnify, hold harmless and defend the indemnified parties for losses suffered or incurred by the indemnified party. Some of the provisions will limit losses to those arising from third-party actions. In some cases, the indemnification will continue after the termination of the agreement. The maximum potential amount of future payments the Company could be required to make under these provisions is not determinable. To date, the Company has not incurred material costs to defend lawsuits or settle claims related to these indemnification provisions. The Company has also entered into indemnification agreements with its directors and officers that may require it to indemnify its directors and officers against liabilities that may arise by reason of their status or service as directors or officers to the fullest extent permitted by corporate law. The Company also has directors’ and officers’ insurance.

Leases

The Company leases certain of its facilities under non-cancellable operating leases expiring at various dates through 2044. The Company is also responsible for utilities, maintenance, insurance, and property taxes under these leases.

Certain leases include options to renew or terminate at the Company’s discretion. The lease terms include periods covered by these options if it is reasonably certain the Company will renew or not terminate. The Company’s lease agreements do not contain any material residual value guarantees or restrictive covenants.

Supplemental balance sheet information related to the Company’s operating leases as of June 30, 2022 was as follows:

(in thousands)	June 30, 2022
Assets:	
Operating lease right-of-use asset	$ 76,165
Current liabilities:	
Current portion of operating lease liabilities	$ 14,352
Noncurrent liabilities:	
Operating lease liabilities, net of current portion	$ 64,244

Future minimum lease payments under all non-cancelable operating leases that have commenced as of June 30, 2022 are as follows:

(in thousands)	Operating leases
Years ending September 30:	
Remainder of 2022	$ 3,281
2023	13,990
2024	13,385
2025	13,724
2026	12,298
Thereafter	97,081
Total minimum lease payments	$ 153,759
Less: imputed interest	(57,737)
Less: tenant improvement allowance (receipt anticipated in 2022)	(17,426)
Total operating lease liabilities	$ 78,596
Less: current portion	(14,352)
Operating lease liabilities, net of current portion	$ 64,244

For the remainder of 2022, future minimum lease payments are comprised of the anticipated receipt of tenant improvement allowances totaling $17.4 million anticipated to be received in 2022, partially offset by non-cancelable operating lease payments of $3.3 million. The statement of cash flows for the nine months ended June 30, 2022, include changes in right-of-use assets and operating lease liabilities of $14.6 million and $17.2 million, respectively. For the nine months ended June 30, 2021, changes in right-of-use assets and operating lease liabilities were $29.1 million and $30.1 million, respectively.

During the three and nine months ended June 30, 2022, operating lease expense was $4.1 million and $11.5 million, respectively. Cash payments for amounts included in the measurement of operating lease liabilities were $3.7 million and $9.1 million for the three and nine months ended June 30, 2022, respectively. As of June 30, 2022, the weighted-average remaining lease term was 15.5 years and the weighted-average discount rate was 6.4%.

On July 28, 2021, the Company entered into a 7-year operating lease for approximately 21,000 square-feet of office space located in South San Francisco, California, to further expand the Company operations. Upon execution of the lease agreement, the Company provided the landlord an approximate $0.2 million security deposit. The Company will pay an initial annual base rent of approximately $1.7 million, which is subject to scheduled 3% annual increases, plus certain operating expenses. The Company has the right to sublease the facility, subject to landlord consent. The lease commenced on October 1, 2021. As of lease commencement date, the total future minimum lease payments under the agreement were $13.1 million.

On August 6, 2021, Abveris, which was subsequently acquired by the Company, entered into a 10-year, 5-month operating lease for approximately 22,000 square-feet of office space located in Quincy, Massachusetts, to further expand operations. Upon execution of the lease agreement, the Company provided the landlord an approximate $0.6 million irrevocable letter of credit as a security deposit. The Company will pay an initial annual base rent of approximately $1.2 million, which is subject to scheduled 2% annual increases, plus certain operating expenses. The Company has the right to sublease the

facility, subject to landlord consent. The lease commenced on March 3, 2022. As of lease commencement date, the total future minimum lease payments under the agreement were $13.2 million.

7. Related party transactions

During the three months ended June 30, 2022 and 2021, the Company purchased raw materials from a related party investor in the amount of $3.1 million and $1.2 million, respectively. During the nine months ended June 30, 2022 and 2021, the Company purchased raw materials from a related party in the amount of $6.5 million and $3.5 million, respectively. Payable balances and receivable balances with the related party were immaterial as of June 30, 2022 and September 30, 2021.

8. Income taxes

In determining quarterly provisions for income taxes, the Company uses the annual estimated effective tax rate applied to the actual year-to-date profit or loss, adjusted for discrete items arising in that quarter. The Company's annual estimated effective tax rate differs from the U.S. federal statutory rate primarily as a result of state taxes, foreign taxes, and changes in the Company's valuation allowance against its deferred tax assets. For the three and nine months ended June 30, 2022, the Company recorded $0.1 million and $10.7 million income tax benefit mainly due to the deferred tax liability assumed as part of the acquisition of AbX Biologics, Inc. (see Note 13, "Business acquisition"). For the three and nine months ended June 30, 2021, the Company recorded $2.4 million and $2.3 million income tax benefit due to the deferred tax liability assumed as part of the Business acquisition.

9. Common stock

In December 2020, the Company completed an underwritten public offering of 3,136,362 shares of its common stock at a price to the public of $110.00 per share, including the full exercise of underwriters' option to purchase an additional 409,090 shares of common stock. The Company received total net proceeds from the offering of $323.9 million, net of estimated underwriting discounts and commissions and offering expenses.

In February 2022, the Company completed an underwritten public offering of 5,227,272 shares of its common stock at a price to the public of $55.00 per share, including the full exercise of underwriters' option to purchase an additional 681,818 shares of common stock. The Company received total net proceeds from the offering of $269.8 million, net of underwriting discounts and commissions and offering expenses.

10. Stock-based compensation

2018 Equity Incentive Plan

Any shares subject to outstanding awards under the 2013 Plan that are canceled or repurchased subsequent to the 2018 Plan's effective date are returned to the pool of shares reserved for issuance under the 2018 Plan. Awards granted under the 2018 Plan may be non-statutory stock options, stock appreciation rights, restricted stock, restricted stock units, performance shares, and performance units.

Restricted Stock Units

Restricted stock primarily consists of restricted stock unit awards (RSUs) which have been granted to employees. The value of an RSU award is based on the Company's stock price on the date of grant. Forfeitures of RSUs are recognized as they occur. The shares underlying the RSU awards are not issued until the RSUs vest. Upon vesting, each RSU converts into one share of the Company's common stock.

Activity with respect to the Company's restricted stock units during the nine months ended June 30, 2022 was as follows:

(in thousands, except per share data)	Number of Shares	Weighted average grant date fair value per share	Weighted average remaining contractual term (years)	Aggregate Intrinsic Value
Outstanding at September 30, 2021	698	$ 73.27	2.7	$ 74,613
Restricted stock units granted	946	72.37		
Restricted stock units vested	(263)	72.53		
Restricted stock units forfeited	(125)	75.37		
Outstanding at June 30, 2022	1,256	$ 72.54	2.9	$ 43,883
Expected to vest at June 30, 2022	1,256	$ 72.54	2.9	$ 43,883

As of June 30, 2022, there was $83.4 million of total unrecognized compensation cost related to these issuances that is expected to be recognized over a weighted average period of 2.9 years.

Performance Stock Units

Performance stock unit awards ("PSUs") were granted to certain employees that will vest upon achievement of operational milestones related to the Wilsonville facility, to Company executives that will vest upon achievement of revenue and gross profit metrics as determined by the board, and to certain consultants that will vest upon achievement of operational milestones. Stock compensation expense for PSUs is recorded over the vesting period based on the grant date fair value of the awards and probability of the achievement of specified performance targets. The grant date fair value is equal to the closing share price of the Company's common stock on the date of grant. PSUs generally vest over a one to three-year service period following the grant date, provided that the recipient is a Company employee at the time of vesting and the achievement of performance targets applicable to each award. The percentage of PSUs that vest will depend on the achievement of specified performance targets at the end of the performance period and can range from 0% to 150% of the number of units granted. Forfeitures of PSUs are recognized as they occur. As of June 30, 2022, the unrecognized compensation costs related to these awards was $29.4 million. The Company expects to recognize those costs over a weighted average period of 1.7.

Activity under the PSUs during the nine months ended June 30, 2022 is summarized below:

(in thousands, except per share data)	Number of shares	Weighted average grant date fair value	Weighted average remaining contractual term	Aggregate intrinsic value
Outstanding at September 30, 2021	10	$ 3.59	2.3	$ 1,016
Performance stock units granted	631	78.83		
Performance stock units vested	(13)	31.29		
Performance stock units forfeited	(53)	85.32		
Outstanding at June 30, 2022	575	$ 84.93	1.7	$ 20,099
Vested or expected to vest and exercisable at June 30, 2022	575	$ 84.93	1.7	$ 20,099

Options

Stock options entitle the holder to purchase, at the end of the vesting term, a specified number of shares of Company common stock at an exercise price per share equal to the closing market price of the common stock on the date of grant. Stock options typically have a contractual life from the date of the grant and a vesting schedule as established by the board of directors. The fair value of each services based stock option grant is estimated on the date of grant using the Black-Scholes option-pricing model. The Company historically had been a private company and lacked company-specific historical and implied volatility information for its stock. Therefore, it estimated its expected stock price volatility based on the historical volatility of publicly traded peer companies through the period ended June 30, 2022 and utilized the "simplified" method for awards that qualify as "plain-vanilla" options. As determined under the simplified method, the expected term of stock options granted to non-employee consultants is equal to the contractual term of the option award, the risk-free interest rate is determined by reference to the U.S. Treasury yield curve in effect at the time of grant of the award for time periods approximately equal to the expected term of the award, the expected dividend yield is zero based on the fact that the Company has never paid cash dividends on common stock and does not expect to pay any cash dividends in the foreseeable future. Forfeitures of options are recognized as they occur.

(in thousands, except per share data)	Number of shares	Weighted average exercise price	Weighted average remaining contractual term	Aggregate intrinsic value
Outstanding at September 30, 2021	2,875	$ 22.83	7.1	$ 242,012
Options granted	223	26.36		
Options vested	(416)	11.50		9,845
Options forfeited	(135)	32.02		
Outstanding at June 30, 2022	2,547	$ 24.80	6.6	$ 34,111
Vested or expected to vest and exercisable at June 30, 2022	2,547	$ 24.80	6.6	$ 34,111

As of June 30, 2022, the unrecognized compensation costs related to these awards was $15.4 million. The Company expects to recognize those costs over a weighted average period of 1.3.

Performance Stock Options

On September 1, 2020, the board of directors approved the implementation of a revised annual equity award program for executive officers, senior level employees and consultants to be granted as performance-based stock options ("PSOs") under the 2018 Plan. The number of PSOs ultimately earned under the awards to executive officers and senior level employees is calculated based on the achievement of a certain total revenue threshold during the fiscal year ending September 30, 2022. The percentage of performance stock options that vest will depend on the board of directors' determination of total revenue at the end of the performance period and can range from 0% to 150% of the number of options granted. The number of PSOs ultimately earned under the awards to a consultant is calculated based on the achievement of certain operational milestones.

The provisions of the PSO are considered a performance condition, and the effects of that performance condition are not reflected in the grant date fair value of the awards. The Company used the Black-Scholes method to calculate the fair value at the grant date without regard to the vesting condition and will recognize compensation cost for the options that are expected to vest. Forfeitures of PSOs are recognized as they occur. The Company reassesses the probability of the performance condition at each reporting period and adjusts the compensation cost based on the probability assessment. As of June 30, 2022, the Company determined that 293,730 shares are expected to vest based on the probability of the performance condition that will be achieved under this equity award program.

Activity under the equity incentive plans during the nine months ended June 30, 2022 is summarized below:

(in thousands, except per share data)	Number of shares	Weighted average exercise price	Weighted average remaining contractual term	Aggregate intrinsic value
Outstanding at September 30, 2021	257	$ 70.62	8.9	$ 9,331
Performance stock options granted	75	20.02		
Performance stock options vested	(19)	19.16		296
Performance stock options forfeited	(19)	67.85		
Outstanding at June 30, 2022	294	$ 63.27	8.5	$ 206
Vested or expected to vest and exercisable at June 30, 2022	294	$ 63.27	8.5	$ 206

As of June 30, 2022, the unrecognized compensation costs related to these awards was $2.3 million. The Company expects to recognize those costs over a weighted average period of 0.7 years.

Total stock-based compensation expense recognized was as follows:

(in thousands)	Three months ended June 30, 2022	Three months ended June 30, 2021	Nine months ended June 30, 2022	Nine months ended June 30, 2021
Cost of revenues	$ 1,228	$ 773	$ 3,347	$ 1,990
Research and development	5,642	2,753	14,506	7,180
Selling, general and administrative	12,989	5,650	42,410	18,581
Total stock-based compensation	$ 19,859	$ 9,176	$ 60,263	$ 27,751

2018 Employee Stock Purchase Plan

On September 26, 2018, the board of directors adopted the 2018 Employee Stock Purchase Plan (the "2018 ESPP"). The number of shares reserved for issuance under the 2018 ESPP upon approval was 275,225 shares of the Company's common stock, and it increases automatically on the first day of each fiscal year, following the fiscal year in which the 2018 ESPP becomes effective, by a number equal to the least of 249,470 shares, 1% of the shares of common stock outstanding at that time, or such number of shares determined by the Company's board of directors. The number of shares reserved for issuance at June 30, 2022 was as follows:

(In thousands)	Shares available
Outstanding at September 30, 2021	355
Additional shares authorized	249
Shares issued during the period	(50)
Outstanding at June 30, 2022	554

Subject to any plan limitations, the 2018 ESPP allows eligible service providers (through qualified and non-qualified offerings) to contribute, normally through payroll deductions, up to 15% of their earnings for the purchase of the Company's common stock at a discounted price per share. The offering periods begin in February and August of each year, except for the initial offering period which commenced with the initial public offering in October 2018 and ended on August 20, 2019. The common shares issuable under the 2018 ESPP were registered pursuant to a registration statement on Form S-8 on November 26, 2018.

Unless otherwise determined by the board of directors, the Company's common stock will be purchased for the accounts of employees participating in the 2018 ESPP at a price per share that is the lesser of 85% of the fair market value of the Company's common stock on the first and last trading day of the offering period. During the three and nine months ended June 30, 2022 and 2021, activity under the 2018 ESPP was immaterial.

Abveris Acquisition

As discussed further in Note 13 "Business acquisition", on December 1, 2021, the Company completed the acquisition of AbX Biologics, Inc. and granted certain equity awards to new employees. These equity awards included up to 231,876 restricted shares of the Company's common stock which are issuable based on achievement of the 2022 calendar revenue target, which had an aggregate grant date fair value of $20.1 million. In addition, all employees must remain employed through the payout date, and certain employees have an additional vesting period of up to two years from the acquisition date. The vesting upon achievement of the 2022 calendar revenue target is considered a performance condition, and the effects of that performance condition are not reflected in the grant date fair value of the awards. The Company used the stock price as of December 1, 2021 for the fair value of restricted shares. As of June 30, 2022, the Company determined that 200,673 shares are expected to vest based on the probability of the performance condition that will be achieved under this equity award program. The Company reassesses the probability of the performance condition at each reporting period and adjusts the compensation cost based on the probability assessment. The Company recorded approximately $7.8 million in stock-based compensation expense for the nine months ended June 30, 2022 related to these awards. The grant date fair value was determined to be $87.06 per share for restricted shares. As of June 30, 2022, the unrecognized compensation costs related to these awards were $9.7 million. The Company expects to recognize those costs over a weighted average period of 0.8 years.

11. Net loss per share attributable to common stockholders

The following table sets forth the computation of the Company's basic and diluted net loss per share attributable to common stockholders:

(in thousands, except per share data)	Three months ended June 30, 2022	Three months ended June 30, 2021	Nine months ended June 30, 2022	Nine months ended June 30, 2021
Numerator:				
Net loss attributable to common stockholders	$ (60,517)	$ (40,037)	$ (166,748)	$ (110,856)
Denominator:				
Weighted average shares used in computing net loss per share, basic and diluted	56,287	48,963	53,005	47,881
Net loss per share attributable to common stockholders, basic and diluted	$ (1.08)	$ (0.82)	$ (3.15)	$ (2.32)

The potentially dilutive common shares that were excluded from the calculation of diluted net loss per share because their effect would have been antidilutive for the periods presented are as follows:

(in thousands)	Three and nine months ended June 30, 2022	Three and nine months ended June 30, 2021
Shares subject to options to purchase common stock	2,547	3,339
Shares subject to performance-based stock options	294	—
Unvested restricted stock units and performance stock units	1,831	726
Unvested shares of common stock issued upon early exercise of stock options	—	6
Shares subject to employee stock purchase plan	66	21
Total	4,738	4,092

12. Geographic, product and industry information

The table below sets forth revenues by geographic region, based on ship-to destinations. Americas consists of the United States of America, Canada, Mexico and South America; EMEA consists of Europe, the Middle East, and Africa; and APAC consists of Japan, China, South Korea, India, Singapore, Malaysia, and Australia.

(in thousands)	Three months ended June 30, 2022	Three months ended June 30, 2021	Nine months ended June 30, 2022	Nine months ended June 30, 2021
Americas	$ 35,797	$ 19,264	$ 87,636	$ 55,161
EMEA	15,482	12,658	45,207	31,694
APAC	4,834	3,096	13,416	7,527
Total	$ 56,113	$ 35,018	$ 146,259	$ 94,382

The table below sets forth revenues by products.

(in thousands)	Three months ended June 30, 2022	Three months ended June 30, 2021	Nine months ended June 30, 2022	Nine months ended June 30, 2021
Synthetic genes	$ 17,400	$ 11,164	$ 45,088	$ 29,228
Oligo pools	3,259	2,017	8,755	5,367
DNA libraries	1,422	1,147	4,650	4,188
Antibody discovery	6,242	1,993	17,643	4,379
NGS tools	27,790	18,697	70,123	51,220
Total	$ 56,113	$ 35,018	$ 146,259	$ 94,382

The table below sets forth revenues by industry.

(in thousands)	Three months ended June 30, 2022	Three months ended June 30, 2021	Nine months ended June 30, 2022	Nine months ended June 30, 2021
Industrial chemicals/materials	$ 16,733	$ 9,422	$ 43,533	$ 25,214
Academic research	9,501	7,748	26,873	18,297
Healthcare	29,437	17,356	74,408	49,896
Food/agricultural	442	492	1,445	975
Total	$ 56,113	$ 35,018	$ 146,259	$ 94,382

13. Business acquisition

On December 1, 2021, the Company acquired all of the outstanding stock of AbX Biologics, Inc. (“Abveris”), a privately-held company providing in vivo antibody discovery services. Abveris offers animal-based antibody discovery and screening services for its customers using the Berkeley Lights Beacon Platform and its proprietary DiversimAb and DivergimAb mouse models, which the Company can humanize using its antibody optimization solution.

The acquisition date fair value of the consideration transferred for Abveris was $102.6 million, consisting of cash totaling $9.5 million, 759,601 shares of the Company’s common stock valued at $66.1 million based on the Company’s closing stock price on December 1, 2021, employee stock awards issued to certain Abveris employees valued at $6.4 million, contingent consideration of $8.5 million, holdbacks of $12.8 million, and an estimated net working capital adjustment of $0.7 million.

The contingent consideration is subject to the attainment of the calendar year 2022 revenue target. The contingent consideration becomes payable after December 31, 2022 and will be settled in a combination of cash and up to 334,939 shares of the Company’s common stock. The acquisition date fair value of the contingent consideration was based on forecasted revenue of Abveris relative to the 2022 revenue target as well as the Company’s stock price as of December 1, 2021.

The Company maintains an indemnity and adjustment holdback for the purposes of providing security against any adjustment to the amounts at closing. The indemnity holdback period extends for 18 months from the anniversary of the closing date. The indemnity holdback will be settled by transferring up to 128,351 shares of the Company’s stock, 15,304 options of the Company’s common stock and an immaterial amount of cash. The fair value of the indemnity holdback was $12.5 million as of the acquisition date. The adjustment holdback will be settled by transferring up to 3,416 shares of the Company’s stock, 408 options of the Company’s common stock and an immaterial amount of cash. The holdback adjustment liability was $0.3 million as of the acquisition date.

Additionally, a working capital adjustment of $0.7 million decreased the total purchase price. The purchase price continues to be subject to adjustment for working capital adjustments as allowed under terms of the agreement.

Post-combination compensation expense excluded from the purchase price includes employee stock awards issued to certain Abveris employees valued at $41.0 million. This includes awards valued at $17.7 million which vest over a two year service period following the acquisition date and awards valued at $3.2 million with no future vesting requirements, which were deemed accelerated by the Company at the acquisition date and expensed within the three months ended December 31, 2021. Finally, post-combination expense includes awards valued at approximately $17.5 million which vest based on achievement of the calendar year 2022 revenue target and continuing employment through the payout date, and for certain employees, additional continuing employment through the two years anniversary of the acquisition date.

This acquisition was accounted for using the acquisition method of accounting in accordance with the business combination guidance in ASC 805. Under the acquisition accounting method, the total estimated purchase price was allocated to the identifiable assets acquired and liabilities assumed based on their fair values. The excess of the purchase price over the net of the acquisition date amounts of the identifiable assets acquired and liabilities assumed has been recorded as goodwill. Management’s estimate of the fair values of the acquired intangible assets at December 1, 2021 is preliminary and subject to change and is based on established and accepted valuation techniques performed with the assistance of third-party valuation specialists. Additional information, which existed as of the acquisition date but is yet unknown to the Company, may become known to the Company during the remainder of the measurement period, which will not exceed twelve months from the acquisition date. Changes to amounts will be recorded as adjustments to the provisional amounts recognized as of the acquisition date and may result in a corresponding adjustment to goodwill in the

period in which new information becomes available. The goodwill that arose from the acquisition consists of synergies expected from integrating Abveris into the Company's operations and customer base. The goodwill recognized is not expected to be deductible for income tax purposes.

The following table summarizes the preliminary fair value amounts of the assets acquired and liabilities assumed as of the acquisition date, as well as the purchase consideration:

(in thousands)	**December 1, 2021**
Assets acquired	
Cash and cash equivalents	$ 1,306
Accounts receivable	2,309
Other current assets and prepaid expenses	1,654
Property, plant and equipment	1,078
Other non-current assets	2,970
Intangible assets	46,500
Liabilities assumed	
Current liabilities	3,549
Non-current liabilities	846
Deferred tax liability	10,545
Fair value of assets acquired and liabilities assumed	$ 40,877
Goodwill	61,768
Total purchase price	$ 102,645
Consideration transferred	
Cash	$ 9,467
Company common stock	72,514
Contingent consideration	8,500
Holdback liabilities	12,838
Net working capital adjustment	(674)
Fair value of purchase consideration	$ 102,645

The following table summarizes the preliminary estimate of the intangible assets as of the acquisition date:

(in thousands except for years)	Estimated Weighted Average Useful Lives in Years	Estimated Fair Value
Developed technology	14	$ 30,900
Customer relationships	10	14,700
Trade name	3	900
Estimated fair value of acquired intangible assets		$ 46,500

The Company estimated the fair value of the developed technology intangible asset and a portion of the customer relationships intangible assets using an excess earnings model. An additional portion of the customer relationships intangible assets was valued using the with and without method. The Company estimated the fair value of the trade name intangible asset using a relief from royalty approach. These fair value measurements were based on significant inputs not observable in the market and thus represent a Level 3 measurement. Key assumptions include the level and timing of expected future revenue, conditions and demands specific to each intangible asset over its remaining useful life, and discount rates the Company believes to be consistent with the inherent risks associated with each type of asset, which was approximately 9.6%. The fair value of these intangible assets is primarily affected by the projected revenues, gross margins, operating expenses, the technology obsolescence curve, and the anticipated timing of the projected income

associated with each intangible asset coupled with the discount rates used to derive their estimated present values. The Company believes the level and timing of expected future cash flows appropriately reflects market participant assumptions.

The Company included the financial results of Abveris in its condensed consolidated financial statements from the date of acquisition. The Company incurred transaction costs related to the acquisition of $1.5 million, which were recorded as an operating expense on the condensed consolidated statements of operations and comprehensive loss for the nine months ended June 30, 2022.

The following table provides a reconciliation of contingent consideration and holdbacks balances from acquisition date to June 30, 2022:

(in thousands)	Contingent consideration	Holdbacks	Total
Balance at December 1, 2021 – acquisition date	$ 8,500	$ 12,164	$ 20,664
Change in fair value during the period	(5,200)	(7,097)	(12,297)
Balance at June 30, 2022	$ 3,300	$ 5,067	$ 8,367

The estimated fair value of the contingent consideration liability decreased as a result of the change in the Company's stock price from December 1, 2021, and the probability of the attainment of the calendar year 2022 revenue target as calculated using the Monte Carlo simulation model. The estimated fair value of the holdback liability decreased as a result of the change in the Company's stock price as of June 30, 2022. For the nine months ended June 30, 2022, the Company recognized a gain of $12.3 million relating to the change in fair value of acquisition consideration in its condensed consolidated statement of operations.

The post-combination effect from net deferred tax liability assumed from the Abveris acquisition also caused a release of the Company's deferred income tax valuation allowance. On the acquisition date, the release resulted in an income tax benefit of $10.5 million.

The following unaudited pro forma financial information presents the combined results of operations for the Company and Abveris as if the Abveris acquisition had occurred on October 1, 2020. The pro forma information contains the actual operating results of the Company Abveris, adjusted to include the pro forma impact of acquisition, which is primarily additional expense as a result of the amortization of identifiable intangible assets. The unaudited pro forma financial information is prepared for comparative purposes only and does not purport to be indicative of the actual operating results that would have been recorded had the Abveris acquisition actually taken place on October 1, 2020 and should not be taken as indicative of future consolidated operating results. Additionally, the unaudited pro forma financial results do not include any anticipated synergies or other expected benefits from the Abveris acquisition.

	Three months ended June 30,		Nine months ended June 30,	
(in thousands)	2022	2021	2022	2021
Revenues	$ 56,113	$ 37,600	$ 148,705	$ 102,713
Net loss attributable to common stockholders	$ (60,517)	$ (38,853)	$ (165,681)	$ (106,461)

Issuance of contingent consideration for iGenomX acquisition
In December 2021, the Company determined that the transition milestones specified in the iGenomX acquisition agreement were completed, and the Company became obligated to issue 59,190 shares of its common stock to satisfy the contingent consideration. The shares of common stock, valued at $4.6 million, were subsequently issued by the Company during January 2022 along with an immaterial cash payment for fractional shares.

14. Investment in variable interest entity

On November 1, 2021, the Company contributed certain assets and licensed certain intellectual property rights to the newly formed Revelar Biotherapeutics, Inc. ("Revelar"), an independently operated, new biotechnology company, to develop and commercialize an antibody, discovered and optimized by Twist Biopharma, a division of the Company. The Company granted a license to Revelar for the exclusive development of an antibody lead along with a series of back up compounds for the potential treatment of SARS-CoV-2. While the licensed antibody neutralized all known variants of concern through Omicron, it does not neutralize the BA.4 and BA.5 variants and Revelar will pursue a partner for the antibody at this time. In addition, Revelar may license up to five additional antibody therapeutics over the next four years, each of which will be subject to additional upfront, milestone and royalty payments to the Company. The Company committed to invest up to

$10.0 million in seed funding based on Revelar's progress in the development of the lead antibody and the potential licensing of additional antibody therapeutics, of which the Company made an initial investment of $5.0 million in a simple agreement for future equity ("SAFE"), and two additional investments of $2.5 million each, as of the date of these consolidated financial statements as described below. In exchange for the assignment of certain contractual rights and the license to the antibody, and its back-up compounds, the Company received stock of Revelar amounting to an ownership percentage as of the date of these financial statements of 49.80%, excluding shares and options reserved for future stock awards and further excluding shares that Revelar may issue to the Company upon conversion of its SAFEs.

On February 3, 2022, the Company purchased an additional SAFE issued by Revelar for $2.5 million pursuant to the Asset License and Contract Assignment Agreement between the parties. In exchange for the SAFE, the Company obtained the right to receive shares of Revelar issued in a future preferred stock financing.

On April 6, 2022, the Company purchased an additional SAFE issued by Revelar for $2.5 million pursuant to the Asset License and Contract Assignment Agreement between the parties. In exchange for the SAFE, the Company obtained the right to receive shares of Revelar issued in a future preferred stock financing.

The Company determined that Revelar is a VIE as the entity lacks sufficient equity to finance its activities without additional support. Additionally, the Company determined that it has (a) the power to direct the activities that significantly impact Revelar's economic performance and (b) the obligation to absorb losses of, and the right to receive benefits from, Revelar that are potentially significant to Revelar. As a result, the Company is deemed to be the primary beneficiary of Revelar and is required to consolidate Revelar in accordance with ASC 810.

Revelar incurred a net loss of approximately $6.0 million and $13.1 million for the three and nine months ended June 30, 2022, and the decrease in net assets was fully absorbed by the Company.

Total assets included on the consolidated balance sheet for Revelar as of June 30, 2022 were $7.4 million, primarily consisting of cash and cash equivalents. Total liabilities included on the consolidated balance sheet for Revelar as of June 30, 2022 were $10.5 million, primarily consisting of accounts payable, accrued expenses and non-current liability relating to the SAFEs.

* * * * *

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 the unaudited condensed consolidated financial statements and related notes that are included elsewhere in this Quarterly Report on Form 10-Q and our Annual Report on Form 10-K for the fiscal year ended September 30, 2021 filed with the U.S. Securities and Exchange Commission, or the SEC, on November 23, 2021, or our Annual Report on Form 10-K. This discussion contains forward-looking statements based upon current plans, expectations and beliefs that involve risks and uncertainties including the effect of the COVID-19 pandemic and our response thereto. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including, but not limited to, those discussed in the section entitled "Risk Factors" and elsewhere in this Quarterly Report on Form 10-Q. In preparing this MD&A, we presume that readers have access to and have read the MD&A in our Annual Report on Form 10-K, pursuant to Instruction 2 to paragraph (b) of Item 303 of Regulation S-K.

Overview

We are an innovative synthetic biology and genomics company that has developed a scalable DNA synthesis platform to industrialize the engineering of biology. The core of our platform is a proprietary technology that pioneers a new method of manufacturing synthetic DNA by "writing" DNA on a silicon chip. We have miniaturized traditional chemical DNA synthesis reactions to write over one million short pieces of DNA on each silicon chip, approximately the size of a large mobile phone. We have combined this technology with proprietary software, scalable commercial infrastructure, and an e-commerce platform to create an integrated technology platform that enables us to achieve high levels of quality, precision, automation, and manufacturing throughput at a significantly lower cost than our competitors. We are leveraging our unique technology to manufacture a broad range of synthetic DNA-based products, including synthetic genes, tools for next-generation sample preparation, and antibody libraries for drug discovery and development.

Additionally, we believe our platform will enable new value-added opportunities, such as discovery partnerships for biologic drugs, and will enable new applications for synthetic DNA, such as digital data storage. We sell our synthetic DNA and synthetic DNA-based products to a customer base of approximately 3,000 customers across a broad range of industries.

We launched the first application of our platform, synthetic genes and oligo pools, in April 2016 to disrupt the gene synthesis market and make legacy DNA synthesis methods obsolete.

We have grown rapidly and generated revenues of $56.1 million and $35.0 million in the three months ended June 30, 2022 and 2021, respectively, while incurring net losses of $60.5 million and $40.0 million for the three months ended June 30, 2022 and 2021, respectively. Since our inception, we have incurred significant operating losses. To support our growth, we have increased our number of employees and increased investment in our manufacturing capabilities. Our ability to generate product revenue sufficient to achieve profitability will depend heavily on the success of our existing products and development and commercialization of additional products in the synthetic biology industry, biologic drug industry or data storage industry.

For the three months ended June 30, 2022 and 2021, we served approximately 1,900 and 1,800 customers, respectively.

Highlights from three months ended June 30, 2022 compared with three months ended June 30, 2021 included:

- Revenue growth of 60% to $56.1 million from $35.0 million, primarily due to order growth in NGS tools, synthetic genes and antibody discovery; and

- Our gross margins were 45% and 40%, respectively.

We have built a scalable commercial platform that enables us to reach a diverse customer base in a variety of industries including industrial chemicals/materials, academic research, healthcare, food, agriculture and data storage. To address this diverse customer base, we have employed a multi-channel strategy comprised of a direct sales force targeting synthetic DNA customers, international distributors, and an e-commerce platform. Launched in fiscal 2018, our e-commerce platform allows customers to design, validate and place on-demand orders of customized DNA online. This is a key component of our strategy to address and support our diverse and growing customer base, as well as support commercial productivity, enhance the customer experience, and promote loyalty.

In the three months ended June 30, 2022, our net revenues increased to $56.1 million from net revenues of $48.1 million in the three months ended March 31, 2022. Our synthetic gene revenue of $17.4 million in the three months ended June 30, 2022 increased from $14.2 million in the three months ended March 31, 2022, primarily due to an increase in our top

customers and growth in the healthcare and industrial chemical industries. Our revenues from NGS tools increased to $27.8 million in the three months ended June 30, 2022, from $23.1 million in the three months ended March 31, 2022, primarily due to an increase in revenue from our top customers and growth in the healthcare and industrial chemical industries. Our research and development expenses increased from $31.2 million in the three months ended March 31, 2022 to $36.8 million in the three months ended June 30, 2022 primarily due to increases in payroll expenses related to increased headcount and stock-based compensation expense relating to Revelar and production material costs.

Investment in Revelar

On November 1, 2021, we contributed certain assets and licensed certain intellectual property rights to Revelar, an independently operated, new biotechnology company, to develop and commercialize an antibody, discovered and optimized by Twist Biopharma. We granted a license to Revelar for the exclusive development of an antibody lead along with a series of back up compounds for the potential treatment of SARS-CoV-2. While the licensed antibody neutralized all known variants of concern through Omicron, it does not neutralize the BA.4 and BA.5 variants and Revelar will pursue a partner for the antibody at this time. We have provided Revelar with $10.0 million in seed funding. We do not intend to provide additional funding to Revelar in the foreseeable future.

COVID-19 considerations

During the three months ended June 30, 2022, our revenues were not significantly affected by the COVID-19 pandemic. However, the extent to which the COVID-19 pandemic affects our future financial results and operations will depend on future developments which are highly uncertain and cannot be predicted, including the recurrence, severity and/or duration of the ongoing pandemic, and current or future domestic and international actions to contain and treat COVID-19.

We are and have been following public and private sector policies and initiatives to reduce the transmission of COVID-19, such as the imposition of travel restrictions and the promotion of social distancing and work-from-home arrangements. We have taken and continue to take a variety of measures to ensure the availability and functioning of our critical infrastructure, to promote the safety and security of our employees and to support the communities in which we operate. These measures include increasing our inventory, requiring remote working arrangements for employees not integral in physically making and shipping our products or who do not need specialized equipment to perform their work, weekly testing for all onsite employees, investing in personal protective equipment, and providing paid sick leave to affected employees.

Due to the evolving nature of the situation, we are not able at this time to estimate the effect of COVID-19 on our financial results and operations, but the effect could be material for the remainder of fiscal year 2022 and/or during any future period affected either directly or indirectly by this pandemic. For further discussion of the risks relating to COVID-19, see Part II, Item 1A. “Risk Factors—We are subject to risks associated with COVID-19.”

Financial overview

The following table summarizes certain selected historical financial results:

	Three months ended June 30,		Nine months ended June 30,	
(in thousands)	**2022**	**2021**	**2022**	**2021**
Revenues	$ 56,113	$ 35,018	$ 146,259	$ 94,382
Loss from operations	(61,163)	(42,118)	(177,905)	(112,915)
Net loss attributable to common stockholders	(60,517)	(40,037)	(166,748)	(110,856)

Revenues

We generate revenue from sales of synthetic genes, oligo pools, NGS tools, DNA libraries and antibody discovery services. Our ability to increase our revenues will depend on our ability to further penetrate the domestic and international markets, generate sales through our direct sales force, and over time from our e-commerce platform and launch of new products.

Revenues by geography

We have one reportable segment from the sale of synthetic DNA products. The following table shows our revenues by geography, based on our customers' shipping addresses. Americas consists of United States of America, Canada, Mexico, and South America; EMEA consists of Europe, Middle East and Africa; and APAC consists of Japan, China, South Korea, India, Singapore, Malaysia and Australia.

	Three months ended June 30,				Nine months ended June 30,			
(in thousands, except percentages)	2022	%	2021	%	2022	%	2021	%
Americas	$ 35,797	64 %	$ 19,264	55 %	$ 87,636	60 %	$ 55,161	58 %
EMEA	15,482	27 %	12,658	36 %	45,207	31 %	31,694	34 %
APAC	4,834	9 %	3,096	9 %	13,416	9 %	7,527	8 %
Total revenues	$ 56,113	100 %	$ 35,018	100 %	$ 146,259	100 %	$ 94,382	100 %

Revenues by product

The table below sets forth revenues by product:

	Three months ended June 30,				Nine months ended June 30,			
(in thousands, except percentages)	2022	%	2021	%	2022	%	2021	%
Synthetic genes	$ 17,400	31 %	$ 11,164	32 %	$ 45,088	31 %	$ 29,228	31 %
Oligo pools	3,259	6 %	2,017	6 %	8,755	6 %	5,367	6 %
DNA libraries	1,422	2 %	1,147	3 %	4,650	3 %	4,188	4 %
Antibody discovery	6,242	12 %	1,993	6 %	17,643	12 %	4,379	5 %
NGS tools	27,790	49 %	18,697	53 %	70,123	48 %	51,220	54 %
Total revenues	$ 56,113	100 %	$ 35,018	100 %	$ 146,259	100 %	$ 94,382	100 %

Revenues by industry

The table below sets forth revenues by industry:

	Three months ended June 30,				Nine months ended June 30,			
(in thousands, except percentages)	2022	%	2021	%	2022	%	2021	%
Industrial chemicals/materials	$ 16,733	30 %	$ 9,422	27 %	$ 43,533	30 %	$ 25,214	27 %
Academic research	9,501	17 %	7,748	22 %	26,873	18 %	18,297	19 %
Healthcare	29,437	52 %	17,356	50 %	74,408	51 %	49,896	53 %
Food/agriculture	442	1 %	492	1 %	1,445	1 %	975	1 %
Total revenues	$ 56,113	100 %	$ 35,018	100 %	$ 146,259	100 %	$ 94,382	100 %

Product shipments including synthetic genes

Shipments of all products and number of genes shipped in the three months ended June 30, 2022, March 31, 2022, December 31, 2021, September 30, 2021, June 30, 2021, March 31, 2021, December 31, 2020, and September 30, 2020 were as follows:

	Three months ended							
(in thousands)	June 30, 2022	March 31, 2022	December 31, 2021	September 30, 2021	June 30, 2021	March 31, 2021	December 31, 2020	September 30, 2020
Number of genes shipped	163	124	125	91	107	90	84	87
Number of shipments	15	14	13	12	14	11	9	8

Comparison of the three months ended June 30, 2022 and 2021

Revenues

(in thousands, except percentages)	Three months ended June 30, 2022	2021	Change	%
Revenues	$ 56,113	$ 35,018	$ 21,095	60 %

In the three months ended June 30, 2022, revenues increased to $56.1 million from $35.0 million in the three months ended June 30, 2021. The revenue increase reflects growth in synthetic genes revenue of $6.2 million, NGS tools revenue of $9.1 million and antibody discovery revenue of $4.2 million. Our synthetic genes revenue grew mainly due to growth in our customers quarter over quarter across in the industrial chemicals and healthcare industries. In the three months ended June 30, 2022, we shipped approximately 163,000 genes compared to approximately 107,000 genes in the three months ended June 30, 2021, an increase of 52%. Synthetic gene pricing to our customers was relatively constant period-over-period. The primary reason for NGS tools revenue growth was the adoption of our product by our top customers in the healthcare industry. We do not believe that pricing changes had a meaningful impact on the revenue changes for NGS tools period-over-period. Our Antibody services revenue grew year over year due to an increase in the Twist Antibody discovery project revenue and also increased revenue attributable to the Abveris acquisition.

Cost of revenues

(in thousands, except percentages)	Three months ended June 30, 2022	2021	Change	%
Cost of revenues	$ 30,974	$ 20,933	$ 10,041	48 %

In the three months ended June 30, 2022, cost of revenues increased to $31.0 million from $20.9 million in the three months ended June 30, 2021. The increase was primarily due to an increase in the consumption of reagents and production materials costs of $6.3 million associated with increased production due to higher sales volumes and product shipments. The increase in the payroll and stock-based compensation expense of $3.0 million was due to growth in Gene volume and increasing capacity for Genes and new products. Abveris's cost of $2.7 million contributed to the increase in the cost of revenues. Depreciation expense also increased by $0.8 million associated with investing in equipment to support the increase in the capacity.

Research and development expenses

(in thousands, except percentages)	Three months ended June 30, 2022	2021	Change	%
Research and development	$ 36,840	$ 19,838	$ 17,002	86 %

In the three months ended June 30, 2022, research and development expenses increased to $36.8 million from $19.8 million in the three months ended June 30, 2021. Revelar's cost of $6.0 million and Abveris's cost of $0.9 million contributed to the increase of research and development costs. The increases were primarily in payroll and stock-based compensation expense of $9.5 million associated with increasing our research and development headcount, an increase in the consumption of reagents and production materials costs of $7.0 million due to an increase in research activities and material prices, in outside services and consulting costs of $0.7 million, primarily associated with the development activities for our data storage technology, and in maintenance costs of $0.2 million.

Selling, general and administrative

(in thousands, except percentages)	Three months ended June 30, 2022	2021	Change	%
Selling, general and administrative	$ 53,693	$ 34,478	$ 19,215	56 %

In the three months ended June 30, 2022, selling, general and administrative expenses increased to $53.7 million from $34.5 million in the three months ended June 30, 2021, primarily due to increases in payroll expenses of $13.1 million related to increased headcount in our commercial organization, and included $7.3 million higher stock-based compensation expenses and $0.6 million higher sales commission. Consulting costs increased by $0.7 million, legal costs by $0.6 million, depreciation and amortization expenses by $0.8 million, advertising expenses by $0.7 million, travel costs by $1.5 million, and rent and facility expenses by $1.7 million, mainly due to our Wilsonville facility lease expense.

Change in fair value of contingent consideration and holdbacks

	Three months ended June 30,			
(in thousands, except percentages)	2022	2021	Change	%
Change in fair value of contingent consideration and holdbacks	$ (4,231)	$ 1,887	$ (6,118)	(324)%

In the three months ended June 30, 2022, we recognized the change in fair value of contingent consideration and holdbacks of $4.2 million related to the acquisition of Abveris primarily as a result of the change of our stock price as of June 30, 2022.

Interest, and other income (expense), net

	Three months ended June 30,			
(in thousands, except percentages)	2022	2021	Change	%
Interest income	$ 722	$ 86	$ 636	740 %
Interest expense	—	(70)	70	(100)%
Other expense	(225)	(312)	87	(28)%
Total interest and other income (expense), net	$ 497	$ (296)	$ 793	(268)%

In the three months ended June 30, 2022, interest income was $0.7 million compared to $0.1 million in the three months ended June 30, 2021, resulting from our short-term and long-term investments. The decrease in interest expense was related to the reduction in the amount of debt outstanding under our credit facility with Silicon Valley Bank.

Benefit from income taxes

	Three months ended June 30,			
(in thousands, except percentages)	2022	2021	Change	%
Benefit from income taxes	$ 149	$ 2,377	$ (2,228)	(94)%

We recorded an income tax benefit of $0.1 million in the three months ended June 30, 2022. In the three months ended June 30, 2021, we recorded an income tax benefit of $2.4 million mainly as a result of the business acquisition.

Comparison of the nine months ended June 30, 2022 and 2021

Revenues

	Nine months ended June 30,			
(in thousands, except percentages)	2022	2021	Change	%
Revenues	$ 146,259	$ 94,382	$ 51,877	55 %

In the nine months ended June 30, 2022, revenues increased to $146.3 million from $94.4 million in the nine months ended June 30, 2021. The revenue increase reflects growth in synthetic genes revenue of $15.9 million, NGS tools revenue of $18.9 million, oligo pools revenue of $3.4 million and antibody discovery revenue of $13.2 million. Our synthetic genes revenue grew mainly due to growth in our customers across all industries including industrial chemicals, healthcare and

academic research. In the nine months ended June 30, 2022, we shipped approximately 412,000 genes compared to approximately 281,000 genes in the nine months ended June 30, 2021, an increase of 47%. Synthetic gene pricing to our customers was relatively constant period-over-period. The primary reason for NGS tools revenue growth was an increase in the revenue from our top customers and the adoption of our product by customers across all industries. We do not believe that pricing changes had a meaningful impact on the revenue changes for NGS tools period-over-period. Our Antibody services revenue grew year over year due to an increase in the Twist Antibody discovery project revenue and also increased revenue attributable to the Abveris acquisition.

Cost of revenues

	Nine months ended June 30,			
(in thousands, except percentages)	**2022**	**2021**	**Change**	**%**
Cost of revenues	$ 87,744	$ 58,123	$ 29,621	51 %

In the nine months ended June 30, 2022, cost of revenues increased to $87.7 million from $58.1 million in the nine months ended June 30, 2021. The increase was primarily due to an increase in the consumption of reagents and production materials costs of $16.8 million associated with increased production due to higher sales volumes and product shipments. The increase in payroll and stock-based compensation expense of $8.3 million was due to growth in Gene volume and increasing capacity for Genes and new products. Abveris's cost of $4.9 million contributed to the increase in the cost of revenues. Depreciation expense increased by $2.1 million associated with investing in the equipments to support the increase in the capacity, information technology costs increased by $1.1 million, maintenance cost increased by $0.9 million and facility costs increased by $0.4 million.

Research and development expenses

	Nine months ended June 30,			
(in thousands, except percentages)	**2022**	**2021**	**Change**	**%**
Research and development	$ 90,701	$ 49,629	$ 41,072	83 %

In the nine months ended June 30, 2022, research and development expenses increased to $90.7 million from $49.6 million in the nine months ended June 30, 2021. Revelar's cost of $13.1 million and Abveris cost of $3.2 million contributed to the increase of research and development costs.The increases were primarily in payroll and stock-based compensation expense of $22.9 million associated with increasing our research and development headcount, an increase in the consumption of reagents and production materials costs of $12.1 million primarily due to an increase in research activities and material prices, an increase in outside services and consulting costs of $5.6 million, primarily associated with the development activities for our data storage technology, and an increase in maintenance costs of $0.2 million. Grant reimbursements, which are netted against our research and development expenses, were $3.6 million in the nine months ended June 30, 2022, as compared to $1.6 million in the nine months ended June 30, 2021, reflecting the timing of the reimbursements.

Selling, general and administrative

	Nine months ended June 30,			
(in thousands, except percentages)	**2022**	**2021**	**Change**	**%**
Selling, general and administrative	$ 158,790	$ 97,658	$ 61,132	63 %

In the nine months ended June 30, 2022, selling, general and administrative expenses increased to $158.8 million from $97.7 million in the nine months ended June 30, 2021, primarily due to increases in payroll expenses of $43.4 million related to increased headcount in our commercial organization, and included $23.8 million higher of stock-based compensation expenses and $3.6 million higher sales commission. Consulting costs increased by $3.0 million, legal costs by $1.2 million, depreciation and amortization expenses by $2.5 million, online services by $0.9 million, advertising costs by $1.3 million, travel costs by $2.6 million and rent expense by $4.0 million, mainly due to our Wilsonville facility lease expense.

Change in fair value of contingent consideration and holdbacks

(in thousands, except percentages)	Nine months ended June 30, 2022	2021	Change	%
Change in fair value of contingent consideration and holdbacks	$ (13,071)	$ 1,887	$ (14,958)	(793)%

In the nine months ended June 30, 2022, we recognized the change in the fair value of the contingent consideration and holdbacks of $12.3 million and $0.8 million related to the acquisitions of Abveris and iGenomX, respectively, primarily as a result of the change in our stock price as of June 30, 2022.

Interest, and other income (expense), net

(in thousands, except percentages)	Nine months ended June 30, 2022	2021	Change	%
Interest income	$ 1,134	$ 377	$ 757	201 %
Interest expense	(54)	(284)	230	(81)%
Other expense	(626)	(305)	(321)	(105)%
Total interest and other income (expense), net	$ 454	$ (212)	$ 666	(314)%

In the nine months ended June 30, 2022, interest income was $1.1 million compared to $0.4 million in the nine months ended June 30, 2021, resulting from our short-term and long-term investments. The decrease in interest expense was related to the reduction in the amount of debt outstanding under our credit facility with Silicon Valley Bank.

Benefit from income taxes

(in thousands, except percentages)	Nine months ended June 30, 2022	2021	Change	%
Benefit from income taxes	$ 10,703	$ 2,271	$ 8,432	371 %

We recorded an income tax benefit of $10.7 million in the nine months ended June 30, 2022 mainly as a result of the acquisition of Abveris. In the nine months ended June 30, 2021, we recorded income tax benefit of $2.3 million mainly as a result of the acquisition of Abveris.

Liquidity and capital resources

Sources of liquidity

To date, we have financed our operations principally through public equity raises, private placements of our convertible preferred stock, borrowings from credit facilities and revenue from our commercial operations.

Since our inception on February 4, 2013 and through June 30, 2022, we have received an aggregate of $1,333.7 million in net proceeds from the issuance of equity securities and an aggregate of $13.8 million from debt. As of June 30, 2022, we had a balance of $376.2 million of cash and cash equivalents and $151.3 million in short-term investments.

Operating capital requirements

Our primary uses of capital are, and we expect will continue to be for the near future, compensation and related expenses, manufacturing costs, laboratory and related supplies, legal and other regulatory expenses and general overhead costs and the capital expenditures for our facility expansion including our “Factory of the Future” in Wilsonville, Oregon. We had $18.8 million in commitments for capital expenditures as of June 30, 2022.

Cash flows

The following table summarizes our sources and uses of cash and cash equivalents:

	Nine months ended June 30,	
(in thousands)	**2022**	**2021**
Net cash used in operating activities	$ (123,118)	$ (77,441)
Net cash used in investing activities	(235,713)	132,244
Net cash provided by financing activities	269,294	327,607

Operating activities

Net cash used in operating activities was $123.1 million in the nine months ended June 30, 2022 and consisted primarily of a net loss of $166.7 million adjusted for non-cash items including depreciation and amortization expenses of $11.6 million, deferred tax liability of $11.2 million, stock-based compensation expense of $60.6 million, non-cash lease expense of $2.6 million, change in fair value of contingent consideration of $13.1 million, and a net change in operating assets and liabilities of $7.9 million. The change in operating assets and liabilities was mainly due to increases in accounts receivable of $10.3 million, inventories of $11.2 million and prepaid expenses of $2.7 million, offset by decreases in other non-current assets of $6.8 million, accrued compensation of $5.5 million, accrued expenses of $0.6 million and other liabilities of $3.0 million.

In the nine months ended June 30, 2021, net cash used in operating activities was $77.4 million and consisted primarily of a net loss of $110.9 million adjusted for non-cash items, including depreciation and amortization expenses of $7.3 million, stock-based compensation expense of $27.8 million, and a change in operating assets and liabilities of $5.4 million. The change in operating assets and liabilities was mainly due to increases in inventory of $8.9 million and other liabilities of $1.9 million and decreases in accounts payable of $5.2 million and accrued expenses of $1.5 million.

Investing activities

In the nine months ended June 30, 2022, our investing activities used net cash of $235.7 million. The use of net cash resulted primarily from the net impact of purchases, sale and maturity of investments of $142.2 million, new businesses acquired of $8.2 million and purchases of laboratory property, equipment and computers of $85.4 million.

In the nine months ended June 30, 2021, our net cash provided by investing activities was $132.2 million primarily as a result of the net impact of purchases and maturity of investments of $151.7 million, and purchases of laboratory property, equipment and computers of $19.0 million.

Financing activities

Net cash provided by financing activities was $269.3 million in the nine months ended June 30, 2022, which consisted of $269.8 million in proceeds from a public offering of our common stock, net of underwriting discounts and commissions and offering expenses, $2.4 million from proceeds from issuance of shares under the 2018 ESPP and $4.8 million from the exercise of stock options, offset by $1.6 million in principal payments on long term debt and $6.1 million in repurchases of common stock for income tax withholdings.

In the nine months ended June 30, 2021, net cash provided by financing activities was $327.6 million, which consisted of $323.9 million in proceeds from a public offering of our common stock, net of underwriting discounts and commissions and offering expenses, $2.8 million from proceeds from issuance of shares under the 2018 ESPP and $11.7 million from the exercise of stock options, offset by $2.5 million in principal payments on long term debt and $8.2 million in repurchases of common stock for income tax withholdings.

Off-balance sheet arrangements

We do not have any off-balance sheet arrangements.

Contractual obligations and other commitments

Our contractual obligations have not materially changed from those reported in our Annual Report on Form 10-K other than transactions noted below.

On August 6, 2021, Abveris, which was subsequently acquired by us, entered into a 10-year, 5-month operating lease for approximately 22,000 square-feet of office space located in Quincy, Massachusetts, to further expand operations. Upon execution of the lease agreement, Abveris provided the landlord an approximate $0.6 million irrevocable letter of credit as a security deposit. Abveris will pay an initial annual base rent of approximately $1.2 million, which is subject to scheduled 2% annual increases, plus certain operating expenses. We have the right to sublease the facility, subject to landlord consent. The lease commenced on March 3, 2022. As of lease commencement date, the total future minimum lease payments under the agreement were $13.2 million.

Critical accounting policies and significant management estimates

The discussion and analysis of our financial condition and results of operations are based upon our condensed consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosures of contingent assets and liabilities. On an ongoing basis, management evaluates the reasonableness of its estimates. Management bases its estimates on historical experience and on various assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily available from other sources. Actual results may differ materially from these estimates under different assumptions or conditions.

We believe the following critical accounting policies require that we make significant judgments and estimates in preparing our consolidated financial statements.

Revenue recognition

Our revenue is generated through the sale of synthetic biology tools, such as synthetic genes, or clonal genes and fragments, oligonucleotide pools, or oligo pools, NGS tools and DNA libraries. We recognize revenue when control of the products is transferred to the customer and at a transaction price that is determined based on the agreed upon rates in the applicable order or master supply agreement applied to the quantity of synthetic DNA that was manufactured and shipped to the customer.

Contracts with customers are in the written form of a purchase order or a quotation, which outline the promised goods and the agreed upon price. Such orders are often accompanied by a Master Supply or Distribution Agreement that establishes the terms and conditions, rights of the parties, delivery terms, and pricing. We assess collectability based on a number of factors, including past transaction history and creditworthiness of the customer.

For all of our contracts to date, other than Biopharma contracts, the customer orders a specified quantity of a synthetic DNA sequence; therefore, the delivery of the ordered quantity per the purchase order is accounted for as one performance obligation.

The transaction price is determined based on the agreed upon rates in the purchase order or master supply agreements applied to the quantity of synthetic DNA that was manufactured and shipped to the customer. Our contracts include only one performance obligation—the shipment of the product to the customer. Accordingly, all of the transaction price, net of any discounts, is allocated to the one performance obligation. Our sales are primarily subject to Ex Works (as defined in Incoterms 2010) and delivery terms and revenue is recorded at the point in time when products are picked up by the customer’s freight forwarder, as we have determined that this is the point in time that product control transfers to the customer. Therefore, upon shipment of the product, there are no remaining performance obligations. Our shipping and handling activities are performed before the customer obtains control of the goods and therefore are considered a fulfillment cost. We have elected to exclude all sales and value added taxes from the measurement of the transaction price. We have not adjusted the transaction price for significant financing since the time period between the transfer of goods and payment is less than one year. We have elected the practical expedient of not disclosing the consideration allocated to remaining performance obligations and an explanation of when those amounts are expected to be recognized as revenue since the duration of our contracts is less than one year.

We recognize revenue at a point in time when control of the products is transferred to the customer.

Our Biopharma revenue currently primarily consists of research and development agreements with third parties that may or may not provide for up-front and milestone-based payments. Our research and development agreements may include more than one performance obligation. At the inception of the agreement, we assess whether each obligation represents a separate performance obligation or whether such obligations should be combined as a single performance obligation. The transaction price for each agreement is determined based on the amount of consideration we expect to be entitled to for satisfying all performance obligations within the agreement. We assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. In agreements where we satisfy performance obligation(s) over time, we recognize development revenue typically using an input method based on our costs incurred relative to the total expected cost which determines the extent of our progress toward completion. As part of the accounting for these arrangements, we must develop estimates and assumptions that require judgment to determine the transaction price and progress towards completion. We review our estimate of the transaction price and progress toward completion based on the best information available to recognize the cumulative progress toward completion as of the end of each reporting period and make revisions to such estimates as necessary. Also, these research and development agreements may include license payments. We recognize revenue from functional license agreements when the license is transferred to the customer and the customer is able to use and benefit from the license. A functional license has significant standalone functionality because it can be used “as is” for performing a specific task.

We had contract assets of $4.0 million and contract liabilities of $2.5 million as of June 30, 2022. For all periods presented, there was no revenue recognized in a reporting period from performance obligations satisfied in previous periods.

Based on the nature of our contracts with customers, which are recognized over a term of less than 12 months, we have elected to use the practical expedient whereby costs to obtain a contract are expensed as they are incurred.

We state our revenues net of any taxes collected from customers that are required to be remitted to various government agencies. The amount of taxes collected from customers and payable to governmental entities is included on the balance sheet as part of “Accrued expenses and other current liabilities.”

Stock-based compensation

We have granted stock-based awards, consisting of stock options and restricted stock, to our employees, certain non-employee consultants and certain members of our board of directors. We measure stock-based compensation expense for restricted stock and stock options granted to our employees and directors on the date of grant and recognize the corresponding compensation expense of those awards over the requisite service period, which is generally the vesting period of the respective award. We measure stock-based compensation expense for restricted stock and stock options granted to non-employee consultants on the date of grant and recognize the corresponding compensation expense of those awards over the period in which the related services are received. We adjust for actual forfeitures as they occur.

We have granted performance-based stock units (PSUs)) and performance stock options (PSOs) to executive officers and senior level employees. We value PSUs using a grant date fair value equal to the closing share price of our common stock on the date of grant. We value PSOs using the Black-Scholes method to calculate the fair value at the grant date without regard to the vesting condition and will recognize compensation cost for the units that are expected to vest.

Business combinations

Accounting for a business acquisition requires management to make significant estimates and assumptions as of acquisition date, which are inherently uncertain. Intangible assets we have recognized from such transaction, includes goodwill, development technology and customer relationships. Significant judgment was exercised in determining the fair value of the developed technology intangible assets acquired, which included estimates and assumptions related to the projected revenues (specifically volume of sales), discount rate, and technology obsolescence curve.

Critical estimates in valuing certain of the intangible assets we have acquired include, but are not limited to, projected revenues, technology obsolescence and discount rate. The rates used to discount expected future revenue to present value are typically derived from a weighted-average cost of capital analysis and adjusted to reflect inherent risks. Unanticipated events and circumstances may occur that could affect either the accuracy or validity of such assumptions, estimates or actual results.

Goodwill

Determining when to test for impairment, the reporting unit, the assets and liabilities of the reporting unit, and the fair value of the reporting unit requires significant judgment and involves the use of significant estimates and assumptions. We test goodwill for impairment in our fourth quarter each year, or more frequently if indicators of an impairment exist, to determine whether it is more likely than not that the fair value of the reporting unit with goodwill is less than its carrying value. For reporting units for which this assessment concludes that it is more likely than not that the fair value is more than its carrying value, goodwill is considered not impaired and we are not required to perform the goodwill impairment test. Qualitative factors considered in this assessment include industry and market considerations, overall financial performance, and other relevant events and factors affecting the fair value of the reporting unit. For reporting units for which this assessment concludes that it is more likely than not that the fair value is below the carrying value, goodwill is tested for impairment by determining the fair value of the reporting unit and comparing it to the carrying value of the net assets assigned to the reporting unit. If the fair value of the reporting unit exceeds its carrying value, goodwill is considered not impaired. If the carrying value of the reporting unit exceeds its fair value, we would record an impairment loss up to the difference between the carrying value and implied fair value.

Recent issued accounting pronouncements

For a description of accounting changes and recent accounting pronouncements, including the expected dates of adoption and estimated effects, if any, on our condensed consolidated financial statements, see Note 2, “Summary of significant accounting policies” in Item 1 of Part I of this Quarterly Report on Form 10-Q for a further discussion of the impairment analysis of acquisition related intangible assets.

Item 3. ***Quantitative and qualitative disclosures about market risk***

Interest rate sensitivity

We are exposed to market risk related to changes in interest rates. We had cash, cash equivalents, and marketable securities of $527.6 million and $477.9 million as of June 30, 2022 and September 30, 2021, respectively, which consisted of primarily of money market funds and marketable securities, largely composed of investment grade, short to intermediate term fixed income securities.

The primary objective of our investment activities is to preserve capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. To achieve our objectives, we maintain a portfolio of investments in a variety of securities of high credit quality and short-term duration, according to our board-approved investment policy. Our investments are subject to interest rate risk and could fall in value if market interest rates increase. A hypothetical 10% relative change in interest rates during any of the periods presented would not have a material impact on our condensed consolidated financial statements.

Foreign currency sensitivity

The majority of our transactions occur in U.S. dollars. However, we do have certain transactions that are denominated in currencies other than the U.S. dollar, primarily the Euro, Chinese Yuan, and British Pound, and we therefore are subject to foreign exchange risk. The fluctuation in the value of the U.S. dollar against other currencies affects the reported amounts of expenses, assets and liabilities primarily associated with a limited number of manufacturing activities.

We do not use derivative financial instruments for speculative trading purposes, nor do we hedge foreign currency exchange rate exposure in a manner that entirely offsets the effects of changes in foreign currency exchange rates. The counterparties to these forward foreign currency exchange contracts are creditworthy multinational commercial banks, which minimizes the risk of counterparty nonperformance. We regularly review our exposure and may, as part of this review, make changes to it.

Inflation risk

While we have experienced increased operating costs in recent periods, which we believe are due in part to the recent growth in inflation, we do not believe that inflation has had a material effect on our business, financial condition or results of operations. If our costs were to become subject to significant inflationary pressures, we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could adversely affect our business, financial condition and results of operations.

Item 4. ***Controls and Procedures***

Evaluation of Disclosure Controls and Procedures

Our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in the rules and forms of the Securities and Exchange Commission and to ensure that such information required to be disclosed is accumulated and communicated to management, including our principal executive and financial officers, as appropriate to allow timely decisions regarding required disclosure.

Because of the inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

The Chief Executive Officer ("CEO") and Chief Financial Officer ("CFO"), with the assistance from other members of management, have evaluated the effectiveness of our disclosure controls and procedures as of June 30, 2022, and based on their evaluation, the CEO and CFO concluded that the disclosure controls and procedures were not effective as of such date due to the material weaknesses in internal control over financial reporting that were disclosed in our Part II, Item 9A of our Annual Report on Form 10-K for the fiscal year ended September 30, 2021.

Notwithstanding the material weakness, the Company performed additional analysis and other post-closing procedures to determine its consolidated financial statements are prepared in accordance with generally accepted accounting principles. Accordingly, management believes that the unaudited condensed consolidated financial statements contained in this Quarterly Report on Form 10-Q fairly present, in all material respects, our financial condition, results of operations and cash flows for the periods presented in conformity with accounting principles generally accepted in the United States of America.

Previously Identified Material Weaknesses

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of annual or interim financial statements would not be prevented or detected on a timely basis.

Refer to the management report on internal control over financial reporting for the material weaknesses in Part II, Item 9A of our Annual Report on Form 10-K for the fiscal year ended September 30, 2021 and continue to exist as of June 30, 2022.

Remediation Plan of Material Weaknesses

As previously described in Part II, Item 9A of our Annual Report on Form 10-K for the fiscal year ended September 30, 2021, we are continuing to enhance our overall control environment and are devoting substantial effort by enhancing our manual or automated controls to remediate the identified material weaknesses. For a more comprehensive discussion of the remedial measures undertaken to address these material weaknesses, refer to Part II, Item 9A, "Remediation of Material Weaknesses," of our Annual Report on Form 10-K.

Additional changes and improvements may be identified and adopted as we continue to evaluate and implement our remediation plans. These material weaknesses will not be considered remediated until the applicable controls operate for a sufficient period of time and management has concluded, through testing, that the enhanced control is operating effectively.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the quarter ended June 30, 2022, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. Other information

Item 1. ***Legal proceedings***

We are subject to various legal proceedings and claims arising in the ordinary course of business. Although occasional adverse decisions or settlements may occur, management believes that the final disposition of such matters will not have a material adverse effect on our business, financial position, results of operations or cash flows.

Item 1A. ***Risk factors***

Risk Factor Summary

Investing in our common stock involves a high degree of risk. You should carefully consider all information in the Annual Report on Form 10-K and in subsequent reports we file with SEC prior to investing in our common stock. These risks are discussed more fully in the section titled "Risk Factors" below. These risks and uncertainties include, but are not limited to, the following:

- We are subject to risks associated with COVID-19;
- We have incurred net losses in every period to date, and we expect to continue to incur significant losses as we develop our business and may never achieve profitability;
- We may require additional financing to achieve our goals, and a failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product manufacturing and development and other operations;
- If we are unable to maintain adequate revenue growth or do not successfully manage such growth, our business and growth prospects will be harmed;
- Rapidly changing technology and extensive competition in synthetic biology could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities;
- The continued success of our business relies heavily on our disruptive technologies and products and our position in the market as a leading provider of synthetic DNA using a silicon chip;
- We depend on one single-source supplier for a critical component for our DNA synthesis process. The loss of this supplier or its failure to supply us with the necessary component on a timely basis, could cause delays in the future capacity of our DNA synthesis process and adversely affect our business;
- We depend on the continuing efforts of our senior management team and other key personnel. If we lose members of our senior management team or other key personnel or are unable to successfully retain, recruit and train qualified researchers, engineering and other personnel, our ability to develop our products could be harmed, and we may be unable to achieve our goals;
- We may engage in strategic transactions, including acquisitions and divestitures that could disrupt our business, cause dilution to our stockholders, reduce our financial resources, or prove not to be successful;
- Our products could in the future be subject to additional regulation by the U.S. Food and Drug Administration or other domestic and international regulatory agencies, which could increase our costs and delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations;
- If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our business;
- Our ability to protect our intellectual property and proprietary technology through patents and other means is uncertain; and
- If we are unable to obtain, maintain and enforce intellectual property protection, others may be able to make, use, or sell products and technologies substantially the same as ours, which could adversely affect our ability to compete in the market.

The following discussion of risk factors contains forward-looking statements. These risk factors may be important to understanding other statements in this Quarterly Report on Form 10-Q. The following information should be read in

conjunction with Part 1, Item 2 “Management’s discussion and analysis of financial condition and results of operations” and our unaudited condensed consolidated financial statements and related notes in Part I, Item 1, “Financial statements” of this Form 10-Q. The risks and uncertainties described below are not the only ones we face. Additional risk and uncertainties not presently known to us or that we presently deem less significant may also impair our business operations. If any of the events or circumstances described in the following risk factors actually occur, our business, operating results, financial condition, cash flows, and prospects could be materially and adversely affected. In that event, the market price of our common stock could decline, and you could lose part or all of your investment.

Our business, financial condition and operating results can be affected by a number of factors, whether currently known or unknown, including but not limited to those described below, any one or more of which could, directly or indirectly, cause our actual financial condition and operating results to vary materially from past, or from anticipated future, financial condition and operating results. Any of these factors, in whole or in part, could materially and adversely affect our business, financial condition, operating results, and stock price.

Because of the following factors, as well as other factors affecting our financial condition and operating results, past financial performance should not be considered to be a reliable indicator of future performance, and investors should not use historical trends to anticipate results or trends in future periods.

Risks related to our business

We are subject to risks associated with COVID-19.

Our global operations expose us to risks associated with COVID-19 that has spread globally. The continued spread of COVID-19 and the appearance of variants have led to disruption to business and economic activity and related uncertainty and volatility in the global capital markets, which increases the cost of, and adversely impacts access to, capital and increases economic uncertainty. The COVID-19 pandemic has caused an economic slowdown and will continue to impact business and economic activity globally. While our financial results for the six months ended June 30, 2022 have not been significantly affected by the COVID-19 outbreak, impacts from COVID-19 may, in the future, adversely affect our operations, supply chains, distribution systems and customer demand, including as a result of impacts associated with preventive and precautionary measures that we, other businesses and governments are taking or may take in the future. Due to the health risks caused by the COVID-19 pandemic to employees who operate and monitor our internal controls and due to the previous requirement and potential future requirements that a large number of employees work remotely, the COVID-19 pandemic impact on staffing could cause challenges for the effective operation of our internal controls. The unanticipated loss or unavailability of key employees due to the COVID-19 outbreak could harm our ability to operate or execute our business strategy. We may not be successful in finding and integrating suitable successors in the event of key employee loss or unavailability. The effectiveness of our sales teams may be negatively impacted by the lack of or reduction in travel resulting in their reduced ability to engage with decision-makers. Our NGS business may be negatively impacted by the sequencing capacity dedicated to COVID-19 related orders. Our shipments may be subject to higher freight costs. Our customers may delay payments for shipments received. A significant portion (approximately 19%) of our business is in the academic markets and the demand for our products in this customer segment has been affected by a reduction in their research grants and may continue to be so affected in the future. Supply chain disruptions may result in the lack of raw materials or component shortages, delay in the release of new products or deliveries of products or compressed margins due to an increase in material costs. Due to these impacts and measures, we may experience significant and unpredictable reductions in demand for our products and our customers may postpone or cancel their existing orders. Due to the COVID-19 pandemic, we and many other employers in the United States and Europe required all employees whose duties can be performed remotely, to work from home and not to go into our offices. This increase in employee telecommuting activity could increase the risk of a security breach of our information technology systems. If the COVID-19 pandemic continues and business and economic conditions persist or worsen, we may experience a decline in sales activities and customer orders or cancellations of existing orders, and it remains uncertain what impact these declines will have on future sales and customer orders once conditions begin to improve. In addition to existing travel restrictions, while many countries have re-opened their borders to U.S. travelers, countries may again impose or expand travel restrictions and impose or resume prolonged quarantines if there is a resurgence of COVID-19 cases, which would significantly impact our ability to support our business operations and customers in those locations and the ability of our employees to access their places of work to produce products, or significantly hamper our products from moving through the supply chain. For example, we may face a shortage of dry ice and other materials which are essential to delivering our products to our customers due to the increased demand for such products due to the COVID-19 vaccination distribution, COVID-19 testing and COVID-19 antibody development. As a result, given the evolving nature of the business and economic conditions in response to the virus, and the uncertainty as to how quickly and effectively mitigation measures, such as vaccines, will be widely available and adopted by the public, the COVID-19 pandemic may negatively affect our revenue growth, and it is uncertain how materially COVID-19 will affect our global operations if these impacts persist or worsen over an extended period of time. Any of these impacts would have an adverse effect on our business, financial

condition and results of operations, and at this point, the extent of the impact of COVID-19 remains uncertain. In addition, our ability to raise capital in the future may also be negatively affected.

We have incurred net losses in every period to date, and we expect to continue to incur significant losses as we develop our business and may never achieve profitability.

We have incurred net losses each year since inception and have generated limited revenue from product sales to date. We expect to incur increasing costs as we grow our business. We cannot be certain if or when we will produce sufficient revenue from our operations to support our costs. Even if profitability is achieved, we may not be able to sustain profitability. We incurred net losses of $152.1 million, $139.9 million and $107.7 million for the years ended September 30, 2021, 2020 and 2019, respectively. As of June 30, 2022, we had an accumulated deficit of $777.3 million. We expect to incur substantial losses and negative cash flow for the foreseeable future. We may incur significant losses in the future for a number of reasons, many of which are beyond our control, including the other risks described in this Form 10-Q, the market acceptance of our products, business and economic conditions resulting from the ongoing COVID-19 pandemic, future product development, and our market penetration and margins. In addition, inflationary pressure could adversely impact our financial results by increasing operating costs. We may not fully offset these cost increases by raising prices for our products and services, which could result in downward pressure on our margins. Further, our clients may choose to reduce their business with us if we increase our pricing.

We may require additional financing to achieve our goals, and a failure to obtain this necessary capital when needed on acceptable terms, or at all, could force us to delay, limit, reduce or terminate our product manufacturing and development and other operations.

Since our inception, substantially all of our resources have been dedicated to the development of our DNA synthesis platform and our sample preparation kit for NGS. We believe that we will continue to expend substantial resources for the foreseeable future as we continue to expand our production capabilities and enter additional markets we may choose to pursue, including new COVID-19 testing products, pharmaceutical biologics drug discovery and digital data storage in DNA. These expenditures are expected to include costs associated with research and development, increasing manufacturing and supply capabilities as well as marketing and selling existing and new products. In addition, other unanticipated costs may arise.

We expect that our existing cash and cash equivalents will be sufficient to fund our planned operating expenses, capital expenditure requirements and debt service payments through at least the next 12 months. However, our operating plan may change as a result of factors currently unknown to us, and as a result, we have sought and may in the future need to seek additional funds sooner than planned, through public or private equity or debt financings or other sources, such as strategic collaborations. In addition, we may seek additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. Such financing may result in dilution to stockholders, imposition of debt covenants and repayment obligations, or other restrictions that may adversely affect our business.

Our future capital requirements depend on many factors, including:

- the number and characteristics of any additional products or manufacturing processes we develop or acquire to serve new or existing markets;
- the scope, progress, results and costs of researching and developing future products or improvements to existing products or manufacturing processes, including increasing our manufacturing capabilities;
- the cost of manufacturing our DNA synthesis equipment and tools, our NGS sample preparation kits, and any future products we successfully commercialize;
- our ability to establish and maintain strategic collaborations, licensing or other arrangements and the financial terms of such agreements;
- the costs of expanding our sales and marketing capabilities in the United States and in other geographies;
- any lawsuits related to our products or commenced against us or any regulatory actions or proceedings commenced;
- the expenses needed to attract and retain skilled personnel;

- the costs associated with being a public company;
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patent claims, including litigation costs and the outcome of such litigation; and
- the timing, receipt and amount of sales of, or royalties on, any future approved products, if any.

Additional funds may not be available when we need them, on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to:

- delay, limit, reduce or terminate our manufacturing, research and development activities; or
- delay, limit, reduce or terminate our establishment of sales and marketing capabilities or other activities that may be necessary to generate revenue and achieve profitability.

If we are unable to maintain adequate revenue growth or do not successfully manage such growth, our business and growth prospects will be harmed.

We have experienced significant revenue growth in a short period of time. We may not achieve similar growth rates in future periods. Investors should not rely on our operating results for any prior periods as an indication of our future operating performance. To effectively manage our anticipated future growth, we must continue to maintain and enhance our manufacturing, sales, financial and customer support administration systems, processes and controls. Failure to effectively manage our anticipated growth could lead us to over-invest or under-invest in development, operational, and administrative infrastructure; result in weaknesses in our infrastructure, systems, or controls; give rise to operational mistakes, losses, loss of customers, productivity or business opportunities; and result in loss of employees and reduced productivity of remaining employees.

Our continued growth could require significant capital expenditures and might divert financial resources from other projects such as the development of new products and services. As additional products are commercialized, we may need to incorporate new equipment, implement new technology systems, or hire new personnel with different qualifications. Failure to manage this growth or transition could result in turnaround time delays, higher manufacturing costs, declining product quality, deteriorating customer service, and slower responses to competitive challenges. A failure in any one of these areas could make it difficult for us to meet market expectations for our products and could damage our reputation and the prospects for our business.

If our management is unable to effectively manage our anticipated growth, our expenses may increase more than expected, our revenue could decline or grow more slowly than expected and we may be unable to implement our business strategy. The quality of our products may suffer, which could negatively affect our reputation and harm our ability to retain and attract customers.

Our quarterly and annual operating results and cash flows have fluctuated in the past and might continue to fluctuate, causing the value of our common stock to decline substantially.

Numerous factors, many of which are outside our control, may cause or contribute to significant fluctuations in our quarterly and annual operating results. These fluctuations may make financial planning and forecasting difficult. In addition, these fluctuations may result in unanticipated decreases in our available cash, which could negatively affect our business and prospects. In addition, one or more of such factors may cause our revenue or operating expenses in one period to be disproportionately higher or lower relative to the others. As a result, comparing our operating results on a period-to-period basis might not be meaningful. You should not rely on our past results as indicative of our future performance. Moreover, our stock price might be based on expectations of future performance that are unrealistic or that we might not meet and, if our revenue or operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially.

Our operating results have varied in the past. As a result, our operating results could be unpredictable, particularly on a quarterly basis. In addition to other risk factors listed in this section, some of the important factors that may cause fluctuations in our quarterly and annual operating results are further described in “Risk factors—Risks relating to owning our stock.”

In addition, a significant portion of our operating expense is relatively fixed in nature, and planned expenditures are based in part on expectations regarding future revenue. Accordingly, unexpected revenue shortfalls might decrease our gross

margins and could cause significant changes in our operating results from quarter to quarter. If this occurs, the trading price of our common stock could fall substantially.

If we are unable to attract new customers and retain and grow sales from our existing customers, our business will be materially and adversely affected.

In order to grow our business, we must continue to attract new customers and retain and grow sales from our existing customers on a cost-effective basis. To do this, we aim to attract new and existing buyers of synthetic DNA and NGS tool kits, convert makers of synthetic DNA into buyers of synthetic DNA, monetize our antibody discovery platform by entering into partnerships and achieve widespread market acceptance by delivering both our current product offerings and new products and technologies at low-cost, with high-quality, reliable turn-around times and throughput, superior e-commerce services and effective technical support. We cannot guarantee that our efforts to provide these key requirements will be consistently acceptable to, and meet the performance expectations of, our customers and potential customers. If we are unable to successfully attract and retain customers, our business, financial position and results of operations would be negatively impacted.

If we, or our partners or suppliers, experience a significant disruption in, or breach in security of, information technology systems, or fail to implement new systems and software successfully, our business could be adversely affected. Cyberattacks and security vulnerabilities could lead to reduced revenue, increased costs, liability claims, or harm to our reputation or competitive position.

We rely on several centralized information technology systems throughout our company to provide products, keep financial records, process orders, manage inventory, process shipments to customers and operate other critical functions. In addition, we currently generate a growing portion of our revenue through sales on our e-commerce platform. We manage our website and e-commerce platform internally and as a result any compromise of our security or misappropriation of proprietary information could have a material adverse effect on our business, financial condition and results of operations. We rely on encryption and authentication technology licensed from third parties to provide the security and authentication necessary to effect secure Internet transmission of confidential information, such as credit and other proprietary information. We announced on February 12, 2020 that our information security management system received ISO 27001:2013 certification, an information security standard published by the International Organization for Standardization (ISO), the world's largest developer of voluntary international standards, and the International Electrotechnical Commission. Even though our information security management system received ISO 27001:2013 certification, our, and our partners' or suppliers', information technology systems have been and may still be susceptible to damage, disruptions or shutdowns due to power outages, hardware failures, computer viruses, cyberattacks such as phishing, social engineering, ransomware and other malware attacks, telecommunication failures, user errors, catastrophes or other unforeseen events. Our, or our partners' or suppliers' information technology systems also may experience interruptions, delays or cessations of service or produce errors in connection with system integration, software upgrades or system migration work that takes place from time to time. If we were to experience a prolonged system disruption in the information technology systems that involve our interactions with customers or suppliers, including negatively impacting our order fulfillment and order entry on our e-commerce platform, it could result in the loss of sales and customers and significant incremental costs, which could adversely affect our business. In addition, security breaches of our, or our partners' or suppliers', information technology systems could result in the misappropriation or unauthorized disclosure of confidential information belonging to us or to our employees, partners, customers or suppliers, which could result in our suffering significant financial or reputational damage. The costs related to significant security breaches or disruptions could be material and exceed the limits of the cybersecurity insurance we maintain against such risks. Further, such a breach may require notification to governmental agencies, the media or individuals pursuant to various federal and state privacy and security laws. We would also be exposed to a risk of litigation and potential liability, which could materially adversely affect our business, results of operations and financial condition.

Our actual operating results may differ significantly from our guidance.

From time to time, we may release guidance in our quarterly earnings conference calls, quarterly earnings releases, or otherwise, regarding our future performance that represents our management's estimates as of the date of release. This guidance, which includes forward-looking statements, is based on projections prepared by our management. This guidance is not prepared with a view toward compliance with published guidelines of the American Institute of Certified Public Accountants (AICPA) regarding projections or the SEC regarding forward-looking statements, and neither our independent registered public accounting firm nor any other independent expert or outside party compiles or examines the projections. Accordingly, no such person will express any opinion or any other form of assurance with respect to the projections.

Projections are based upon a number of assumptions and estimates that, while presented with numerical specificity, are inherently subject to significant business, economic and competitive uncertainties and contingencies, many of which are

beyond our control and are based upon specific assumptions with respect to future business decisions, some of which will change. Our aim is to state possible outcomes as high and low ranges to provide a sensitivity analysis as variables are changed but are not intended to imply that actual results could not fall outside of the suggested ranges. The principal reason that we release guidance is to provide a basis for our management to discuss our business outlook with analysts and investors. We do not accept any responsibility for any projections or reports published by any such third parties.

Guidance is necessarily speculative in nature, and it can be expected that some or all of the assumptions underlying the guidance furnished by us will not materialize or will vary significantly from actual results. Accordingly, our guidance is only an estimate of what management believes is realizable as of the date of release. Actual results may vary from our guidance and the variations may be material. In light of the foregoing, investors are urged not to rely upon our guidance in making an investment decision regarding our common stock.

Any failure to successfully implement our operating strategy or the occurrence of any of the events or circumstances set forth in the “Risk factors” section in this Form 10-Q could result in the actual operating results being different from our guidance, and the differences may be adverse and material.

Rapidly changing technology and extensive competition in synthetic biology could make the products we are developing and producing obsolete or non-competitive unless we continue to develop and manufacture new and improved products and pursue new market opportunities.

The synthetic biology industry is characterized by rapid and significant technological changes, frequent new product introductions and enhancements and evolving industry demands and standards. Our future success will depend on our ability to continually improve the products we are developing and producing, to develop and introduce new products that address the evolving needs of our customers on a timely and cost-effective basis and to pursue new market opportunities that develop as a result of technological and scientific advances. These new market opportunities may be outside the scope of our proven expertise or in areas which have unproven market demand, and the utility and value of new products and services developed by us may not be accepted in the markets served by the new products. Our inability to gain market acceptance of existing products in new markets or market acceptance of new products could harm our future operating results. Our future success also depends on our ability to manufacture these new and improved products to meet customer demand in a timely and cost-effective manner, including our ability to resolve manufacturing issues that may arise as we commence production of any new products we develop. Unanticipated difficulties or delays in replacing existing products with new products we introduce or in manufacturing improved or new products in sufficient quantities to meet customer demand could diminish future demand for our products and harm our future operating results.

In addition, there is extensive competition in the synthetic biology industry, and our future success will depend on our ability to maintain a competitive position with respect to technological advances. Technological development by others may result in our technologies, as well as products developed using our technologies, becoming obsolete. Our ability to compete successfully will depend on our ability to develop proprietary technologies and products that are technologically superior to and/or are less expensive than our competitors’ technologies and products. Our competitors may be able to develop competing and/or superior technologies and processes and compete more aggressively and sustain that competition over a longer period of time.

The continued success of our business relies heavily on our disruptive technologies and products and our position in the market as a leading provider or synthetic DNA using a silicon chip.

Our future profitability will depend on our ability to successfully execute and maintain a sustainable business model and generate continuous streams of revenue. Our business model is premised on the fact that we are the only DNA synthesis provider to synthesize DNA on a silicon chip on a large commercial level and the competitive advantages this creates. Our DNA synthesis methods, among other things, reduce the amount of raw materials required, speed up the synthesis process and deliver large volumes of high-quality synthetic DNA at low unit cost. However, if other competitors develop and commercialize a manufacturing process using a silicon chip or other similar technologies providing for the development of competitive synthetic DNA products at scale, this could be disruptive to our business model and could adversely affect our business prospects, financial condition and results of operations. If we are unable to convert a sufficient number of current manufacturers of synthetic DNA to buyers of our synthetic DNA, surpass our competitors regarding certain industry-related data points, and effectively implement our e-commerce platform which facilitates efficient order entry and fulfillment for our customers, our business, prospects, financial condition and results of operation will be adversely affected.

If we are unable to expand into adjacent addressable markets, our business may be materially and adversely affected.

Our future revenue growth and market potential may depend on our ability to leverage our DNA synthesis platform together with our custom libraries and other proprietary tools, such as our antibody discovery and optimization platform, in adjacent businesses such as pharmaceutical biologics drug discovery and digital data storage in DNA. There can be no assurance that we can continue to utilize our antibody libraries to accelerate the lead identification and lead optimization steps of antibody discovery or to discover more effective antibody drugs. In addition, our technology may not develop in a way that allows data storage in DNA to become cost competitive with traditional data storage media or in a way that otherwise enables us to address the markets opportunities that we believe exist. If we are unable to expand into adjacent addressable markets, our business, financial position and results of operations could be negatively impacted.

A significant portion of our sales depends on customers' budgets that may be subject to significant and unexpected variation, including seasonality.

Our customers' spending on research and development impacts our sales and profitability. Our customers and potential customers include chemicals/materials, diagnostics, therapeutics, food/agriculture, and their budgets can have a significant effect on the demand for our products. Their research and development budgets are based on a wide variety of factors, including factors beyond our control, such as:

- the allocation of available resources to make purchases;
- funding from government sources;
- funding from research grants;
- changes in government programs that provide funding to research institutions and companies;
- the spending priorities among various types of research equipment;
- policies regarding capital expenditures during recessionary periods;
- political climate or macroeconomic conditions, including economic downturns or market uncertainty or reduced spending in response to emergency situations, such as the outbreak of COVID-19;
- inability to raise sufficient funds in the capital markets;
- changes in the regulatory environment;
- differences in budgetary cycles;
- inflationary pressures; and
- market acceptance of relatively new technologies, such as ours.

Any decrease in spending or change in spending priorities of our customers and potential customers could significantly reduce the demand for our products. As we expand into new geographic markets, our revenue may be impacted by seasonal trends in the different regions, the seasonality of customer budgets in those regions and the mix of domestic versus international sales. In addition, access to capital markets is critical to many of our customers' ability to fund their operations, including purchase our products and services. Traditionally, biotechnology and life sciences companies have funded their research and development expenditures through raising capital in the equity markets. Declines and uncertainties in these markets in the past have severely restricted raising new capital and have affected companies' ability to fund existing research and development efforts. For example, in the third quarter of fiscal year 2022, we believe two customers cancelled orders due to funding concerns. Moreover, we have no control over the timing and volume of purchases by these customers and potential customers, and as a result, revenue from these sources may vary significantly due to factors that can be difficult to forecast. Any delay or reduction in purchases by customers and potential customers or our inability to forecast fluctuations in demand could harm our future operating results.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities from us.

We generally do not have long-term contracts with our customers requiring them to purchase any specified quantities from us and without such contracts our customers are not obligated to order or reorder our products. As a result, we cannot accurately predict our customers' decisions to reduce or cease purchasing our products. Additionally, even where we enter into contracts with our customers, there is no guarantee that such agreements will be negotiated on terms that are commercially favorable to us in the long-term. Therefore, if many of our customers were to substantially reduce their transaction volume or cease ordering products from us, this could materially and adversely affect our financial performance.

We may be unable to successfully increase our market share and expand our customer base.

Our ability to achieve profitability depends on our being able to increase our market share and expand our customer base. Although members of our sales and marketing teams have considerable industry experience and have engaged in marketing activities for our products, in the future we must expand our sales, marketing, distribution and customer support capabilities with the appropriate technical expertise to effectively market our products. Furthermore, it takes six to nine months to recruit, onboard and ramp sales personnel to full capability. New hires and sales personnel who operate at full capability are currently encountering challenging sales conditions due to business and operational difficulties arising from the COVID-19 pandemic, and may not be fully productive while these conditions persist or worsen. To perform sales, marketing, distribution and customer support successfully, we will face a number of risks, including that:

- we may not be able to attract, retain and manage the sales, marketing and service workforce necessary to publicize and gain broader market acceptance of our technology;
- the time and cost of establishing a specialized sales, marketing and service force for a particular product or service, which may be difficult to justify in light of the revenue generated;
- our field sales personnel may not be able to access our customers' premises which could delay the adoption and ordering of our products; and
- our sales, marketing and service force may be unable to initiate and execute successful commercialization activities with respect to new products or markets we may seek to enter.

If our sales and marketing efforts, or those of any third-party sales and distribution partners, are not successful, our new technologies and products may not gain market acceptance, which could materially impact our business operations.

The United Kingdom's ("U.K.") referendum to exit from the European Union ("E.U.") will continue to have uncertain effects and could adversely impact our business, results of operations and financial condition.

As a result of a referendum in June 2016, the U.K. withdrew from the E.U. ("Brexit") on January 31, 2020. It began a transition period in which to negotiate a new trading relationship for goods and services that ended on December 31, 2020. During the time since the June 2016 referendum, there have been periods of significant volatility in the global stock markets and currency exchange rates, as well as challenging market conditions in the U.K. On December 24, 2020, the U.K. and E.U. announced they had entered into a post-Brexit deal on certain aspects of trade and other strategic and political issues. We are continuing to evaluate our own risks and uncertainty related to ascertain what financial, trade, regulatory and legal implications this new Brexit trade deal could have on our U.K. and European business operations. This uncertainty also includes the impact on our customers' business operations and capital planning as well as the overall impact on the biotechnology industry in the U.K. While we have not experienced any direct material financial impact since the 2016 referendum, we cannot predict its future implications, and Brexit and its related effects could result in a negative impact on our consolidated financial position and results of operations.

If we are unable to expand our DNA synthesis manufacturing capacity, we could lose revenue and our business could be harmed.

In order to expand our manufacturing capacity of new and existing products, we need to either build additional internal manufacturing capacity, contract with one or more partners, or both. We are currently building a new production facility in Wilsonville, Oregon but we cannot guarantee that such a facility will allow us to effectively increase our manufacturing capacity which could impact our revenue growth. Our technology and the production process for our DNA synthesis equipment and tools are complex, involving specialized parts, and we may encounter unexpected difficulties in the

manufacture, improvement or increasing the capacity of our DNA synthesis equipment and tools, and addressing these difficulties may cause us to divert our time and resources from our other product offerings. There is no assurance that we will be able to continue to increase manufacturing capacity internally or that we will find one or more suitable partners to help us towards this objective, in order to meet the volume and quality requirements necessary for success in our existing and potential markets. Manufacturing and product quality issues may arise as we continue to increase the scale of our production. If our DNA synthesis equipment and tools do not consistently produce DNA products that meet our customers' performance expectations, our reputation may be harmed, and we may be unable to generate sufficient revenue to become profitable. Any delay or inability in expanding our manufacturing capacity could diminish our ability to develop or sell our products, which could result in lost revenue and materially harm our business, financial condition and results of operations.

We are substantially dependent on the success of our synthetic DNA products.

To date, we have invested a substantial portion of our efforts and financial resources towards the research and development and commercialization of our synthetic DNA products. The DNA synthesis business is very capital intensive, particularly for early-stage companies that do not have significant off-setting revenues and which are making significant investments in the commercialization and marketing of their products.

Substantially all of our revenue generated to date is from our synthetic DNA products. Our financial results are dependent on strengthening our core business while diversifying into other developing sectors such as pharmaceutical biologics drug discovery, creating useful DNA libraries and data storage.

Our near-term prospects, including our ability to finance our research and development activities and initiatives and enter into strategic collaborations, will depend heavily on the successful development and commercialization of our synthetic DNA products. These initiatives will be substantially dependent on our ability to generate revenue from our synthetic DNA products and obtain other funding necessary to support these initiatives. Our inability to continue these initiatives and initiate new research and development efforts could result in a failure to develop new products, improve upon existing products such that sectors like pharmaceutical biologics drug discovery, DNA library creation and data storage may never be fully developed, and expand our addressable market which could have a material and adverse impact on our sales, business, financial position and results of operations.

We depend on one single-source supplier for a critical component for our DNA synthesis process. The loss of this supplier or its failure to supply us with the necessary component on a timely basis, could cause delays in the future capacity of our DNA synthesis process and adversely affect our business.

We depend on one single-source supplier for a critical component for our DNA synthesis process. We do not currently have the infrastructure or capability internally to manufacture this component. Although we have a reserve of supplies and although alternative suppliers exist for this critical component of our synthesis process, our existing DNA synthesis manufacturing process has been designed based on the functions, limitations, features and specifications of the components that we currently utilize. We have a supply agreement in place with this component supplier. However, there can be no assurance that our supply of this component will not be limited, interrupted, or of satisfactory quality or continue to be available at acceptable prices. Additionally, we do not have any control over the process or timing of the acquisition or manufacture of materials by our supplier and cannot ensure that it will deliver to us the component we order on time, or at all.

The loss of this component provided by this supplier could require us to change the design of our manufacturing process based on the functions, limitations, features and specifications of the replacement components. In addition, the lead time needed to establish a relationship with a new supplier can be lengthy, and we may experience delays in meeting demand in the event we must switch to a new supplier. The time and effort to qualify a new supplier could result in additional costs, diversion of resources or reduced manufacturing yields, any of which would negatively impact our operating results. Further, we may be unable to enter into agreements with a new supplier on commercially reasonable terms, which could have a material adverse impact on our business. Our dependence on this single-source supplier exposes us to certain risks, including the following:

- our supplier may cease or reduce production or deliveries, raise prices or renegotiate terms;
- we may be unable to locate a suitable replacement on acceptable terms or on a timely basis, if at all;

- if there is a disruption to our single-source supplier's operations, and if we are unable to enter into arrangements with alternative suppliers, we will have no other means of completing our synthesis process until they restore the affected facilities or we or they procure alternative manufacturing facilities or sources of supply;

- delays caused by supply issues may harm our reputation, frustrate our customers and cause them to turn to our competitors for future projects; and

- our ability to progress our DNA synthesis products could be materially and adversely impacted if the single-source supplier upon which we rely were to experience a significant business challenge, disruption or failure due to issues such as financial difficulties or bankruptcy, issues relating to other customers such as regulatory or quality compliance issues, or other financial, legal, regulatory, operational or reputational issues.

Moreover, to meet anticipated market demand, our single-source supplier may need to increase manufacturing capacity, which could involve significant challenges. This may require us and our supplier to invest substantial additional funds and hire and retain the technical personnel who have the necessary experience. Neither we nor our supplier may successfully complete any required increase to existing manufacturing capacity in a timely manner, or at all.

We must continue to secure and maintain sufficient and stable supplies of raw materials. Any shortage of raw materials or materials necessary for our production capabilities may adversely affect our business.
Although historically we have not experienced price increases due to unexpected shortages in raw materials or other materials and other unanticipated events, there is no assurance that our supply of raw materials or other materials will not be significantly adversely affected in the future, which may in turn adversely affect our business, prospects, financial condition and results of operation.

In addition, as we grow, our existing suppliers may not be able to meet our increasing demand, and we may need to find additional suppliers. There is no assurance that we will always be able to secure suppliers who provide raw materials at the specification, quantity and quality levels that we demand (or at all) or be able to negotiate acceptable fees and terms of services with any such suppliers. Identifying a suitable supplier is an involved process that requires us to become satisfied with their quality control, responsiveness and service, financial stability and labor and other ethical practices. Even if we are able to expand existing sources, we may encounter delays in production and added costs as a result of the time it takes to train suppliers in our methods, products and quality control standards.

We typically do not enter into agreements with our suppliers but secure our raw materials and component parts we use in our equipment on a purchase order basis. Our suppliers may reduce or cease their supply of raw materials, component parts and outsourced services and products to us at any time in the future. If the supply of raw materials, component parts and the outsourced services and products is interrupted due to shortages or other reasons, our production processes may be delayed. If any such event occurs, our operation and financial position may be adversely affected.

A deterioration of our relationship with any of our suppliers, or problems experienced by these suppliers, could lead to shortages in our production capacity for some or all of our products. In such case, we may not be able to fulfill the demand of existing customers or supply new customers. In addition, shortages of raw materials or component parts or an increase in the cost of the raw materials or component parts we use could result in decreased revenue or could impair our ability to maintain or expand our business.

While we have experienced increased operating costs in recent periods, which we believe are due in part to the recent growth in inflation, we do not believe that inflation has had a material effect on our business, financial condition or results of operations. In the event of significant price increases for raw materials, we may have to pass the increased raw materials costs to our customers. However, we cannot assure you that we will be able to raise the prices of our products sufficiently to cover increased costs resulting from increases in the cost of our raw materials or overcome the interruption of a sufficient supply of qualified raw materials for our products. As a result, a price increase for our raw materials may negatively impact our business, financial position and results of operations.

We may encounter difficulties in managing our growth, and these difficulties could impair our profitability.

Currently, we are working simultaneously on multiple projects, expanding our capacity as well as targeting several market sectors, including activities in the chemicals/materials, diagnostics, therapeutics, food and data storage sectors. In addition, we work to renew our ISO certifications from time to time. These diversified operations and activities place significant demands on our limited resources and require us to substantially expand the capabilities of our technical, administrative and operational resources.

If we are unable to manage this growth and the periodic ISO recertification of our manufacturing facilities effectively, our shipments to our customers could be impacted, our time and resources could be diverted from other products and offerings and our business and operating results could suffer. In addition, if we fail to timely deliver products or meet quantity requirements under our contracts with customers, we may offer discounts to them, and customers' minimum purchase requirements, if applicable, may be reduced. Our ability to manage our operations and costs, including research and development, costs of components, manufacturing, sales and marketing, requires us to continue to enhance our operational, financial and management controls, reporting systems and procedures and to attract and retain sufficient numbers of talented employees. Failure to attract and retain sufficient numbers of talented employees will further strain our human resources and could impede our growth.

Our revenue, results of operations, cash flows and reputation in the marketplace may suffer upon the loss of a limited number of large customers.

We have derived, and believe we may continue to derive, a significant portion of our revenues from a limited number of large customers. Our customers may buy less of our products depending on their own technological developments, end-user demand for our products and internal budget cycles. In addition, existing customers may choose to produce some or all of their synthetic DNA requirements internally by using or developing manufacturing capabilities organically or by using capabilities from acquisitions of assets or entities from third parties with such capabilities. The loss of any significant customer or a significant reduction in the amount of product ordered by Ginkgo or any other significant customer would adversely affect our revenue, results of operations, cash flows and reputation in the marketplace.

We depend on the continuing efforts of our senior management team and other key personnel. If we lose members of our senior management team or other key personnel or are unable to successfully retain, recruit and train qualified researchers, engineering and other personnel, our ability to develop our products could be harmed, and we may be unable to achieve our goals.

Our future success depends upon the continuing services of members of our senior management team and scientific and engineering personnel. We are highly dependent on Dr. Emily Leproust, our President and Chief Executive Officer, who is employed “at will,” meaning we or she may terminate the employment relationship at any time. In particular, our researchers and engineers are critical to our future technological and product innovations, and we will need to hire additional qualified personnel. We may not be able to attract and retain qualified personnel on acceptable terms, or at all. In addition, to the extent we hire personnel from competitors, we may be subject to allegations that they have been improperly solicited or that they have divulged proprietary or other confidential information, or that their former employers own their research output. Our industry, particularly in the San Francisco Bay Area, is characterized by high demand and intense competition for talent, and the turnover rate can be high. We compete for qualified management and scientific personnel with other life science companies, academic institutions and research institutions, particularly those focusing on genomics.

Many of these employees could leave our company with little or no prior notice and would be free to work for a competitor. If one or more of our senior executives or other key personnel were unable or unwilling to continue in their present positions, we might not be able to replace them easily or at all, and other senior management may be required to divert attention from other aspects of the business. In addition, we do not have “key person” life insurance policies covering members of our management team or other key personnel except Dr. Leproust. While we conduct succession planning to identify the person(s) for key positions who possess the skills and capabilities to take on the responsibilities filled by our leaders, we cannot assure you that these strategies will successfully mitigate the loss of any key personnel. The loss of any of these individuals or our inability to attract or retain qualified personnel, including researchers, engineers and others, could prevent us from pursuing collaborations and adversely affect our product development and introductions, business growth prospects, results of operations and financial condition.

We may engage in strategic transactions, including acquisitions that could disrupt our business, cause dilution to our stockholders, reduce our financial resources, or prove not to be successful.

In the future, we may enter into transactions to acquire other businesses, products or technologies and our ability to do so successfully cannot be ensured. While historically we have not completed many acquisitions, we recently closed a few business acquisitions in the first quarter of 2022 and we are continuing to pursue opportunities in the life sciences industry that complement and expand our synthetic DNA product and our other products in both local and international markets. If we identify suitable opportunities, we may not be able to make such acquisitions on favorable terms or at all. Any

acquisitions we make may not strengthen our competitive position, and these transactions may be viewed negatively by customers or investors. We may decide to incur debt in connection with an acquisition or issue our common stock or other equity securities to the stockholders of the acquired company, as we did for the business acquisitions, which would reduce the percentage ownership of our existing stockholders. We could incur losses resulting from undiscovered liabilities of the acquired business that are not covered by any indemnification we may obtain from the seller. In addition, we may not be able to successfully integrate the acquired personnel, technologies and operations into our existing business in an effective, timely and non-disruptive manner. Acquisitions may also divert management attention from day-to-day responsibilities, increase our expenses and reduce our cash available for operations and other uses. In addition, we cannot guarantee that we will be able to fully recover the costs of such acquisitions or that we will be successful in leveraging any such strategic transactions into increased business, revenue or profitability. We also cannot predict the number, timing or size of any future acquisitions or the effect that any such transactions might have on our operating results.

From time to time, we may consider other strategic transactions, including collaborations. The competition for collaborators is intense, and the negotiation process is time-consuming and complex. Any new collaboration may be on terms that are not optimal for us, and we may not be able to maintain any new collaboration. Any such collaboration may require us to incur non-recurring or other charges, increase our near- and long-term expenditures and pose significant integration or implementation challenges or disrupt our management or business. These transactions would entail numerous operational and financial risks, including exposure to unknown liabilities, disruption of our business and diversion of our management's time and attention to manage a collaboration, incurrence of substantial debt or dilutive issuances of equity securities to pay transaction consideration or costs, higher than expected collaboration, acquisition or integration costs, write-downs of assets or goodwill or impairment charges, increased amortization expenses, difficulty and cost in facilitating the collaboration or combining the operations and personnel of any acquired business, impairment of relationships with key suppliers, manufacturers or customers of any acquired business due to changes in management and ownership and the inability to retain key employees of any acquired business. Antitrust or other competition laws may also limit our ability to acquire or work collaboratively with certain businesses or to fully realize the benefits of a strategic transactions to acquire or collaborate with other businesses. Accordingly, although there can be no assurance that we will undertake or successfully complete any collaborations, any transactions that we do complete may be subject to the foregoing or other risks and have a material and adverse effect on our business, financial condition, results of operations and prospects. Conversely, any failure to enter any collaboration or other strategic transaction that would be beneficial to us could delay the development and potential commercialization of our products and technologies.

As we expand our development and commercialization activities outside of the United States, we will be subject to an increased risk of inadvertently conducting activities in a manner that violates the U.S. Foreign Corrupt Practices Act and similar laws. If that occurs, we may be subject to civil or criminal penalties which could have a material adverse effect on our business, financial condition, results of operations and growth prospects.

We are subject to the U.S. Foreign Corrupt Practices Act, or the FCPA, which prohibits corporations and individuals from paying, offering to pay, or authorizing the payment of anything of value to any foreign government official, government staff member, political party, or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. We are also subject to the UK Anti-Bribery Act, which prohibits both domestic and international bribery, as well as bribery across both public and private sectors. We require that our employees review our Code of Business Conduct and Ethics, our Anti-Money Laundering Policy and our Anti-Corruption Policy on an annual basis.

In the course of establishing and expanding our commercial operations and complying with non-U.S. regulatory requirements, we will need to establish and expand business relationships with various third parties and we will interact more frequently with foreign officials, including regulatory authorities. Expanded programs to maintain compliance with such laws will be costly and may not be effective. Any interactions with any such parties or individuals where compensation is provided that are found to be in violation of such laws could result in substantial fines and penalties and could materially harm our business. Furthermore, any finding of a violation under one country's laws may increase the likelihood that we will be prosecuted and be found to have violated another country's laws. We require that our employees annually certify that they understand and will comply with our Code of Business Conduct and Ethics Policy, our Anti-Money Laundering Policy, our Anti-Corruption Policy as well as the UK Modern Slavery Act of 2015. Even so, if our business practices outside the United States are found to be in violation of the FCPA, UK Anti-Bribery Act, antitrust or other similar laws, we may be subject to significant civil and criminal penalties which could have a material adverse effect on our financial condition and results of operations.

We could engage in exporting or related activity that contravenes international trade restraints, or regulatory authorities could promulgate more far reaching international trade restraints, which could give rise to one or more of substantial legal liability, impediments to our business and reputational damage.

Our international business activities must comport with U.S. export controls and other international trade restraints, including the U.S. Department of Commerce's Export Administration Regulations and economic sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls.

We have established an international trade compliance program that encompasses best practices for preventing, detecting and addressing noncompliance with international trade restraints. Furthermore, to date our exports have not been licensable under export controls; however, we could fail to observe the compliance program requirements in a manner that leaves us in noncompliance with export controls or other international trade restraints. In addition, authorities could promulgate international trade restraints that impinge on our ability to pursue our business as planned. One or more of resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business and financial condition.

We operate in a highly competitive industry and if we are not able to compete effectively, our business and operating results will likely be harmed.

We face competition from a broad range of providers of core synthetic biology products such as GenScript Biotech Corporation, DNA Script, Inc., GENEWIZ (owned by Azenta), Integrated DNA Technologies, Inc. (owned by Danaher Corporation), DNA 2.0 Inc. d/b/a/ ATUM, GeneArt (owned by Thermo Fisher Scientific Inc.), Eurofins Genomics LLC, Sigma-Aldrich Corporation (owned by Charles River Laboratories, Inc.) (an indirect wholly owned subsidiary of Merck & Company), Promega Corporation, OriGene Technologies, Inc., Blue Heron Biotech, LLC and others. Additionally, we compete with both large and emerging providers in the life sciences tools and diagnostics industries focused on sample preparation for NGS such as Thermo Fisher Scientific Inc., Illumina, Inc., Integrated DNA Technologies, Inc., Agilent, and Roche NimbleGen, Inc. In the antibody discovery market, we compete with clinical research organizations, such as Curia, GenScript, and Genovac (formerly part of Aldevron, LLC), and antibody discovery biotechnology companies, such as Fair Journey/Iontas, Adimab, Distributed Bio (owned by Charles River), Ablexis, Specifica, OmniAb and AbCellera Biologics Inc. In the emerging field of DNA digital data storage, we compete with Catalog Technologies, Inc., Helixworks, Iridia, Inc., Roswell, Microsoft, Genscript, Molecular Assemblies, Ansa Biotechnologies, various academic institutions, and other emerging competitors.We may not be successful in maintaining our competitive position for a number of reasons. Some of our current competitors, as well as many of our potential competitors, have significant name recognition, substantial intellectual property portfolios, longer operating histories, greater resources to invest in new technologies, substantial experience in new product development and manufacturing capabilities and more established distribution channels to deliver products to customers than we do. These competitors may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements. Our competitors may develop disruptive technologies or products that are comparable or superior to our technologies and products. In light of these advantages, even though we believe our technology is superior to the products offerings of our competitors, current or potential customers might accept competitive products in lieu of purchasing our products. Increased competition is likely to result in continued pricing pressures, which could harm our sales, profitability or market share. Our failure to continue competing effectively or winning additional business with our existing customers could materially and adversely affect our business, financial condition or results of operations.

We may be subject to significant pricing pressures and if we are unable to pass on any cost increase to our customers, our business, financial position and results of operations could be adversely affected.

Over time, increasing customer demand for lower prices could force us to discount our products and result in lower margins. The impact may be further exacerbated if we are unable to successfully control production costs. In addition, if due to rising market prices, our suppliers increase prices or reduce discounts on their supplies, we may be unable to pass on any cost increase to our customers, thereby resulting in reduced margins and profits. Furthermore, changes in our product mix may negatively affect our gross margins. Overall, these pricing pressures may adversely affect our business, financial position and results of operations.

Ethical, legal and social concerns surrounding the use of genetic information could reduce demand for our technology.

Our products may be used to create DNA sequences of humans, agricultural crops and other living organisms. Our products could be used in a variety of applications, which may have underlying ethical, legal and social concerns. Governmental authorities could, for safety, social or other purposes, impose limits on or implement regulation of the use of gene synthesis. Such concerns or governmental restrictions could limit the use of our DNA synthesis products, which could have a material adverse effect on our business, financial condition and results of operations. In addition, public perception about the safety and environmental hazards of, and ethical concerns over, genetically engineered products and processes could influence public acceptance of our technologies, products and processes. These concerns could result in increased expenses, regulatory scrutiny, delays or other impediments to our programs.

We use biological and hazardous materials that require considerable expertise and expense for handling, storage and disposal and may result in claims against us.

We work with materials, including chemicals, biological agents, and compounds and DNA samples that could be hazardous to human health and safety or the environment. Our operations also produce hazardous and biological waste products. Federal, state and local laws and regulations govern the use, generation, manufacture, storage, handling and disposal of these materials and wastes. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental laws and regulations may restrict our operations. If we do not comply with applicable regulations, we may be subject to fines and penalties.

In addition, we cannot eliminate the risk of accidental injury or contamination from these materials or wastes, which could cause an interruption of our commercialization efforts, research and development programs and business operations, as well as environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations. Furthermore, environmental laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. While our property insurance policy provides limited coverage in the event of contamination from hazardous and biological products and the resulting cleanup costs, we do not currently have any additional insurance coverage for legal liability for claims arising from the handling, storage or disposal of hazardous materials.

Accordingly, in the event of contamination or injury, we could be liable for damages or penalized with fines in an amount exceeding our resources and our operations could be suspended or otherwise adversely affected.

We could develop DNA sequences or engage in other activity that contravenes biosecurity requirements, or regulatory authorities could promulgate more far reaching biosecurity requirements that our standard business practices cannot accommodate, which could give rise to substantial legal liability, impede our business and damage our reputation.

The Federal Select Agent Program, or the FSAP, involves rules administered by the Centers for Disease Control and Prevention and Toxins and the Animal and Plant Health Inspection Service that regulate possession, use and transfer of biological select agents and toxins that have the potential to pose a severe threat to public, animal or plant health or to animal or plant products.

We have established a comprehensive biosecurity program under which we follow biosafety and biosecurity best practices and avoid DNA synthesis activities that implicate FSAP rules; however, we could err in our observance of compliance program requirements in a manner that leaves us in noncompliance with FSAP or other biosecurity rules. In addition, authorities could promulgate new biosecurity requirements that restrictions our operations. One or more resulting legal penalties, restraints on our business or reputational damage could have material adverse effects on our business and financial condition.

Third parties may use our products in ways that could damage our reputation.

After our customers have received our products, we do not have any control over their use and our customers may use them in ways that are harmful to our reputation as a supplier of synthetic DNA products. In addition, while we have established a biosecurity program designed to comply with biosafety and biosecurity requirements and perform export control screening in an effort to ensure that third parties do not obtain our products for malevolent purposes, we cannot guarantee that these preventative measures will eliminate or reduce the risk of the domestic and global opportunities for the misuse of our products. Accordingly, in the event of such misuse, our reputation, future revenue and operating results may suffer.

Any damage to our reputation or brand may materially and adversely affect our business, financial condition and results of operations.

We believe that developing and maintaining our brand is important to our success and that our financial success is influenced by the perception of our brand by our customers. Furthermore, the importance of our brand recognition may become even greater to the extent that competitors offer more products similar to ours. Many factors, some of which are beyond our control, are important to maintaining our reputation and brand. These factors include our ability to comply with ethical, social, product, labor and environmental standards. Any actual or perceived failure in compliance with such standards could damage our reputation and brand.

Because we are subject to existing and potential additional governmental regulation, the markets for our products may be narrowed.

We are subject, both directly and indirectly, to the adverse impact of existing and potential future government regulation of our operations and markets. For example, the export of our products is subject to strict regulatory control in a number of jurisdictions. The failure to satisfy export control criteria or obtain necessary clearances could delay or prevent the shipment of products, which could adversely affect our revenues and profitability. Moreover, the life sciences industry, which is currently the primary market for our technology, has historically been heavily regulated. There are, for example, laws in several jurisdictions restricting research in genetic engineering, which can operate to narrow our markets. Given the evolving nature of this industry, legislative bodies or regulatory authorities may adopt additional regulation that adversely affects our market opportunities. Our business is also directly affected by a wide variety of government regulations applicable to business enterprises generally and to companies operating in the life science industry in particular. Failure to comply with these regulations or obtain or maintain necessary permits and licenses could result in a variety of fines or other censures or an interruption in our business operations which may have a negative impact on our ability to generate revenues and could increase the cost of operating our business.

Our products could in the future be subject to additional regulation by the U.S. Food and Drug Administration or other domestic and international regulatory agencies, which could increase our costs and delay our commercialization efforts, thereby materially and adversely affecting our business and results of operations.

The FDA regulates medical devices, including in vitro diagnostics, or IVDs. IVDs are a category of medical devices that include reagents, instruments, and systems intended for use in diagnosis of disease or other conditions, including a determination of the state of health, in order to cure, mitigate, treat, or prevent disease or its sequelae. IVDs are intended for use in the collection, preparation, and examination of specimens taken from the human body. An RUO IVD product is an IVD product that is in the laboratory research phase of development. As such, an RUO IVD is not intended for use in clinical investigations or in clinical practice. Such RUO products do not require premarket clearance or approval from the FDA, provided that they are labeled “For Research Use Only. Not For Use In Diagnostic Procedures” pursuant to FDA regulations. Our IVD products are not intended for clinical or diagnostic use, and we market and label them as RUO. However, the FDA may disagree with our assessment that our products are properly marketed as RUO and may determine that our products are subject to pre-market clearance, approval, or other regulatory requirements. If the FDA determines that our products are subject to such requirements, we could be subject to enforcement action, including administrative and judicial sanctions, and additional regulatory controls and submissions for our tests, all of which could be burdensome.

In the future, certain of our products or related applications could be subject to additional FDA regulation. Even where a product is not subject to FDA clearance or approval requirements, the FDA may impose restrictions as to the types of customers to which we can market and sell our products. Such regulation and restrictions may materially and adversely affect our business, financial condition and results of operations. Other regulatory regimes that do not currently present material challenges but that could in the future present material challenges include export controls and biosecurity.

Many countries have laws and regulations that could affect our products and which could limit our ability to sell our products in those countries. The number and scope of these requirements are increasing. We may not be able to obtain regulatory approvals in such countries or may incur significant costs in obtaining or maintaining foreign regulatory approvals. For example, the European Union, or EU, is transitioning from the existing European Directive 98/79/EC on in vitro diagnostic medical devices, or IVD Directive (IVDD), to the In Vitro Diagnostic Device Regulation (EU) 2017/746, or IVDR, which imposes stricter requirements for the marketing and sale of medical devices, including in the area of clinical evaluation requirements, quality systems and post-market surveillance. The IVDR is expected to become effective in May 2022. It is likely that we will be impacted by this new regulation, either directly as a manufacturer of IVDs, or indirectly as a supplier to customers who are placing IVDs in the EU market for clinical or diagnostic use.

Complying with the requirements of the IVDR may require us to incur significant expenditures. Failure to meet these requirements could adversely impact our business in the EU and other regions that tie their product registrations or chemical regulations to the EU requirements.

Certain of our potential customers may require that we become certified under the Clinical Laboratory Improvement Amendments of 1988.

Although we are not currently subject to the Clinical Laboratory Improvement Amendment of 1988, or CLIA, we may in the future be required by certain customers to obtain a CLIA certification. CLIA, which extends federal oversight over clinical laboratories by requiring that they be certified by the federal government or by a federally approved accreditation agency, is designed to ensure the quality and reliability of clinical laboratories by mandating specific standards in the areas of personnel qualifications, administration and participation in proficiency testing, patient test management, quality control, quality assurance and inspections. If our customers require a CLIA certification, we will have to continually expend time,

money and effort to ensure that we meet the applicable quality and safety requirements, which may divert the attention of management and disrupt our core business operations.

Our manufacturing operations in the United States currently depend primarily on one facility. If this facility is destroyed or we experience any manufacturing difficulties, disruptions, or delays, this could limit supply of our product or adversely affect our ability to sell products or conduct our clinical trials, and our business would be adversely impacted.

While we are in the process of building out a second manufacturing facility in Wilsonville, Oregon, a substantial portion of our manufacturing currently takes place at our headquarters in South San Francisco, California. If regulatory, manufacturing, or other problems require us to discontinue production at this facility, we will not be able to manufacture our synthetic genes, oligo pools or NGS tool or create our DNA libraries, which would adversely impact our business. If this facility or the equipment in it is significantly damaged or destroyed by fire, flood, power loss, or similar events, or is shut down for health and safety or other reasons, we may not be able to quickly or inexpensively replace our manufacturing capacity or replace the facility at all. In the event of a temporary or protracted loss of this facility or equipment, we might not be able to transfer manufacturing to another third party. Even if we could transfer manufacturing from one facility to another, the shift would likely be expensive and time-consuming, particularly if we were to maintain the current manufacturing standards procedures at such alternative facility.

Natural disasters, public health crises, political crises, and other catastrophic events or other events outside of our control may damage our facilities or the facilities of third parties on which we depend, and could impact our ability to sell products.

Our headquarters in South San Francisco is located near known earthquake fault zones and is vulnerable to damage from earthquakes. An earthquake or other natural disaster or power shortages or outages could disrupt operations or impair critical systems at our headquarters or at any of our other facilities throughout the world. We, our suppliers, third-party service providers and customers are vulnerable to damage from natural disasters, including fire, floods or monsoons, power loss, communications failures, public health crises, such as pandemics and epidemics, political crises, such as terrorism, war, political instability or other conflict and similar events. If any disaster were to occur, our ability to operate our business at any of our facilities could be seriously, or potentially completely, impaired. In addition, the nature of our activities could cause significant delays in our research programs and commercial activities and make it difficult for us to recover from a disaster. The insurance we maintain may not be adequate to cover our losses resulting from disasters or other business interruptions. Accordingly, an earthquake or other disaster could materially and adversely harm our ability to conduct business.

Delivery of our products could be delayed or disrupted by factors beyond our control, and we could lose customers as a result.

We rely on third-party carriers for the timely delivery of our products. As a result, we are subject to carrier disruptions and increased costs that are beyond our control, including travel restrictions, employee strikes, inclement weather and increased fuel costs. Any failure to deliver products to our customers in a timely and accurate manner may damage our reputation and brand and could cause us to lose customers. If our relationship with any of these third-party carriers is terminated or impaired or if any of these third parties are unable to deliver our products, the delivery and acceptance of our products by our customers may be delayed which could harm our business and financial results. The failure to deliver our products in a timely manner may harm our relationship with our customers, increase our costs and otherwise disrupt our operations.

Doing business internationally creates operational and financial risks for our business.

During our fiscal years ended September 30, 2021, 2020 and 2019, 42%, 36%, and 34%, respectively, of our revenue was generated from customers located outside of the United States. In connection with our growth strategy, we intend to further expand in international markets. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources. If we fail to coordinate and manage these activities effectively, our business, financial condition or results of operations could be adversely affected. International sales entail a variety of risks, including longer payment cycles and difficulties in collecting accounts receivable outside of the United States, currency exchange fluctuations, challenges in staffing and managing foreign operations, tariffs and other trade barriers, (including tariffs enacted and proposed by the U.S. government on various imports from China and by the Chinese government on certain U.S. goods), unexpected changes in legislative or regulatory requirements of foreign countries into which we sell our products, difficulties in obtaining export licenses or in overcoming other trade barriers, laws and business practices favoring local companies, political and economic instability,

difficulties protecting or procuring intellectual property rights, and restrictions resulting in delivery delays and significant taxes or other burdens of complying with a variety of foreign laws.

Changes in the value of the relevant currencies may affect the cost of certain items required in our operations. Changes in currency exchange rates may also affect the relative prices at which we are able to sell products in the same market. Our revenue from international customers may be negatively impacted as increases in the U.S. dollar relative to our international customers' local currency could make our products more expensive, impacting our ability to compete. Our costs of materials from international suppliers may increase if in order to continue doing business with us they raise their prices as the value of the U.S. dollar decreases relative to their local currency. Foreign policies and actions regarding currency valuation could result in actions by the United States and other countries to offset the effects of such fluctuations. The recent global financial downturn has led to a high level of volatility in foreign currency exchange rates and that level of volatility may continue, which could adversely affect our business, financial condition or results of operations.

Our ability to use our net operating loss carryforwards to offset future taxable income may be subject to certain limitations.

In general, under Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, a corporation that undergoes an "ownership change" is subject to limitations on its ability to use its pre-change net operating loss carryforwards, or NOLs, to offset future taxable income. We have experienced at least one ownership change in the past, and we may experience ownership changes in the future. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change under Section 382 of the Code. Furthermore, our ability to use NOLs of companies that we may acquire in the future may be subject to limitations. For these reasons, we may not be able to use a material portion of the NOLs reflected on our balance sheet, even if we attain profitability.

The enactment of legislation implementing changes in taxation of international business activities, the adoption of other corporate tax reform policies, or changes in tax legislation or policies could impact our future financial position and results of operations.

Corporate tax reform, base-erosion efforts and tax transparency continue to be high priorities in many tax jurisdictions where we intend to have business operations. As a result, policies regarding corporate income and other taxes in numerous jurisdictions are under heightened scrutiny and tax reform legislation is being proposed or enacted in a number of jurisdictions. For example, the Tax Cuts and Jobs Act of 2017, or the Tax Act, signed into law on December 22, 2017, adopting broad U.S. corporate income tax reform, among other things, reduced the U.S. corporate income tax rate, but imposed base-erosion prevention measures on non-U.S. earnings of U.S. entities as well as a one-time mandatory deemed repatriation tax on accumulated non-U.S. earnings of U.S. entities.

In addition, many countries are beginning to implement legislation and other guidance to align their international tax rules with the Organization for Economic Co-operation and Development's Base Erosion and Profit Shifting recommendations and action plan that aim to standardize and modernize global corporate tax policy, including changes to cross-border tax, transfer-pricing documentation rules, and nexus-based tax incentive practices.

Such legislative initiatives may materially and adversely affect our plans to expand internationally and may negatively impact our financial condition and results of operations generally.

Our inability to collect on our accounts receivable by a significant number of customers may have an adverse effect on our business, financial condition and results of operations.

Sales to our customers are generally made on open credit terms. Management maintains an allowance for potential credit losses. If our customers' cash flow, working capital, financial conditions or results of operations deteriorate, they may be unable or even unwilling to pay trade receivables owed to us promptly or at all. As a result, we could be exposed to a certain level of credit risk. If a major customer experiences, or a significant number of customers experience, financial difficulties, the effect on us could be material and have an adverse effect on our business, financial condition and results of operations.

Risks related to being a public company

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our business.

As a public company, we are required to comply with Section 404 of the Sarbanes Oxley Act of 2002 ("SOX"), which requires, among other things, that companies maintain disclosure controls and procedures to ensure timely disclosure of material information, and that management review the effectiveness of those controls on a quarterly basis. Because we ceased to be an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act") with our transition to large accelerated filer status as of September 30, 2020, we are also now subject to Section 404(b) of SOX, which requires that our independent registered public accounting firm provide an attestation report on the effectiveness of our internal control over financial reporting in the Annual Report on Form 10-K for the year ended September 30, 2021, among other additional requirements. Effective internal controls are necessary for us to provide reliable financial reports and to help prevent fraud, and our management and other personnel devote a substantial amount of time to these compliance requirements. These rules and regulations also increase our legal and financial compliance costs and make some activities more time-consuming and costly.

As disclosed in Part II—Item 9A, "Controls and Procedures", of the Annual Report on Form 10-K, we identified material weaknesses in our internal control over financial reporting related to controls surrounding our journal entry process, revenue order entry process, and information technology general controls. As a result, management concluded that our internal control over financial reporting was not effective as of September 30, 2021. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement in a company's annual or interim financial statements will not be prevented or detected on a timely basis. The material weaknesses identified in Item 9A in the Annual Report on Form 10-K did not result in any misstatement of our financial statements for any period presented. We have designed and have begun implementation of a remediation plan for these material weaknesses. However, our remediation efforts may be inadequate, and we may in the future discover other areas of our internal controls that require remediation.

We cannot be certain that we will be able to maintain adequate controls over our financial processes and reporting in the future. If we fail to maintain effective internal controls, investors may lose confidence in the accuracy and completeness or our financial reports, the market price of our securities may be negatively affected, and we could be subject to sanctions or investigation by regulatory authorities, such as the SEC or Nasdaq.

The requirements of being a public company may strain our resources and require a substantial amount of management's attention.

As a public company, we are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, the Nasdaq listing requirements and other applicable securities rules and regulations. The SEC and other regulators have continued to adopt new rules and regulations and make additional changes to existing regulations that require our compliance. Stockholder activism, the current political environment, and the current high level of government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact, in ways we cannot currently anticipate, the manner in which we operate our business. Compliance with these rules and regulations may cause us to incur additional accounting, legal and other expenses. We also incur costs associated with corporate governance requirements, including requirements under securities laws, as well as rules and regulations implemented by the SEC and Nasdaq, particularly as a large accelerated filer. These rules and regulations have increased our legal and financial compliance costs and we devote significant time to comply with these requirements. We are currently evaluating and monitoring developments with respect to these rules and regulations, and we cannot predict or estimate the amount of additional costs we may incur or the timing of such costs.

Risks related to our intellectual property

Our ability to protect our intellectual property and proprietary technology through patents and other means is uncertain.

Our commercial success depends in part on our ability to protect our intellectual property and proprietary technologies. We rely on patent protection, where appropriate and available, as well as a combination of copyright, trade secret and trademark laws, and nondisclosure, confidentiality and other contractual restrictions to protect our proprietary technology. However, these legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep any competitive advantage.

As of June 30, 2022, we own 37 issued U.S. patents and 27 issued international patents; three in China, three in Europe, seven in South Korea, four in Taiwan, five in Japan, one in Eurasia, one in Singapore, one in Israel, one in Hong Kong and one in Australia. There are 321 pending patent applications, including 94 in the United States, 204 international applications, and 23 applications filed under the Patent Cooperation Treaty. Additionally, we have exclusively licensed a patent portfolio containing 10 issued patents, including one U.S. patent and nine international patents, and 13 pending

applications, including three in the U.S. and ten international applications. We have also licensed a patent portfolio containing two pending applications, including one in the US and one PCT. We have further licensed another patent portfolio containing two issued US patents, three international patents, and five pending applications (one in the US and four international applications).

Several patent applications covering our technologies have been filed recently. We cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent, or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or, if applicable in the future, licensed to us could deprive us of rights necessary for the practice of our technologies or the successful commercialization of products that we may develop. Since patent applications in the United States and most other countries are confidential for a period of time after filing, we cannot be certain that we were the first to file any patent application related to our technologies or products. Furthermore, an interference proceeding can be provoked by a third party or instituted by the U.S. Patent and Trademark Office, or the USPTO, to determine who was the first to invent any of the subject matter covered by the patent claims of our applications.

Patent law can be highly uncertain and involve complex legal and factual questions for which important principles remain unresolved. In the United States and in many international jurisdictions, policy regarding the breadth of claims allowed in patents can be inconsistent. The U.S. Supreme Court and the Court of Appeals for the Federal Circuit have made, and will likely continue to make, changes in how the patent laws of the United States are interpreted. Similarly, international courts have made, and will likely continue to make, changes in how the patent laws in their respective jurisdictions are interpreted. We cannot predict future changes in the interpretation of patent laws or changes to patent laws that might be enacted into law by U.S. and international legislative bodies.

If we are unable to obtain, maintain and enforce intellectual property protection, others may be able to make, use, or sell products and technologies substantially the same as ours, which could adversely affect our ability to compete in the market.

We may not pursue or maintain patent protection for our products in every country or territory in which we sell our products and technologies. In addition, our pending U.S. and foreign patent applications may not issue as patents or may not issue in a form that will be sufficient to protect our proprietary technology and gain or keep our competitive advantage. Any patents we have obtained or do obtain may be subject to re-examination, reissue, opposition or other administrative proceedings, or may be challenged in litigation, and such challenges could result in a determination that the patent is invalid or unenforceable.

Patents have a limited lifespan. Patent terms may be shortened or lengthened by, for example, terminal disclaimers, patent term adjustments, supplemental protection certificates, and patent term extensions. Although extensions may be available, the life of a patent, and the protection it affords, is limited. Patent term extensions and supplemental protection certificates, and the like, may be impacted by the regulatory process and may not significantly lengthen patent term. Non-payment or delay in payment of patent fees or annuities, delay in patent filings or delay in extension filing, whether intentional or unintentional, may also result in the loss of patent rights important to our business. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case. In addition, certain countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to other parties. Furthermore, many countries limit the enforceability of patents against other parties, including government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of any patents.

We cannot be certain that the steps we have taken will prevent unauthorized use or unauthorized reverse engineering of our technology. In addition, competitors may be able to design alternative methods or devices that avoid infringement of our patents. To the extent our intellectual property, including licensed intellectual property, offers inadequate protection, or is found to be invalid or unenforceable, we are exposed to a greater risk of direct competition. If our intellectual property does not provide adequate protection against our competitors' products, our competitive position could be adversely affected, as could our business. Both the patent application process and the process of managing patent disputes can be time consuming and expensive.

Monitoring unauthorized use of our intellectual property is difficult and costly. From time to time, we review our competitors' products, and may in the future seek to enforce our patents or other rights against potential infringement. However, the steps we have taken to protect our proprietary rights may not be adequate to prevent misappropriation of our intellectual property. We may not be able to detect unauthorized use of, or take appropriate steps to enforce, our intellectual property rights. We cannot guarantee that any of our patent searches or analyses, including but not limited to the identification of relevant patents, the scope of patent claims or the expiration of relevant patents, are complete or thorough,

nor can we be certain that we have identified each and every third-party patent and pending application in the United States and abroad that is relevant to or necessary for the commercialization of our products in any jurisdiction. For example, U.S. applications filed before November 29, 2000 and certain U.S. applications filed after that date that will not be filed outside the United States remain confidential until patents issue. Patent applications in the United States and elsewhere are published approximately 18 months after the earliest filing for which priority is claimed. Therefore, patent applications covering our product candidates or technologies could have been filed by others without our knowledge. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our platform technologies, our products or the use of our products or technologies. The scope of a patent claim is determined by the interpretation of the law, the written disclosure in a patent and the patent's prosecution history. Our interpretation of the relevance or the scope of a patent or a pending application may be incorrect, which may negatively impact our ability to market our products. We may incorrectly determine that our products are not covered by a third-party patent or may incorrectly predict whether a third party's pending application will issue with claims of relevant scope. Our determination of the expiration date of any patent in the United States or abroad that we consider relevant may be incorrect, which may negatively impact our ability to develop and market our product candidates.

A court or other judicial body may decide that the patent we seek to enforce is invalid or unenforceable or may refuse to stop the other party from using the technology at issue on the grounds that the patent in question does not cover the technology in question. An adverse result in any litigation could put one or more of our patents at risk of being invalidated or interpreted narrowly. Some of our competitors may be able to devote significantly more resources to intellectual property litigation and may have significantly broader patent portfolios to assert against us if we assert our rights against them.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on our technologies and products in all countries throughout the world would be prohibitively expensive. In addition, the laws of some non-U.S. countries do not protect intellectual property rights to the same extent as the laws of the United States, and many companies have encountered significant problems in protecting and defending such rights in foreign jurisdictions. Consequently, we may not be able to prevent third parties from using our inventions in countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own technologies and products and may export otherwise infringing products to territories where we have patent protection. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

The legal systems of certain countries, particularly China and certain other developing countries, do not favor the enforcement of patents and other intellectual property protection, particularly those relating to biotechnology, which could make it difficult for us to stop the infringement of our patents. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business, put our own patents at risk of being invalidated or interpreted narrowly put our patent applications at risk of not being issued, and provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop. Certain countries in Europe and developing countries, including China and India, have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In those countries, we may have limited remedies if any of our patents are infringed or if we are compelled to grant a license to a third party, which could materially diminish the value of those patents. This could limit our potential revenue opportunities. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

If we are unable to protect the confidentiality of our proprietary information and know-how, the value of our technology and products could be adversely affected.

In addition to pursuing patents on our technology, we take steps to protect our intellectual property and proprietary technology by entering into confidentiality agreements and intellectual property assignment agreements with our employees, consultants, corporate partners and, when needed, our advisors. Such agreements may not be enforceable or may not provide meaningful protection for our trade secrets or other proprietary information in the event of unauthorized use or disclosure or other breaches of the agreements, and we may not be able to prevent such unauthorized disclosure. Monitoring unauthorized disclosure is difficult, and we do not know whether the steps we have taken to prevent such disclosure are, or will be, adequate. If we were to enforce a claim that a third party had illegally obtained and was using our

trade secrets, it would be expensive and time consuming, and the outcome would be unpredictable. In addition, courts outside the United States may be less willing to protect trade secrets.

Trade secrets and know-how can be difficult to protect as trade secrets, and know-how will over time be disseminated within the industry through independent development, the publication of journal articles, and the movement of personnel skilled in the art from company to company. In addition, because we may rely on third parties in the development of our products, we may, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, consulting agreements or other similar agreements with third parties prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. If we are unable to prevent unauthorized material disclosure of the intellectual property related to our technologies to third parties, we will not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business, results of operations and financial condition.

Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either lawfully or through breach of our agreements with third parties, independent development or publication of information by any of our third-party collaborators. Competitors could willfully infringe our intellectual property rights, design around our protected technology or develop their own competitive technologies that fall outside of our intellectual property rights. In addition, if any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent such competitor from using that technology or information to compete with us, which could harm our competitive position. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may have an adverse effect on our business and results of operations.

We may be involved in lawsuits to protect or enforce our patents and proprietary rights, to determine the scope, coverage and validity of others' proprietary rights, or to defend against third-party claims of intellectual property infringement that could require us to spend significant time and money and could prevent us from selling our products or impact our stock price.

Litigation may be necessary for us to enforce our patent and proprietary rights and/or to determine the scope, coverage and validity of others' proprietary rights. Litigation on these matters has been prevalent in our industry and we expect that this will continue. As the biotechnology and synthetic biology industries expand and more patents are issued, the risk increases that there may be patents issued to third parties that relate to our technologies and products of which we are not aware or that we may need to challenge to continue our operations as currently contemplated. In addition, our competitors and others may have patents or may in the future obtain patents and claim that the use of our products or processes infringes these patents. As we move into new markets and applications for our products and processes, incumbent participants in such markets may assert their patents and other proprietary rights against us as a means of slowing our entry into such markets or as a means to extract substantial license and royalty payments from us.

Patent infringement suits can be expensive, lengthy and disruptive to business operations and the outcome following legal assertions of invalidity and unenforceability is unpredictable. We could incur substantial costs and divert the attention of our management and technical personnel in prosecuting or defending against any claims and may harm our reputation. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. There can be no assurance that we will prevail in any suit initiated against us by third parties, successfully settle or otherwise resolve patent infringement claims. If we are unable to successfully settle claims on terms acceptable to us, we may be required to engage in or continue costly, unpredictable and time- consuming litigation and may be prevented from or experience substantial delays in marketing our technologies and products. Furthermore, parties making claims against us may be able to obtain injunctive or other relief, which could block our ability to develop, commercialize and sell products, and could result in the award of substantial damages against us, including treble damages and attorneys' fees and costs in the event that we are found to be a willful infringer of third-party patents.

In the event of a successful claim of infringement against us, we may be required to obtain one or more licenses from third parties, which we may not be able to obtain at a reasonable cost, if at all. We could, therefore, incur substantial costs related to royalty payments for licenses obtained from third parties, which could negatively affect our gross margins. In addition, we could encounter delays in product introductions while we attempt to develop alternative methods or products to avoid infringing third-party patents or proprietary rights. Defense of any lawsuit or failure to obtain any required licenses

on favorable terms could prevent us from commercializing our products, and the risk of a prohibition on the sale of any of our products could adversely affect our ability to grow and gain market acceptance for our products.

Suppliers of certain equipment and technology platforms on which we rely for our business may also be subject to patent infringement lawsuits. Even if we are not a named party in such lawsuits, if such suppliers are enjoined by a court to stop selling their equipment and technology platforms or supporting our existing equipment and technology platforms, we may not have an alternative source for such equipment and technology platforms, which may have a material adverse effect on our business.

We may also be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. We were previously involved in litigation of this kind with Agilent. While we have settled this dispute, there can be no assurance that future litigation will not be initiated by these parties. Some of our employees were previously employed at universities or biotechnology or biopharmaceutical companies, including our competitors or potential competitors. We may be subject to claims that these employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights. A loss of key research personnel or their work product could hamper our ability to commercialize, or prevent us from commercializing, our products and technologies. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and distraction to management and other employees.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. In addition, during the course of this kind of litigation, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. Finally, any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise the funds necessary to continue our operations.

In addition, our agreements with some of our suppliers, distributors, customers and other entities with whom we do business may require us to defend or indemnify these parties to the extent they become involved in infringement claims against us, including the claims described above. We could also voluntarily agree to defend or indemnify third parties in instances where we are not obligated to do so if we determine it would be important to our business relationships. If we are required or agree to defend or indemnify any of these third parties in connection with any infringement claims, we could incur significant costs and expenses that could adversely affect our business, operating results, or financial condition.

We may not be successful in obtaining or maintaining necessary rights to our products and technologies through acquisitions and in-licenses, and our intellectual property agreements with third parties may involve unfavorable terms or be subject to disagreements over contract interpretation.

We may find that our programs require the use of proprietary rights held by third parties, and the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. We may be unable to acquire or in-license compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify as necessary for our products and technologies. The licensing and acquisition of third-party intellectual property rights is a competitive area, and other companies may also be pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These companies may have a competitive advantage over us due to their size, financial resources and greater commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. Moreover, collaboration arrangements are complex and time-consuming to negotiate, document, implement and maintain. We may not be successful in our efforts to establish and implement collaborations or other alternative arrangements should we so choose to enter into such arrangements. We also may be unable to license or acquire third-party intellectual property rights on terms that would be favorable to us or would allow us to make an appropriate return on our investment.

We engage in discussions regarding other possible commercial and cross-licensing agreements with third parties from time to time. There can be no assurance that these discussions will lead to the execution of commercial license or cross-license agreements or that such agreements will be on terms that are favorable to us. Even if we are able to obtain a license to intellectual property of interest, we may not be able to secure exclusive rights, in which case others could use the same

rights and compete with us. In addition, if we enter into cross-licensing agreements, there is no assurance that we will be able to effectively compete against others who are licensed under our patents.

In addition, provisions in our licensing and other intellectual property agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could affect the scope of our rights to the relevant intellectual property or technology or affect financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

We have not yet registered some of our trademarks in all of our potential markets, and failure to secure those registrations could adversely affect our business.

Some of our trademark applications may not be allowed for registration, and our registered trademarks may not be maintained or enforced. In addition, in the U.S. Patent and Trademark Office and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings.

In addition, third parties may file first for our trademarks in certain countries. If they succeed in registering such trademarks, and if we are not successful in challenging such third-party rights, we may not be able to use these trademarks for marketing our products and technologies in those countries. Over the long-term, if we are unable to establish name recognition based on our trademarks, then our marketing abilities may be materially adversely impacted.

We depend on certain technologies that are licensed to us. We do not control these technologies and any loss of our rights to them could prevent us from selling our products.

We rely on, or may in the future rely on, licenses in order to be able to use various proprietary technologies that are material to our business. We do not or will not own the patents that underlie these licenses. Our rights to use the technology we license are subject to the negotiation of, continuation of and compliance with the terms of those licenses. In some cases, we do not or will not control the prosecution, maintenance, or filing of the patents to which we hold licenses, or the enforcement of these patents against third parties. Some of our patents and patent applications were either acquired from another company who acquired those patents and patent applications from yet another company or are licensed from a third party. For example, Twist Bioscience acquired Genome Compiler Corporation in 2016, and Genome Compiler had a non-exclusive license to U.S. Patent No—7,805,252 owned by DNA 2.0. Thus, these patents and patent applications are not written by us or our attorneys, and we did not have control over the drafting and prosecution. The former patent owners and our licensors might not have given the same attention to the drafting and prosecution of these patents and applications as we would have if we had been the owners of the patents and applications and had control over the drafting and prosecution. We cannot be certain that drafting and/or prosecution of the licensed patents and patent applications by the licensors have been or will be conducted in compliance with applicable laws and regulations or will result in valid and enforceable patents and other intellectual property rights.

Our rights to use the technology we license is subject to the validity of the owner’s intellectual property rights. Enforcement of our licensed patents or defense or any claims asserting the invalidity of these patents is often subject to the control or cooperation of our licensors. Legal action could be initiated against the owners of the intellectual property that we license. Even if we are not a party to these legal actions, an adverse outcome could harm our business because it might prevent these other companies or institutions from continuing to license intellectual property that we may need to operate our business.

Our licenses contain or will contain provisions that allow the licensor to terminate the license upon specific conditions. Our rights under the licenses are subject to or will be subject to our continued compliance with the terms of the license, including the payment of royalties due under the license.

Termination of these licenses could prevent us from marketing some or all of our products. Because of the complexity of our products and the patents we have licensed, determining the scope of the license and related royalty obligation can be difficult and can lead to disputes between us and the licensor. An unfavorable resolution of such a dispute could lead to an increase in the royalties payable pursuant to the license. If a licensor believed we were not paying the royalties due under the license or were otherwise not in compliance with the terms of the license, the licensor might attempt to revoke the license. If such an attempt were successful, we might be barred from producing and selling some or all of our products.

Risks relating to owning our common stock

We have never paid dividends on our capital stock and we do not intend to pay dividends for the foreseeable future. Consequently, any gains from an investment in our common stock will likely depend on whether the price of our common stock increases.

We have never declared or paid any dividends on our common stock and do not intend to pay any dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the operation of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their common stock after any price appreciation as the only way to realize any future gains on their investments. Furthermore, we are party to a credit agreement with SVB which contains negative covenants that limit our ability to pay dividends. For more information, see the section of this Form 10-Q captioned "Management's discussion and analysis of financial condition and results of operation—Liquidity and capital resources." For more information regarding the negative covenants in our loan and security agreement with Silicon Valley Bank, see "Risk factors—Our credit facility contains restrictions that limit our flexibility in operating our business."

Our charter documents and Delaware law could prevent a takeover that stockholders consider favorable and could also reduce the market price of our stock.

Our amended and restated certificate of incorporation and our amended and restated bylaws contain provisions that could delay or prevent a change in control of our company. These provisions could also make it more difficult for stockholders to elect directors and take other corporate actions. These provisions include:

- providing for a classified board of directors with staggered, three-year terms;
- authorizing our board of directors to issue preferred stock with voting or other rights or preferences that could discourage a takeover attempt or delay changes in control;
- prohibiting cumulative voting in the election of directors;
- providing that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- prohibiting the adoption, amendment or repeal of our amended and restated bylaws or the repeal of the provisions of our amended and restated certificate of incorporation regarding the election and removal of directors without the required approval of at least 66.67% of the shares entitled to vote at an election of directors;
- prohibiting stockholder action by written consent;
- limiting the persons who may call special meetings of stockholders; and
- requiring advance notification of stockholder nominations and proposals.

These provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management. In addition, the provisions of Section 203 of the Delaware General Corporate Law, or the DGCL, govern us. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time without the consent of our board of directors.

These and other provisions in our amended and restated certificate of incorporation and our amended and restated bylaws and under Delaware law could discourage potential takeover attempts, reduce the price investors might be willing to pay in the future for shares of our common stock and result in the market price of our common stock being lower than it would be without these provisions.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware and the federal district courts of the United States will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or other employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware is the sole and exclusive forum for any derivative action or proceeding brought on our behalf, any action asserting a breach of

fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, any action asserting a claim against us arising pursuant to any provisions of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws, any action or proceeding asserting a claim as to which the Delaware General Corporation Law confers jurisdiction upon the Court of Chancery of the State of Delaware or any action asserting a claim against us that is governed by the internal affairs doctrine, subject in each case to the Court of Chancery having personal jurisdiction over the parties named as defendants therein. The exclusive forum provision will not apply to suits brought to enforce any liability or duty created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. If a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we might incur additional costs associated with resolving such action in other jurisdictions.

In addition, our amended and restated certificate of incorporation provides that the U.S. federal district courts are the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. Our exclusive forum provision will not relieve us of our duties to comply with the federal securities laws and the rules and regulations thereunder, and our stockholders will not be deemed to have waived our compliance with these laws, rules and regulations.

The enforceability of similar federal court choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find our federal court choice of forum provision to be inapplicable or unenforceable. If a court were to find either of the choice of forum provisions contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions. Additionally, while the Delaware Supreme Court recently determined that choice of forum provisions for actions arising under the Securities Act are facially valid, a stockholder may nevertheless seek to bring such a claim arising under the Securities Act against us, our directors, officers, or other employees in a venue other than in the federal district courts of the United States of America. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated certificate of incorporation, and this may require significant additional costs associated with resolving such action in other jurisdictions.

General risk factors

The market price of our common stock is likely to be volatile and could fluctuate or decline, resulting in a substantial loss of your investment.

The market price of our common stock could be subject to wide fluctuations in response to, among other things, the factors described in this "Risk factors" section or otherwise, and other factors beyond our control, such as fluctuations in the valuations of companies perceived by investors to be comparable to us.

Furthermore, the stock markets have experienced price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market fluctuations, as well as general economic, systemic, political and market conditions, such as recessions, interest rate changes or international currency fluctuations, may negatively affect the market price of our common stock.

Factors that could cause the market price of our common stock to fluctuate significantly include:

- actual or anticipated fluctuations in our financial condition and operating results, including fluctuations in our quarterly and annual results;
- announcements of technological innovations by us or our competitors;
- overall conditions in our industry and the markets in which we operate;
- addition or loss of significant customers, or other developments with respect to significant customers;
- changes in laws or regulations applicable to our products;
- actual or anticipated changes in our growth rate relative to our competitors;

- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures or capital commitments;
- additions or departures of key personnel;
- competition from existing products or new products that may emerge;
- issuance of new or updated research or reports by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- disputes or other developments related to proprietary rights, including patents, litigation matters and our ability to obtain intellectual property protection for our technologies;
- announcement or expectation of additional financing efforts;
- sales of our common stock by us or our stockholders;
- the addition or removal of our stock to or from a stock index fund;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- the expiration of contractual lock-up agreements with our executive officers, directors and stockholders, which we have entered into and may enter into in the future from time to time;
- general economic and market conditions, including economic downturns or uncertainty in financial markets; and
- other factors beyond our control, such as terrorism, war, natural disasters and pandemics.

In the past, many companies that have experienced volatility in the market price of their stock have become subject to securities class action litigation. We may be the target of this type of litigation in the future. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could harm our business.

If securities or industry analysts do not publish research or reports about our business or publish negative reports about our business, our share price and trading volume could decline.

The trading market for our common stock will depend on the research and reports that securities or industry analysts publish about us or our business and we will not have any control over such analysts. If one or more of the analysts who cover us downgrade our shares or change their opinion of our shares, our share price would likely decline. If one or more of these analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause the stock price of our common stock to decline.

As we have in the past, we may sell common stock, convertible securities or other equity securities in one or more transactions at prices and in a manner, we determine from time to time. We have also issued and expect to issue common stock to employees and directors pursuant to our equity incentive plans. If we sell common stock, convertible securities or other equity securities in future transactions, or common stock is issued pursuant to equity incentive plans, investors may be materially diluted. New investors in such subsequent transactions could gain rights, preferences and privileges senior to those of holders of our common stock.

Claims for indemnification by our directors and officers may reduce our available funds to satisfy successful third-party claims against us and may reduce the amount of money available to us.

Our amended and restated certificate of incorporation and amended and restated bylaws provide that we will indemnify our directors and officers, in each case to the fullest extent permitted by Delaware law.

In addition, as permitted by Section 145 of the DGCL, our amended and restated bylaws and our indemnification agreements that we have entered into with our directors and officers provide that:

- we will indemnify our directors and officers for serving us in those capacities or for serving other business enterprises at our request, to the fullest extent permitted by Delaware law which provides that a corporation may indemnify such person if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the registrant and, with respect to any criminal proceeding, had no reasonable cause to believe such person's conduct was unlawful;

- we may, in our discretion, indemnify employees and agents in those circumstances where indemnification is permitted by applicable law;

- we are required to advance expenses, as incurred, to our directors and officers in connection with defending a proceeding, except that such directors or officers shall undertake to repay such advances if it is ultimately determined that such person is not entitled to indemnification;

- we will not be obligated pursuant to our amended and restated bylaws to indemnify a person with respect to proceedings initiated by that person against us or our other indemnitees, except with respect to proceedings authorized by our board of directors or brought to enforce a right to indemnification;

- the rights conferred in our amended and restated bylaws are not exclusive, and we are authorized to enter into indemnification agreements with our directors, officers, employees and agents and to obtain insurance to indemnify such persons; and

- we may not retroactively amend our amended and restated bylaw provisions to reduce our indemnification obligations to directors, officers, employees and agents.

Evolving expectations around corporate responsibility practices, specifically related to environmental, social and governance ("ESG") matters, may expose us to reputational and other risks.

Investors, stockholders, customers, suppliers and other third parties are increasingly focusing on ESG and corporate social responsibility endeavors and reporting. Certain institutional investors, investment funds, other influential investors, customers, suppliers and other third parties are also increasingly focused on ESG practices. Companies that do not adapt to or comply with the evolving investor or stakeholder expectations and standards, or which are perceived to have not responded appropriately, may suffer from reputational damage and result in the business, financial condition and/or stock price of a company being materially and adversely affected. Further, this increased focus on ESG issues may result in new regulations and/or third-party requirements that could adversely impact our business, or certain shareholders reducing or eliminating their holdings of our stock. Additionally, an allegation or perception that we have not taken sufficient action in these areas could negatively harm our reputation.

Item 2. ***Unregistered sales of equity securities and use of proceeds***

Sales of unregistered securities

None.

Item 3. ***Defaults upon senior securities***

None.

Item 4. ***Mine safety disclosures***

Not applicable.

Item 5. ***Other information***

Prior Senior Business Advisor Agreement with Nelson C. Chan

Prior to the date Nelson C. Chan joined our board of directors in May 2019, under a Senior Business Advisor Agreement dated November 1, 2017 with the Company (the "Legacy Advisor Agreement"), he provided data storage advisory services to us and was entitled to an option to purchase 7,070 shares of our common stock (the "Option Award").

Since Mr. Chan's appointment to our board of directors, he has provided no advisory services to the Company and has solely served as an independent director.

As previously disclosed in our proxy statements, at the time of Mr. Chan's appointment to our board of directors in May 2019, it was discovered that the Option Award had not been granted. To address our failure to fulfill our obligation to Mr. Chan under the Legacy Advisor Agreement without compromising his independence under Nasdaq rules, the Legacy Advisor Agreement was amended to ensure that the value of the payments he was entitled to receive under the Legacy Advisor Agreement would not exceed $120,000 in any rolling 12-month period. All payments under the Legacy Advisor Agreement were solely to provide Mr. Chan what he was owed prior to his appointment to our board of directors.

In August 2022, Mr. Chan received the final payment of $119,999 under the Legacy Advisor Agreement. Following this final payment, the Company will have no further obligations to Mr. Chan under the Legacy Advisory Agreement.

›Item 6. ***Exhibits***

Exhibit Number	Description	Filed / Furnished / Incorporated from Form
31.1	Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, Rule 13(a)-14(a)/15d-14(a), by President and Chief Executive Officer.	Filed herewith
31.2	Certification pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, Rule 13(a)-14(a)/15d-14(a), by Chief Financial Officer.	Filed herewith
32.1†	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by President and Chief Executive Officer.	Furnished herewith
32.2†	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, by Chief Financial Officer.	Furnished herewith
101	The following materials from Twist Bioscience Corp.'s Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, formatted in iXBRL (inline eXtensible Business Reporting Language): (i) the Condensed Consolidated Balance Sheets, (ii) the Condensed Consolidated Statements of Operations and Comprehensive Loss, (iii) the Condensed Consolidated Balance Sheets, (iv) the Condensed Consolidated Statements of Stockholders' Equity, (v) the Condensed Consolidated Statements of Cash Flows, and (vi) Notes to Unaudited Condensed Consolidated Financial Statements, tagged as blocks of text.	Filed herewith
104	The cover page from the Company's Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, formatted in Inline XBRL (included in Exhibit 101).	Filed herewith

† The certifications attached as Exhibits 32.1 and 32.2 that accompany this Quarterly Report on Form 10-Q are not deemed filed with the SEC and are not to be incorporated by reference into any filing of Twist Bioscience Corporation under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Quarterly Report on Form 10-Q, regardless of any general incorporation language contained in any filing.

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.

August 8, 2022

Twist Bioscience Corporation

By: /s/ James M. Thorburn

James M. Thorburn
Chief Financial Officer
(Authorized officer)

Exhibit 31.1

Certification of Principal Executive Officer
pursuant to
Exchange Act Rules 13a-14(a) and 15d-14(a),
as adopted pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, Emily M. Leproust, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Twist Bioscience Corporation for the quarter ended June 30, 2022;
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)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under 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. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report 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
    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (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.
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 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.

/s/ Emily M. Leproust
Emily M. Leproust
President and Chief Executive Officer
(Principal Executive Officer)

Date: August 8, 2022

Exhibit 31.2

Certification of Principal Financial Officer
pursuant to
Exchange Act Rules 13a-14(a) and 15d-14(a),
as adopted pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, James M. Thorburn, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Twist Bioscience Corporation for the quarter ended June 30, 2022;
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)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under 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. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report 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
    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (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.
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 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.

/s/ James M. Thorburn
James M. Thorburn
Chief Financial Officer

Date: August 8, 2022

Exhibit 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**

In connection with the Quarterly Report of Twist Bioscience Corporation (the "Company") on Form 10-Q for the quarterly period ended June 30, 2022, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Emily M. Leproust, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

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

Date: August 8, 2022

/s/ Emily M. Leproust
Emily M. Leproust
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 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

In connection with the Quarterly Report of Twist Bioscience Corporation (the "Company") on Form 10-Q for the quarterly period ended June 30, 2022, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, James M. Thorburn, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, that:

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

Date: August 8, 2022

/s/ James M. Thorburn
James M. Thorburn
Chief Financial Officer