**Filed Pursuant to Rule 424(b)(5)**
**Registration Statement No. 333-237539**

**PROSPECTUS SUPPLEMENT (To Prospectus dated April 10, 2020)**

# 1,040,000 Shares
# Common Stock
# Yield10 Bioscience, Inc.

We are offering 1,040,000 shares of our common stock, par value $0.01 per share (the "Common Stock").

Our Common Stock is listed on the Nasdaq Capital Market under the symbol "YTEN." The last reported sale price of our Common Stock on January 28, 2021 was $14.23 per share.

You should read this prospectus supplement and the accompanying prospectus and the documents incorporated by reference in this prospectus supplement carefully before you invest.

**See "Risk Factors" on page S-9 of this prospectus supplement to read about factors you should consider before buying shares of our Common Stock.**

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.**

As of January 28, 2021, the aggregate market value of our outstanding Common Stock held by non-affiliates was $50,369,269, based on 3,564,632 shares of outstanding Common Stock, of which 2,748,416 shares were held by non-affiliates, and a per share price of $18.34 per share, which was the last reported sale price of our Common Stock on the Nasdaq Capital Market on January 26, 2021. We have sold 1,991,835 shares of our Common Stock pursuant to General Instruction I.B.6. of Form S-3 during the prior 12 calendar month period that ends on and includes the date of this prospectus supplement.

We have retained Maxim Group LLC to act as underwriter in connection with this offering. We have agreed to pay the underwriter the fees set forth in the table below.

Jack W. Schuler, an existing stockholder, and entities affiliated with him has indicated an interest in purchasing an aggregate of 405,600 shares of our Common Stock in this offering. The underwriter will not receive a fee with respect to the aggregate purchase price of any shares of our Common Stock to be sold to Mr. Schuler and entities affiliated with him in this offering.

| | Per Share | Total |
|---|---|---|
| Public offering price | $12.25 | $12,740,000 |
| Underwriting fees(1) | $ 0.86 | $ 543,998 |
| Proceeds, before expenses, to Yield10 Bioscience | $11.39 | $12,196,002 |

(1) In addition, we have agreed to reimburse the underwriter's actual out-of-pocket expenses up to $40,000. See "Underwriting".

We expect that delivery of the shares of our Common Stock being offered pursuant to this prospectus supplement and the accompanying prospectus will be made to purchasers through the facilities of The Depository Trust Company on or about February 3, 2021.

# Maxim Group LLC

The date of this prospectus supplement is February 2, 2021.

## TABLE OF CONTENTS

### Prospectus Supplement



### Prospectus

## ABOUT THIS PROSPECTUS SUPPLEMENT

This document consists of two parts. The first part is this prospectus supplement, which describes the specific terms of the offering and other matters relating to us. The second part is the accompanying prospectus, which provides more general information about the securities we may offer from time to time, some of which may not apply to this offering of Common Stock. This prospectus supplement and the accompanying prospectus are part of a registration statement that we filed with the Securities and Exchange Commission (the "SEC") on April 1, 2020, which registration statement was declared effective on April 10, 2020. You should read both this prospectus supplement and the accompanying prospectus, together with the documents incorporated by reference and the additional information described under the heading "Where You Can Find More Information" in this prospectus supplement and the accompanying prospectus before making an investment decision.

To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus, on the other hand, the information contained in this prospectus supplement shall control. If any statement in this prospectus supplement conflicts with any statement in a document that has been incorporated herein by reference, then you should consider only the statement in the more recent document. You should assume that the information contained in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference is accurate only as of their respective dates.

We have not, and the underwriter has not, authorized any person to provide you with any information or to make any representation other than as contained in this prospectus supplement or in the accompanying prospectus and the information incorporated by reference herein and therein. We and the underwriter do not take any responsibility for, and can provide no assurance as to the reliability of, any information that others may provide you. The information appearing or incorporated by reference in this prospectus supplement and the accompanying prospectus is accurate only as of the date of this prospectus supplement or the date of the document in which incorporated information appears unless otherwise noted in such documents. Our business, financial condition, results of operations and prospects may have changed since those dates.

The distribution of this prospectus supplement and the accompanying prospectus and the offering of the Common Stock in certain jurisdictions may be restricted by law. We are not, and the underwriter is not, making an offer of the Common Stock in any jurisdiction where the offer is not permitted. Persons who come into possession of this prospectus supplement and the accompanying prospectus should inform themselves about and observe any such restrictions. This prospectus supplement and the accompanying prospectus do not constitute, and may not be used in connection with, an offer or solicitation by anyone in any jurisdiction in which such offer or solicitation is not authorized or in which the person making such offer or solicitation is not qualified to do so or to any person to whom it is unlawful to make such offer or solicitation.

## SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein contain forward-looking statements. All statements, other than statements of historical facts contained in this prospectus supplement, the accompanying prospectus and in the documents incorporated by reference herein, including statements regarding our efforts to develop and commercialize our products, anticipated yields and product performance, our short-term and long-term business strategies, market and industry expectations and future results of operations and financial position are forward-looking statements. In many cases, you can identify forward-looking statements by terms such as "may", "will", "should", "expect", "plan", "anticipate", "could", "intend", "target", "project", "contemplate", "believe", "estimate", "potential", "continue" or other similar words.

We based these forward-looking statements largely on our current expectations and projections about future events or trends that we believe may affect our business and financial performance. These forward-looking statements involve known and unknown risks and uncertainties that may cause our actual results, performance or achievements to materially differ from any future results, performance or achievements expressed or implied by these forward-looking statements. We have described in the "Risk Factors" section

and elsewhere in this prospectus supplement and in the documents incorporated by reference herein the material risks and uncertainties that we believe could cause actual results to differ from these forward-looking statements. Because forward-looking statements are inherently subject to risks and uncertainties, some of which we cannot predict or quantify, you should not rely on these forward-looking statements as guarantees of future results, performance or achievements.

The forward-looking statements in this prospectus supplement, the accompanying prospectus and in the documents incorporated by reference herein represent our views as of the date of the document in which the forward-looking statement appears. We undertake no obligation to update publicly, except to the extent required by law, any forward-looking statements for any reason to conform these statements to actual results or to changes in our expectations.

## PROSPECTUS SUMMARY

*This summary highlights some information from this prospectus. It may not contain all the information important to making an investment decision. You should read the following summary together with the more detailed information regarding our Company and the securities being sold in this offering, including "Risk Factors" and other information incorporated by reference herein.*

### Business Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company that is using its differentiated trait gene discovery platform, which we refer to as the Trait Factory, to develop improved Camelina varieties to produce proprietary products, and to produce other high value seed traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. Our goals are to efficiently develop and commercialize a high value crop products business based on developing superior varieties of Camelina for the production of feedstock oils, nutritional oils, and PHA bioplastics, and to license our yield traits to major seed companies for commercialization in commercial row crops, including corn, soybean and canola.

*Camelina sativa* (Camelina) is an annual oilseed plant in the mustard family that is native to Europe, and that we deploy as an essential component of our Trait Factory. It has several excellent agronomic traits, including low water and fertilizer input, drought resistance, and a short life cycle, making it suitable as a rotation crop in the U.S. northwest, and as a cover crop with corn and soybean in the U.S. Midwest. In addition, it produces a relatively abundant harvest of oil-containing seeds. For approximately ten years, Yield10 has been conducting research in Camelina, identifying and deploying new gene traits, evaluating the performance of these novel traits in field tests, developing PHA bioplastics in seed, and securing exclusive rights to omega-3 oils technology.

We are beginning to prepare for the commercial launch of our products business based on current Camelina varieties to supply oil and protein meal markets. We anticipate that this will be followed by the launch of two proprietary higher value products, omega-3 (DHA+EPA) oils, which we are developing pursuant to an agreement for technology in development with Rothamsted Research ("Rothamsted"), and PHA bioplastics. We expect the sequential launch of these products to allow us to establish the operating foundation of the commercial products business, to grow revenues and margins based on sales of omega-3 oil products and to generate cash flow to fund the commercialization of PHA bioplastics.

We are pursuing the development of elite Camelina germplasm exhibiting herbicide tolerance, disease resistance and other traits that will form a core Camelina germplasm foundation for deploying our product traits to reduce grower costs and increase value. Based on our research and development activities in Camelina, Yield10 has a pipeline of more than 10 novel yield traits currently in research and development. We have agreements in place for a number of our current yield trait gene candidates, including with the Bayer Crop Science division of Bayer AG ("Bayer"), GDM Seeds ("GDM"), Forage Genetics International, LLC, a division of Land O'Lakes, Inc. ("Forage Genetics") and JR Simplot Company ("Simplot"). These companies are currently progressing the development of Yield10 traits in soybean, forage sorghum, and potato, respectively. We expect to generate several proof points for our traits in various crops over the next two years and plan to find partners to license our traits for canola, corn and other crops as we generate additional data.

We believe the market opportunity for our Camelina varieties, proprietary products in development, and performance traits is significant. We are targeting uses for our Camelina products in applications such as: oils for animal and human nutrition; use as cover crops; feedstock oils for renewable diesel, omega-3 oils for aquaculture, and PHA bioplastics in a range of applications. Leading seed companies are the potential clients for our performance trait innovations in major crops. Each of these product targets is well-aligned with trends in food security, social responsibility, and sustainability, including the need for:

- *Low-carbon index feedstocks for renewable diesel biofuel;*
- *New sources of oil and protein meal for animal feed;*
- *Nutritional oils for human consumption;*

- *Land-based omega-3 fatty acid oils to replace diminishing world supplies of fish oil for aquaculture;*
- *Biobased, biodegradable bioplastics for feed, water treatment and to reduce plastic waste;*
- *Increasing the organic carbon content of soil in farming; and*
- *Performance traits to increase yield per acre of major agricultural crops.*

We are building a portfolio of intellectual property around our crop yield technology and traits. As of December 31, 2020, we owned or held exclusive rights to 22 patents issued or pending patent applications worldwide related to advanced technologies for increasing crop performance and composition traits in oils and PHA bioplastics. As part of our agreement with Rothamsted, we have exclusive rights to three patent filings for the production of EPA/DHA oil in Camelina.

**Risks Affecting Us**

Our business is subject to a number of risks and uncertainties that you should understand before making an investment decision. For example, we have a history of net losses and our business may not achieve commercial success. Furthermore, our technologies are in the early stages of development and we may never commercialize a technology or product that will generate meaningful, or any, revenues. A portion of our revenue to date has been from government grants. Over time, we expect our revenue to shift from being derived primarily from collaborations and government grants to royalties based on licensing of Yield10 traits and/or sales derived from niche crop products based on our technologies, but we may not be successful in achieving this transition. As of September 30, 2020, we had an accumulated deficit of $372.5 million. With the exception of 2012, we have incurred losses since our inception. We expect to have significant losses and negative cash flow for at least the next several years, as we incur additional costs and expenses for the continued development of our technology, including the ongoing expenses of research, development, commercialization and administration. The Company held unrestricted cash, cash equivalents and short-term investments of $11.8 million at September 30, 2020. Based on our cash forecasts, we believe these resources will be sufficient to fund our operations through the end of 2021. Risks are discussed more fully in the section entitled “Risk Factors” following this prospectus summary. These risks include, but are not limited to, the following:

- We have a history of net losses and our future profitability is uncertain.
- We will be required to raise additional funds to finance our operations and remain a going concern; we may not be able to do so when necessary, and/or the terms of any financings may not be advantageous to us.
- Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.
- Our technologies in the area of crop science are at a very early stage of development. We may never commercialize a technology or product that will generate meaningful, or any, revenues.
- A portion of our revenue to date has been generated from government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.
- Our government grants may subject us to government audits, which could expose us to penalties.
- Our crop science product development cycle is lengthy and uncertain and will depend heavily on future collaborative partners.
- Even if we or our collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.
- If ongoing or future field trials conducted by us or our collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.
- We may not be successful using our Camelina platform to develop and commercialize niche crops to produce specialty oils and/or PHA biomaterials.

- Consumer and government resistance to genetically modified organisms may negatively affect the ability to commercialize crops containing our traits, as well as our public image.
- We may not be able to obtain or maintain the necessary regulatory approvals for our products, which could restrict our ability to sell those products in some markets.
- If ongoing or future field trials conducted by us or our future collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.
- Competition in the market for traits and seeds is intense and requires continuous technological development, and, if we are unable to compete effectively, our financial results will suffer.
- Our business is subject to various government regulations and if we or our collaborators are unable to timely complete the regulatory process for our products in development, our or our collaborators' ability to market our traits could be delayed, prevented or limited.
- The products of third parties or the environment may be negatively affected by the unintended appearance of our yield trait genes.
- We rely on third parties to conduct, monitor, support, and oversee field trials and, in some cases, to maintain regulatory files for those products in development, and any performance issues by third parties, or our inability to engage third parties on acceptable terms, may impact our or our collaborators' ability to complete the regulatory process for or commercialize such products.
- If we lose key personnel or are unable to attract and retain necessary talent, we may be unable to develop or commercialize our products under development.
- Patent protection for our technologies is both important and uncertain.
- Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.
- Portions of our crop science technology are owned by or subject to retained rights of third parties.
- We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.
- The intellectual property landscape around genome editing technology, such as CRISPR, is highly dynamic and uncertain, and any resolution of this uncertainty could have a material adverse effect on our business.
- We rely in part on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could harm our business.
- Trading volume in our stock is low and an active trading market for our common stock may not be available on a consistent basis to provide stockholders with adequate liquidity. Our stock price may be extremely volatile, and our stockholders could lose a significant part of their investment.
- We may not be able to maintain the listing of our common stock on The Nasdaq Capital Market.
- Provisions in our certificate of incorporation and by-laws and Delaware law might discourage, delay or prevent a change of control of our company or changes in our management and, therefore, depress the trading price of our common stock.
- Concentration of ownership among our existing officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.
- Our financial condition, research and development efforts, and results of operations could be further adversely affected by the ongoing coronavirus outbreak.

**Corporate Information**

We were incorporated in Massachusetts in 1992 under the name Metabolix, Inc. In September 1998, we reincorporated in Delaware. We changed our name to Yield10 Bioscience, Inc. in January 2017 to reflect our

change in mission around innovations in agricultural biotechnology focused on developing disruptive technologies for step-change improvements in crop yield and niche crop products. Our corporate headquarters are located at 19 Presidential Way, Woburn, MA 01801, and our telephone number is +1 (617) 583-1700. Our website address is www.yield10bio.com. The information contained on our website or that can be accessed through our website is not part of this prospectus and investors should not rely on any such information in deciding whether to purchase our securities.

| THE OFFERING | |
|---|---|
| **Issuer** | Yield10 Bioscience, Inc. |
| **Common stock offered** | 1,040,000 shares |
| **Common stock to be outstanding after this offering** | 4,604,632 shares |
| **Use of proceeds** | We expect to receive net proceeds of approximately $12 million from this offering after deducting the underwriter fees and discounts and estimated offering expenses payable by us. We intend to use the net proceeds from this offering for general corporate purposes, including working capital. See "Use of Proceeds". |
| **Nasdaq Capital Market symbol** | YTEN |
| **Risk factors** | Investing in our securities involves a high degree of risk. See "Risk Factors" on page S-12 of this prospectus to read about factors that you should consider carefully before buying our securities. |

Jack W. Schuler, an existing stockholder, and entities affiliated with him has indicated an interest in purchasing an aggregate of 405,600 shares of our Common Stock in this offering.

The number of shares of Common Stock that will be outstanding after this offering is based on 3,564,632 shares outstanding as of January 28, 2021, and excludes:

- 469,408 shares of Common Stock issuable upon exercise of options to purchase our Common Stock outstanding as of January 28, 2021 at a weighted average exercise price of $27.98 per share;
- 8,500 shares of Common Stock issuable upon vesting of restricted stock units as of January 28, 2021;
- 39,623 shares of Common Stock reserved as of January 28, 2021 for future issuance under our 2018 Stock Option and Incentive Plan;
- 14,270 shares of Common Stock issuable upon exercise of warrants outstanding as of January 28, 2021 and issued pursuant to the Securities Purchase Agreement we entered into with certain investors on July 3, 2017 (which warrants became exercisable on January 7, 2018 at an exercise price of $201.60 per share and expire on January 7, 2024);
- 750 shares of Common Stock issuable upon exercise of immediately vested warrants outstanding as of January 28, 2021 and issued to an investor relations consultant on September 12, 2017 at an exercise price of $116.00 per share and which expire on September 11, 2024;
- 160,975 shares of Common Stock issuable upon exercise of vested Series A warrants outstanding as of January 28, 2021 pursuant to the Securities Purchase Agreement we entered into with certain investors on December 21, 2017 at an exercise price of $90.00 per share and which expire on December 21, 2022;
- 1,202,152 shares of Common Stock issuable upon exercise of Series A Warrants issued in concurrent public and private offerings in November 2019 and outstanding as of January 28, 2021 at an exercise price of $8.00 per share and which expire on May 19, 2022; and
- 1,238,727 shares of Common Stock issuable upon exercise of Series B Warrants issued in concurrent public and private offerings in November 2019 and outstanding as of January 28, 2021 at an exercise price of $8.00 per share and which expire on May 19, 2027.

## RISK FACTORS

*Our business is subject to numerous risks. We caution you that the following important factors, among others, could cause our actual results to differ materially from those expressed in forward-looking statements made by us or on our behalf in filings with the SEC, press releases, communications with investors and oral statements. Any or all of our forward-looking statements contained in this prospectus supplement and in any other public statements we make may turn out to be wrong. They can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties. Many factors mentioned in the discussion below will be important in determining future results. Consequently, no forward-looking statement can be guaranteed. Actual future results may differ materially from those anticipated in forward-looking statements. We undertake no obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosure we make in our reports filed with the SEC.*

### Risks Relating to our Financial Position

***We have a history of net losses and our future profitability is uncertain.***

We have recorded losses every year since our inception, with the exception of 2012. As of September 30, 2020, our accumulated deficit was $372.5 million. Since 1992, we have been engaged primarily in research and development and early-stage commercial activities. Because our crop science technology is at an early stage of development, we cannot be certain that the Yield10 Bioscience business will generate sufficient revenue to become profitable. We expect to continue to have significant losses and negative cash flow for at least the next several years, as we incur additional costs and expenses for the continued development of our technology, including the ongoing expenses of research, development, commercialization and administration. The amount we spend will impact our need for capital resources as well as our ability to become profitable and this will depend, in part, on the number of new technologies that we attempt to develop. We may not achieve any or all of these goals and, thus, we cannot provide assurances that we will ever be profitable or achieve significant, or any, product revenues.

***We will need to secure additional funding to finance our operations and may not be able to do so when necessary, and/or the terms of any financings may not be advantageous to us.***

As of September 30, 2020, we held unrestricted cash, cash equivalents and short-term investments of $11.8 million. On August 26, 2020, we completed a public offering of 835,000 shares of our common stock at a public offering price of $4.25 per share. In addition, the underwriter exercised its over-allotment option to purchase 116,835 shares of common stock at the same price for total gross proceeds of $4,045 before issuance costs of $425. The shares of common stock were offered by the Company pursuant to a registration statement on Form S-3 (File No. 333-237539), as initially filed with the SEC on April 1, 2020 and declared effective on April 10, 2020. Concurrent with the registered public offering described above, we completed a separate private placement offering of 396,450 shares of its common stock on August 26, 2020 to certain existing shareholders at the same $4.25 price offered to investors in the public offering. Proceeds from this private placement were $1,685.

In March 2019, we closed on a registered direct offering of our common stock, raising $2.6 million, net of offering costs, and in November 2019, we closed on a public offering and a concurrent private placement of our securities, raising $10.2 million, net of offering costs. Through September 30, 2020, we received an additional $1.7 million from investor exercises of outstanding warrants. We follow the guidance of Accounting Standards Codification ("ASC") Topic 205-40, *Presentation of Financial Statements-Going Concern*, in order to determine whether there is substantial doubt about the Company's ability to continue as a going concern for one year after the date its financial statements are issued. We believe that together with the proceeds of the registered offering and private placement completed in August 2020, we have sufficient cash and short-term investments to fund operations through the end of calendar 2021.

We continue to face significant challenges and uncertainties and, as a result, our available capital resources may be consumed more rapidly than currently expected due to any or all of the following:

- lower than expected revenues from grants and licenses related to our technologies;

- changes we may make to the business that affect ongoing operating expenses;
- further changes we may make to our business strategy;
- changes in our research and development spending plans; and
- other items affecting our forecasted level of expenditures and use of cash resources.

We will require additional capital resources to support the implementation of our business strategy and we may pursue one or more of a variety of financing options, including public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, as well as licensing or other collaborative arrangements. There can be no assurance that our financing efforts will be successful. If we are not able to secure such additional capital resources or otherwise fund our operations, we will be forced to explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

If we issue equity or debt securities to raise additional funds in the future, we may incur fees associated with such issuances, our existing stockholders may experience dilution from the issuance of new equity securities, we may incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. In addition, utilization of our net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), due to ownership changes resulting from equity financing transactions. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies or grant licenses on terms that are not favorable to us.

***We have changed our corporate strategy to focus on the crop science industry, and our technologies in this area are at a very early stage of development. We may never commercialize a technology or product that will generate meaningful, or any, revenues.***

In July 2016, our Board of Directors approved a plan to implement a strategic restructuring under which Yield10 Bioscience has become our core business. As part of the restructuring, we discontinued our biopolymer operations, eliminated positions in our biopolymer operations and corporate organization, and sold certain of our biopolymer business assets.

The crop science products and technologies we are currently developing as a result of our strategic repositioning are at a very early stage of development, and the process of developing them is lengthy and uncertain. In addition, our current management has limited experience in developing technologies for the crop science industry and has never commercialized a product or technology in this industry. We may never reach a point at which our efforts result in products that allow us to achieve revenue from their license or sale.

***There can be no assurance that we will be able to comply with the continued listing standards of The Nasdaq Capital Market.***

We cannot assure you that we will be able to comply with the standards that we are required to meet in order to maintain a listing of our common stock on The Nasdaq Capital Market ("Nasdaq"). Nasdaq listing rules require us to maintain certain closing bid price, stockholders' equity and other financial metric criteria in order for our common stock to continue trading on Nasdaq. For example, Nasdaq Listing Rule 5550(a)(4) requires companies to maintain a minimum of 500,000 publicly held shares. Nasdaq Listing Rule 5550(a)(2) requires listed securities to maintain a minimum bid price of $1.00 per share, and Listing Rule 5810(c)(3)(A) provides that a failure to meet the minimum bid price requirement exists if the deficiency continues for a period of 30 consecutive business days.

On June 25, 2019, we received a deficiency letter from Nasdaq which provided us a grace period of 180 calendar days, or until December 23, 2019, to regain compliance with the minimum bid price requirement. We subsequently received an additional 180 days (until June 22, 2020) to regain compliance with the requirement. On January 9, 2020, our stockholders approved an amendment to our Amended and Restated

Certificate of Incorporation, as amended, authorizing a reverse stock split of our common stock. A 1-for-40 ratio for the reverse stock split was subsequently approved by our Board of Directors, and the reverse stock split took effect on January 15, 2020. As a result of the reverse stock split, every forty shares of our common stock were automatically combined and converted into one issued and outstanding share of our common stock, with no change in the par value per share. As of January 30, 2020, we had regained compliance with the minimum bid price requirement.

***Currently, our primary source of our revenue is government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.***

Historically, a portion of our revenue has been generated from payments to us from government entities in the form of government grants, whereby we are reimbursed for certain expenses incurred in connection with our research and development activities, subject to our compliance with the specific requirements of the applicable grant, including rigorous documentation requirements. To the extent that we do not comply with these requirements, the expenses that we incur may not be reimbursed. Any of our existing grants or new grants that we may obtain in the future may be terminated or modified.

Our ability to obtain grants or incentives from government entities in the future is subject to the availability of funds under applicable government programs and approval of our applications to participate in such programs. The application process for these grants and other incentives is highly competitive. We may not be successful in obtaining any additional grants, loans or other incentives. A political focus on reducing spending at the U.S. federal and state levels may continue to reduce the scope and amount of funds dedicated to crop science products, if such funds will continue to be available at all. To the extent that we are unsuccessful in being awarded any additional government grants in the future, we would lose a potential source of revenue.

***Our government grants may subject us to government audits, which could expose us to penalties if we have failed to comply with the terms of the grants.***

We may be subject to audits by government agencies as part of routine audits of our activities funded by our government grants. As part of an audit, these agencies may review our performance, cost structures and compliance with applicable laws, regulations and standards and the terms and conditions of the grant. If any of our costs are found to be allocated improperly, the costs may not be reimbursed, and any costs already reimbursed for such contract may have to be refunded. Accordingly, an audit could result in a material adjustment to our results of operations and financial condition. Moreover, if an audit uncovers improper or illegal activities, we may be subject to civil and criminal penalties and administrative sanctions.

***Our financial condition and results of operations could be adversely affected by public health epidemics, including the ongoing coronavirus outbreak.***

A novel strain of coronavirus was reported to have originated in Wuhan, Hubei Province, China in December 2019, and has been rapidly spreading across the globe, including in the United States and Canada. Any outbreak of contagious disease such as the coronavirus or other adverse public health developments could have a material and adverse effect on our business operations. Such adverse effects could include quarantines, disruptions of or restrictions on our ability and/or the ability of our collaborators' personnel to travel or conduct normal business activities, as well as closures of our facilities or the facilities of our collaborators for an indefinite period of time (including shutdowns that may be requested or mandated by governmental authorities). Any temporary closures of facilities would likely affect our development efforts and operating results, and any disruption to the operations of our collaborators would likely impact our development efforts and operating results. The extent to which the coronavirus may impact our results will depend on future developments, which are highly uncertain and cannot be predicted, and on new information that may emerge concerning the severity of the coronavirus. However, current predictions suggest that the impact of sustained business closures and quarantines resulting from the coronavirus on the global economy will be severe, and this may have a material adverse effect on our business.

**Risks Relating to our Yield10 Bioscience Crop Science Program**

***The crop science product development cycle is lengthy and uncertain, and our progress will depend heavily on our ability to attract third-party investment in research under license agreements and on our ability to establish future collaborative partnerships to develop and commercialize our innovations.***

The technology and processes used in our crop science program and the application of our technology to enhance photosynthetic efficiency of crops are at an early stage of development. Research and development in the seed, agricultural biotechnology, and larger agriculture industries is expensive and prolonged and entails considerable uncertainty. Completion of development work with respect to our products will require a significant investment of both time and money, if it can be completed at all. We expect that collaborations with established agricultural industry companies will be required to successfully develop and commercialize our innovations. Our initial development strategy is to make it attractive for established agricultural industry companies to invest financial and technical resources to introduce our traits into their elite germplasm for event selection and evaluation under research licenses. For example, in 2017 we entered into a non-exclusive research license with Monsanto, which was subsequently acquired by Bayer AG ("Bayer"), pursuant to which we granted Monsanto a non-exclusive research license to evaluate our novel C3003 and C3004 yield traits in soybean. We expanded the agreement with Bayer in 2019 to cover a new discovery and intellectual property related to C3004. In 2018, we granted a non-exclusive research license to Forage Genetics, a subsidiary of Land O'Lakes, Inc., to evaluate five of our novel yield traits in forage sorghum. The traits included in the research license include C3003 as well as four traits from our GRAIN platform, C4001, C4002, C4003 and C4029. In 2019, we granted a non-exclusive research license to J.R. Simplot Company to evaluate C3003, C3004 and C4001 in potato. In 2020, we signed a non-exclusive research license with GDM for evaluation of seed yield traits in soybean, which will provide opportunities to explore additional Yield10 commercial crop performance traits with a leading seed market participant and potentially provide access to South American acreage in Argentina and Brazil. We may not be successful in establishing or maintaining suitable relationships with established agricultural industry companies for research licenses in the future, and there can be no assurance that any such relationships will result in future collaboration agreements to develop and commercialize our innovations, with terms that are satisfactory to us or at all. In addition, industry collaborators have significant resources and development capabilities and may develop products and technologies that compete with or negatively impact the development and commercialization of our technologies.

***Any potential collaborative partnerships that we may enter into in the future may not be successful, which could adversely affect our ability to develop and commercialize our innovations.***

We expect that collaborations with established agricultural industry companies will be required for us to successfully develop and commercialize our innovations. The agriculture industry is highly concentrated and dominated by a small number of large companies, which could impact efforts to form the collaborations that we will need in order to complete the development of our products. To the extent that we pursue such arrangements, we will face significant competition in seeking appropriate partners. Moreover, such arrangements are complex and time-consuming to negotiate, document, implement and maintain. We may not be successful in establishing or implementing such arrangements. The terms of any partnerships, joint ventures or other collaborative arrangements that we may establish may not be favorable to us.

The success of any future collaborative partnerships is uncertain and will depend heavily on the efforts and activities of our potential partners. Such arrangements are subject to numerous risks, including the risks that:

- our partners may have significant discretion in determining the efforts and resources that they will apply to the arrangement;
- our partners may not pursue the development and commercialization of our product candidates based on trial results, changes in their strategic focus, competing priorities, availability of funding, or other external factors;
- our partners may delay or abandon field trials, fail to conduct field trials that produce sufficient conclusory data, provide insufficient funding for field trials, or repeat or conduct new field trials;

- partners who have marketing, manufacturing and distribution rights with respect to a product may not commit sufficient resources to, or otherwise not perform satisfactorily in carrying out, these activities;
- to the extent that such arrangements provide for exclusive rights, we may be precluded from collaborating with others;
- our partners may not properly maintain or defend our intellectual property rights, or may use our intellectual property or proprietary information in a way that gives rise to actual or threatened litigation that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential liability;
- disputes may arise between us and a partner that causes the delay or termination of the research, development or commercialization of our current or future products, or that results in costly litigation or arbitration that diverts management attention and resources;
- such arrangements may be terminated, and, if terminated, may result in a need for additional capital for our independent pursuit of matters previously covered by such arrangement;
- our partners may own or co-own intellectual property that results from our arrangement; and
- a partner's sales and marketing activities or other operations may not be in compliance with applicable laws resulting in civil or criminal proceedings.

***Our crop science program may not be successful in developing commercial products.***

We and our potential future collaborators may spend many years and dedicate significant financial and other resources developing traits that will never be commercialized. Seeds containing the traits that we develop may never become commercialized for any of the following reasons:

- our traits may not be successfully validated in the target crops;
- our traits may not achieve our targeted yield improvements;
- we may not be able to secure sufficient funding to progress our traits through development and commercial validation;
- our traits may not have the desired effects sought by future collaborators for the relevant crops;
- development and validation of traits, particularly during field trials, may be adversely affected by environmental or other circumstances beyond our control;
- we or our future collaborators may be unable to obtain the requisite regulatory approvals for the seeds containing our traits, to the extent regulatory approvals are required;
- competitors may launch competing or more effective seed traits or seeds;
- a market may not exist for seeds containing our traits or such seeds may not be commercially successful;
- future collaborators may be unable to fully develop and commercialize products containing our seed traits or may decide, for whatever reason, not to commercialize such products;
- we may be unable to patent our traits in the necessary jurisdictions; and
- our efforts to develop niche crop products based on our Camelina platform, including Omega-3 oils, specialty oils, PHB biomaterials and PHA bioplastics are in the early stages and may not be successful.

If any of these things were to occur, it could have a material adverse effect on our business and our results of operations. Research and development in the crop science industry is expensive and prolonged and entails considerable uncertainty. Because of the stringent product performance and safety criteria applied in development of crop science products, products currently under development may neither survive the development process nor ultimately receive any requisite regulatory approvals that may be needed to market such products. Even when such approvals are obtained, there can be no assurance that a new product will

be commercially successful. In addition, research undertaken by competitors may lead to the launch of competing or improved products, which may affect sales of any products that we are able to develop.

***Even if we or our future collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.***

Our strategy depends upon our or our future collaborators' ability to incorporate our traits into a wide range of crops in significant markets and geographies. Even if we or our future collaborators are able to develop commercial products that incorporate our traits, any such products may not achieve commercial success for one or more of the following reasons, among others:

- products may fail to be effective in particular crops, geographies, or circumstances, limiting their commercialization potential;
- our competitors, or competitors of our collaborators, may launch competing or more effective traits or products;
- significant fluctuations in market prices for agricultural inputs and crops could have an adverse effect on the value of our traits;
- farmers are generally cautious in their adoption of new products and technologies, with conservative initial purchases and proof of product required prior to widespread deployment, and accordingly, it may take several growing seasons for farmers to adopt our or our collaborators' products on a large scale;
- we may not be able to produce high-quality seeds in sufficient amounts to meet demand; and
- we may not be able to secure the financial or other resources needed to achieve commercial success.

Our financial condition and results of operations could be materially and adversely affected if any of the above were to occur.

***Our estimates of market opportunity and forecasts of market growth may prove to be inaccurate, and even if the markets in which we may compete in the future achieve growth, our business could fail to achieve the same growth rates as others in the industry.***

Market opportunity estimates and market growth forecasts are subject to significant uncertainty and are based on assumptions and estimates that may not prove to be accurate. Our estimates and forecasts relating to the size and expected growth of the global seed industry and the biotechnology seeds market, and the market size for any products that we may develop in our Camelina products business, such as PHA biomaterials, and the estimated ranges of incremental value increase that a novel, newly developed crop trait may produce, may prove to be inaccurate. Even if the markets in which we may compete in the future achieve these opportunity estimates and market growth forecasts, our business could fail to grow at similar rates, if at all.

***If ongoing or future field trials conducted by us or our future collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.***

The successful completion of multi-year, multi-site field trials is critical to the success of product development and marketing efforts for products containing our traits. If our ongoing or future field trials, or those of our future collaborators, are unsuccessful or produce inconsistent results or unanticipated adverse effects on crops, or if we or our collaborators are unable to collect reliable data, regulatory review of products in development containing our traits could be delayed or commercialization of products in development containing our traits may not be possible. In addition, more than one growing season may be required to collect sufficient data to develop or market a product containing our traits, and it may be necessary to collect data from different geographies to prove performance for customer adoption. Even in cases where field trials are successful, we cannot be certain that additional field trials conducted on a greater number of acres, or in different crops or geographies, will be successful. Generally, we or our research licensees conduct these field trials, or we pay third parties, such as farmers, consultants, contractors, and universities, to conduct field trials on our behalf. Poor trial execution or data collection, failure to follow required

agronomic practices, regulatory requirements, or mishandling of products in development by our collaborators or these third parties could impair the success of these field trials.

Many factors that may adversely affect the success of our field trials are beyond our control, including weather and climatic variations, such as drought or floods, severe heat or frost, hail, tornadoes and hurricanes, uncommon or unanticipated pests and diseases, or acts of protest or vandalism. For example, if there were a prolonged or permanent disruption to the electricity, climate control, or water supply operating systems in our greenhouses or laboratories, the crops in which we or our collaborators are testing our traits and the samples we or our collaborators store in freezers, both of which are essential to our research and development activities including field tests, could be severely damaged or destroyed, adversely affecting these activities and thereby our business and results of operations. Unfavorable weather conditions including drought or excessive rain, or fluctuations in temperature, which we have experienced from time to time in our field trials, can also reduce both acreages planted and incidence, or timing of, certain crop diseases or pest infestations, each of which may halt or delay our field trials. Any field test failure we may experience may not be covered by insurance and, therefore, could result in increased cost for the field trials and development of our traits, which may negatively impact our business, results of operations, and ability to secure financing. Such factors outside of our control can create substantial volatility relating to our business and results of operations.

***Competition in the market for traits and seeds is intense and requires continuous technological development, and, if we are unable to compete effectively, our financial results will suffer.***

We face significant competition in the markets in which we operate. The markets for traits and agricultural biotechnology products are intensely competitive and rapidly changing. In most segments of the seed and agricultural biotechnology market, the number of products available to consumers is steadily increasing as new products are introduced. At the same time, the expiration of patents covering existing products reduces the barriers to entry for competitors. We may be unable to compete successfully against our current and future competitors, which may result in price reductions, reduced margins and the inability to achieve market acceptance for any products that we or our future collaborators commercialize containing our traits. In addition, most of our competitors have substantially greater financial, marketing, sales, distribution, research and development, and technical resources than we have, and some of our potential future collaborators have more experience in research and development, regulatory matters, manufacturing, and marketing. We anticipate increased competition in the future as new companies enter the market and new technologies become available. Our technologies may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors, which will prevent or limit our ability to generate revenues from the commercialization of our traits being developed.

***Our business is subject to various government regulations in the United States and Canada, the regulatory requirements for our future products in development are evolving and are subject to change, and if there are adverse changes to the current regulatory framework, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.***

In the United States and Canada, where our seed traits and biotechnology-derived plant lines are developed and field tested, changes in regulatory requirements applicable to our seed traits or future products in development containing our traits could result in a substantial increase in the time and costs associated with developing and commercializing future products containing our traits, and could materially affect our ability to meet our desired development timelines or to develop and commercialize a future product containing our traits at all.

In the United States, our seed traits and any future products that are successfully developed containing our seed traits are or will be subject to USDA and FDA regulatory requirements. The USDA and FDA requirements will vary depending on the particular seed trait and the intended use of any product that will be commercialized. Our business strategy is focused on crop yield traits and we have no current plans for the development of pesticide or herbicide traits, which would be subject to regulation by the EPA.

Within USDA, the APHIS is responsible for protecting agricultural plants under the Plant Protection Act. USDA-APHIS regulates organisms and products that are known or are suspected to be plant pests or

to pose a plant pest risk, including those that have been altered or produced through various genetic engineering techniques. These genetically engineered plants are called “regulated articles” in the relevant USDA-APHIS regulations, which control the import, handling, interstate movement and release into the environment of regulated articles, including certain genetically engineered organisms undergoing confined experimental use or field trials. Seed traits developed using the insertion of recombinant DNA, such as our C3003 yield trait that leverages the biological functions of an algal gene, are regulated articles and are therefore subject to extensive USDA-APHIS oversight, including but not limited to permitting requirements for import, handling, interstate movement and release into the environment.

In recent years, we and others have submitted various petitions to USDA-APHIS to determine whether particular biotechnology-derived plants developed through the use of different genome editing techniques may be considered to be not regulated under the framework administered by the agency. In general, genome editing approaches to novel plant trait development have been considered not regulated by USDA-APHIS. In particular, we have submitted two petitions (also known as the “Am I Regulated?” letter) to USDA-APHIS’s Biotechnology Regulatory Services in order to confirm that the following two oil content traits are not going to be regulated by the agency under 7 CFR part 340: (i) the single trait C3008 Camelina plant line, developed using CRISPR genome editing technology for increased oil content; and (ii) the triple-edited Camelina line that combines three gene traits, C3008a, C3008b and C3009, to increase oil production. In both cases, USDA-APHIS approved our petitions and confirmed in writing that each of these novel plant lines would not be treated as a regulated article.

The USDA also announced in March 2018 that it would not require an assessment on products that used modern forms of mutagenesis if it was clear these outcomes could occur in nature. The USDA stated at that time that it did not “have any plans to regulate plants that could otherwise have been developed through traditional breeding techniques as long as they are developed without the use of a plant pest as the donor or vector and they are not themselves plant pests.” This USDA policy statement applies to genetic deletions of any size, which would include genome editing through CRISPR-Cas9 and other emerging technologies, although it remains to be seen how this policy announcement will be implemented by USDA-APHIS and what practical effect that may have on seed trait developers like us and our competitors.

There can be no guarantee that the USDA-APHIS governing regulations and policies will not change. We cannot predict whether advocacy groups will challenge existing regulations and USDA determinations, whether the USDA will alter its interpretations of existing regulations, modify existing regulations or promulgate new regulations, or whether additional laws will come into effect. If these or other developments resulted in adverse changes to the current regulatory framework, our seed traits or future products in development containing our traits could be subjected to more burdensome regulatory standards, thereby substantially increasing the time and costs associated with developing and commercializing any future products. Moreover, we cannot assure you that USDA-APHIS will analyze any of our future yield traits or products in development containing our traits in a manner consistent with its analysis of our genome edited yield traits to date. Complying with the USDA’s plant pest regulations for traits that are classified as “regulated articles,” including the permitting requirements for field testing and environmental release, is a costly, time-consuming process and could substantially delay or prevent the commercialization of any future products containing traits that we expected to be deemed non-regulated by USDA-APHIS under 7 CFR part 340.

In addition to USDA-APHIS regulation of plant breeding and planting, a biotechnology-derived plant also will be regulated by the FDA if it is intended to be used as human food or animal feed. The FDA regulates the safety of food for humans and animals, and foods derived from novel plant varieties must meet the same food safety requirements as foods derived from traditionally bred plants (also called conventional foods). Since 1992, the FDA has had in place a voluntary consultation process for developers of bioengineered food (“Biotechnology Consultations”).

Biotechnology Consultations are data-intensive and examine the new food product’s safety and nutritional profile, among other issues. Generally, the FDA has found that such food products do not pose unique health risks to humans or animals, but if a novel allergen or other distinction from the conventional food is present in the new plant variety, the agency may require specific label statements on the product to ensure that consumers are made aware of material differences between genetically engineered and conventional

versions. When such a determination cannot be made, the novel plant variety may become subject to FDA premarket review and approval as a food additive.

As part of a broader effort to modernize its regulatory approach to all biotechnology-derived products, the FDA has been re-evaluating its regulatory approach in light of the increasing prevalence of certain genome edited plants. In January 2017, the FDA asked for public input to help inform its thinking about human and animal foods derived from new plant varieties produced using genome editing techniques. Among other things, the FDA's request for comments asked for data and information in response to questions about the safety of foods from genome edited plants, such as whether certain categories of genome edited plants present food safety risks different from other plants produced through traditional plant breeding. Subsequently, in October 2018, FDA leadership issued a document entitled the "Plant and Animal Biotechnology Innovation Action Plan" ("Action Plan") that identified three key priorities for the agency in this area and stated that the FDA has reviewed the comments and other information it received in response to the January 2017 request for comments. The FDA also stated that it intended to develop guidance for industry explaining how the FDA's existing regulatory policy for foods derived from new plant varieties applies to foods produced using genome editing. Although the expected draft guidance has not yet been released for public comment, on March 4, 2020 FDA, USDA, and EPA launched a new initiative to help consumers better understand foods created through genetic engineering, called "Feed Your Mind," which aims to answer the most common questions that consumers have about such crops. The FDA also stated in the 2018 Action Plan that it intended to begin updating the existing procedures for voluntary Biotechnology Consultations to reflect the agency's 25 years of experience with foods derived from biotechnology plants and to incorporate any additional issues related to genome editing of food crops. Subsequently, in February 2019, FDA completed its first consultation on a genome edited plant variety (a soybean variety modified to have increased levels of oleic acid).

We have not participated in any Biotechnology Consultations or engaged in any informal discussions with the FDA about our novel yield traits, whether those traits have been developed using genome editing or traditional genome modification using the insertion of recombinant DNA. Any delay in the regulatory consultation process, or a determination by the FDA that future product candidates containing our traits raise different safety issues than the relevant conventional crop and therefore must be approved by the agency as a new food additive through an intensive premarket safety review process, could increase the costs associated with or delay or prevent the commercialization of the future product candidate. Such delays may lead to reduced acceptance by farmers, food manufacturers or the public and an increase in competitor products that may directly compete with ours. Further, if the FDA enacts new regulations or policies with respect to genome edited plants in particular, such policies could result in additional compliance costs or delay or prevent the commercialization of any potential commercial products containing our seed traits, which could adversely affect our ability to generate revenues and to achieve profitability.

In Canada, genetically engineered crops and the food products into which they are incorporated are regulated by multiple government agencies under a federal framework for the regulation of biotechnology products that is similar to the U.S. system. First, the Canadian Food Inspection Agency ("CFIA") is the lead agency for ensuring that a new agricultural biotechnology crop will not pose new risks to Canadian plants, animals and other agricultural commodities. The CFIA's Plant Biosafety Office ("PBO") is responsible for conducting environmental assessments of biotechnology-derived plants, referred to as "plants with novel traits" ("PNT"). Authority for the PBO includes both approving confined field trials with the PNT through permits and authorizing their "unconfined release" as a first step towards commercialization. Second, under the Food and Drugs Act and related regulations, Health Canada is responsible for reviewing a pre-market safety assessment that must be submitted by the manufacturer or importer of a "novel food," a term of art that includes any PNT or other biotechnology-derived foods. Health Canada will evaluate the data and information about the novel food and make a determination regarding whether it is safe and nutritious before it can be sold in Canada, as well as whether any restrictions are warranted under applicable law or the product's safety profile. Any commercialization of our yield crops in Canada is expected to be done by a third-party collaborator or other partner and complying with Health Canada's pre-market notification requirement and safety assessment for novel foods would be the obligation of that third-party collaborator.

Our work involving the development, greenhouse testing and field testing of novel yield trait genes in crop plants requires certain government and municipal permits and we must ensure compliance with all

applicable regulations including regulations relating to genetically engineered crops. With laboratories and greenhouses in both the U.S. and Canada, we are also subject to regulations governing the shipment of seeds and other plant material between our facilities in the U.S. and Canada, including USDA-APHIS permits for the import and export of plant materials that could pose a risk to domestic agriculture. We also have been conducting field studies of various yield traits in Canada since 2016 under PNT permits issued by Canadian regulators.

Complying with the Canadian regulations is a costly, time-consuming process and could substantially delay or prevent the commercialization of our products. In addition, we cannot assure you that CFIA and Health Canada regulations or the agencies' implementation of those regulations will not change or that the legislative framework in Canada for biotechnology-derived crops, whether for genome edited plants or plants modified using the insertion of recombinant DNA, will not be amended or otherwise changed in a manner that could result in additional compliance costs or delay or prevent the commercialization of any potential commercial products containing our seed traits, which could adversely affect our ability to generate revenues and to achieve profitability.

Failure to comply with applicable regulatory requirements may, among other things, result in fines, suspensions of regulatory approvals, product recalls, product seizures, operating restrictions and criminal prosecution.

***If we or our future collaborators are unable to comply with and timely complete the regulatory process in the United States and Canada for our future products in development, our or our future collaborators' ability to market our traits could be delayed, prevented or limited.***

We apply for and maintain the regulatory permits in the United States and Canada necessary for our operations, particularly those covering our field trials. We anticipate that we or our future collaborators will apply for and maintain regulatory approvals, if any, necessary for the commercialization of any future products containing our seed traits. Even if we and our collaborators make timely and appropriate applications for regulatory permits for our field trials, government delays in issuing such permits can significantly affect the development timelines for our traits, particularly if the planting period for a crop growing season expires before the necessary permits are obtained.

The regulatory process is expensive and time-consuming, and the time required to complete the process is difficult to predict and depends upon numerous factors, including the substantial discretion of the regulatory authorities. We have not completed all phases of the regulatory process for any of our traits in development. Our traits could require a significantly longer time to complete the regulatory process than expected, or may never gain approval, even if we and our collaborators expend substantial time and resources seeking such approval. The time required for regulatory approval, or any delay or denial of such approval, could negatively impact our ability to generate revenues and to achieve profitability and finance our ongoing operations. In addition, changes in regulatory review policies during the development period of any of our traits, changes in, or the enactment of, additional regulations or statutes, or changes in regulatory review practices for a submitted product application may cause a delay in obtaining approval or result in the rejection of an application for regulatory approval. Regulatory approval, if obtained, may be made subject to limitations on the intended uses for which we or our collaborators may market a future product containing our traits. These limitations could adversely affect our potential revenues.

***The regulatory environment for genetically engineered crops in jurisdictions outside the United States and Canada varies greatly, and some jurisdictions have more restrictive regulations that could delay, prevent or limit our or our future collaborators' ability to market our traits.***

Other jurisdictions and governmental authorities, including in South America and Asia, are increasingly taking an interest in regulating agricultural products of biotechnology. Regulatory approaches vary by jurisdiction as a result of the existing public health frameworks and phytosanitary laws, as well as other less tangible factors such as cultural and religious norms that may have an impact on individual country risk assessments and decision-making. Each jurisdiction may have its own regulatory framework, which may include restrictions and regulations on planting and growing genetically engineered plants, import of grain and other plant products, and in the consumption and labeling of feed and foods derived from such novel plants, and which may apply to future products containing our traits. We cannot predict future changes in

the global regulatory landscape regarding genetically engineered plants or commercial products incorporating such novel plant varieties. The regulatory environment for such plants is greatly uncertain outside of the U.S. and Canada, and some jurisdictions have more restrictive regulations that could delay, prevent or limit our or our future collaborators' ability to market our traits.

For example, regulation of all genetically engineered plants in the European Union ("EU") is far more stringent than in the U.S. and Canada. U.S. and Canadian regulators have determined that genome edited plants pose fewer risks than traditional biotechnology-derived plants subjected to modification through the insertion of recombinant DNA. In contrast, an EU legal ruling indicated that the existing EU regulations for genetically engineered plants modified by the insertion of recombinant DNA, which were already more stringent than corresponding U.S. and Canadian regulations, should be strictly applied to genome edited plants as well. As a result, there is a sharp distinction between how EU and U.S. and Canadian regulatory agencies oversee novel seed traits, and in particular those that are generated using the more modern techniques of genome editing.

Although we are not currently targeting EU markets for the development or commercialization of future products containing our traits, emerging oversight regimes for genetically engineered products in other jurisdictions may follow the EU approach and impose similarly strict requirements for the release of such products into the environment and their incorporation into human food or other consumer products. Such jurisdictions may also elect to regulate genetically engineered plants without distinguishing between traditional biotechnology-derived plants modified with recombinant DNA and genome edited plants. There is no guarantee that countries for which we may have or may develop future marketing plans would not take a stricter legal and regulatory approach to controlling genetically engineered plants similar to that of the EU, which could increase regulatory costs and delay, prevent or limit our or our future collaborators' ability to market our traits in such jurisdictions.

***Consumer resistance to genetically engineered crops may negatively affect the ability to commercialize future crops containing our traits, as well as our public image, and may reduce any future sales of seeds containing our yield traits.***

Food and feed made from genetically engineered seeds and plants are not accepted by some consumers, and in certain countries production of certain genetically engineered crops is effectively prohibited, including throughout the EU, due to concerns over such products' effects on food safety and the environment. Advocacy groups have engaged in publicity campaigns and filed lawsuits in various countries against companies and regulatory authorities, seeking to halt regulatory approval activities or influence public opinion against genetically engineered and/or genome edited products. Actions by consumer groups and others also may disrupt research and development or production of genetically engineered plants, seeds or food products that incorporate such novel plant varieties. The high public profile of the biotechnology industry in food and feed production, and a lack of consumer acceptance of the types of products to which we have devoted substantial development resources, could have a negative impact on the commercial success of any of products incorporating our traits that may successfully complete the development process, as to which no assurance can be given, and could materially and adversely affect our ability to obtain future collaborations and to finance our crop science program. Further, we could incur substantial liability and/or legal expenses if there are claims that genetically engineered crops damage the environment or contaminate other farm crops. This could distract our management and cause us to spend resources defending against such claims.

***Government policies and regulations, particularly those affecting the agricultural sector and related industries, could adversely affect our operations and our ability to generate future revenues and to achieve profitability.***

Agricultural production and trade flows are subject to government policies and regulations. Governmental policies and approvals of technologies affecting the agricultural industry, such as taxes, tariffs, duties, subsidies, incentives and import and export restrictions on agricultural commodities and commodity products can influence the planting of certain crops, the location and size of crop production, and the volume and types of imports and exports. Future government policies in the United States, Canada or in other countries could discourage farmers from using any of our products that may successfully complete the development process, as to which no assurance can be given. Similarly, these policies could discourage food processors from purchasing harvested crops containing our traits or could encourage the

use of our competitors' products, which would put us at a commercial disadvantage and could negatively impact our ability to generate any revenues and to achieve profitability.

***The products of third parties, or the environment itself, may be negatively affected by the unintended appearance of our trait genes, novel seed compositions and novel speed products.***

The potential for unintended but unavoidable trace amounts, sometimes called "adventitious presence," of trait genes, novel seed compositions and novel speed products in conventional seed, or in the grain or products produced from conventional or organic crops, could affect acceptance by the general public or by the agricultural industry of these traits. Trace amounts of yield trait genes may unintentionally be found outside our containment area in the products of third parties, which may result in negative publicity and claims of liability brought by such third parties against us. Furthermore, in the event of an unintended dissemination of our genetically engineered materials to the environment, we could be subject to claims by multiple parties, including environmental advocacy groups, as well as governmental actions such as mandated crop destruction, product recalls or additional stewardship practices and environmental cleanup or monitoring. The occurrence of any of these events could have a material adverse effect on our business and results of operations.

***Loss of or damage to our elite novel trait events and plant lines would significantly slow our product development efforts.***

We have a collection of elite novel trait events and plant lines in which we are developing traits for incorporation into elite germplasm and potential seed products. Our elite novel trait events and plant lines are a key strategic asset since they form the basis for the introgression of our traits into plant breeding programs. If we suffer loss or damage to our elite novel trait events and plant lines, our research and development activities could be negatively impacted.

***Our insurance coverage may be inadequate to cover all the liabilities we may incur.***

We face the risk of exposure to liability claims if any products that are successfully developed containing our seed traits, as to which no assurance can be given, are defective and if any product that we develop or any product that uses our technologies or incorporates any of our traits causes injury. Although we carry insurance at levels customary for companies in our industry, such coverage may become unavailable or be inadequate to cover all liabilities we may incur. There can be no assurance that we will be able to continue to maintain such insurance, or obtain comparable insurance at a reasonable cost, if at all. If we are unable to obtain sufficient insurance coverage at an acceptable cost or otherwise, or if the amount of any claim against us exceeds the coverage under our policies, we may face significant expenses.

***We rely on third parties to conduct, monitor, support, and oversee field trials and, in some cases, to maintain regulatory files for those products in development, and any performance issues by third parties, or our inability to engage third parties on acceptable terms, may impact our or our future collaborators' ability to complete the regulatory process for or commercialize such products.***

We rely on third parties to conduct, monitor, support, and oversee field trials. As a result, we have less control over the timing and cost of these trials than if we conducted these trials with our own personnel. If we are unable to maintain or enter into agreements with these third parties on acceptable terms, or if any such engagement is terminated prematurely, we may be unable to conduct and complete our trials in the manner we anticipate. In addition, there is no guarantee that these third parties will devote adequate time and resources to our studies or perform as required by our contract or in accordance with regulatory requirements, including maintenance of field trial information regarding our products in development. If any of these third parties fail to meet expected deadlines, fail to transfer to us any regulatory information in a timely manner, fail to adhere to protocols, or fail to act in accordance with regulatory requirements or our agreements with them, or if they otherwise perform in a substandard manner or in a way that compromises the quality or accuracy of their activities or the data they obtain, then field trials of our traits in development may be extended or delayed with additional costs incurred, or our data may be rejected by the applicable regulatory agencies. Ultimately, we are responsible for ensuring that each of our field trials is conducted in accordance with the applicable protocol and with legal, regulatory and scientific standards, and our reliance on third

parties does not relieve us of our responsibilities. We could be subject to penalties, fines and liabilities if our third-party contractors fail to perform as required.

If our relationship with any of these third parties is terminated, we may be unable to enter into arrangements with alternative parties on commercially reasonable terms, or at all. Switching or adding service providers can involve substantial cost and require extensive management time and focus. Delays may occur, which can materially impact our ability to meet our desired development timelines. If we are required to seek alternative service arrangements, the resulting delays and potential inability to find a suitable replacement could materially and adversely impact our business.

In addition, there has been an increasing trend towards consolidation in the agricultural biotechnology industry. Consolidation among our competitors and third parties upon whom we rely could lead to changes in the competitive landscape, capabilities, and strategic priorities among potential service providers, which could have an adverse effect on our business and operations.

***If we lose key personnel or are unable to attract and retain necessary talent, we may be unable to develop or commercialize our products under development.***

We are highly dependent on our key technical and scientific personnel, who possess unique knowledge and skills related to our research and technology. If we were to lose the services of these individuals, we may be unable to readily find suitable replacements with comparable knowledge and the experience necessary to advance the research and development of our products. Because of the unique talents and experience of many of our scientific and technical staff, competition for our personnel is intense. The loss of key personnel or our inability to hire and retain personnel who have the required expertise and skills could have a material adverse effect on our research and development efforts, our business, and our ability to secure additional required financing.

***Our business and operations would suffer in the event of system failures.***

We utilize information technology systems and networks to process, transmit and store electronic information in connection with our business activities. As use of digital technologies has increased, cyber incidents, including deliberate attacks and attempts to gain unauthorized access to computer systems and networks, have increased in frequency and sophistication. These threats pose a risk to the security of our systems and networks and the confidentiality, availability and integrity of our data. There can be no assurance that we will be successful in preventing cyber-attacks or successful in mitigating their efforts.

Despite the implementation of security measures, our internal computer systems and those of our contractors and consultants are vulnerable to damage from such cyber-attacks, including computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Such an event could cause interruption of our operations. For example, the loss of data from completed field tests for our yield traits could result in delays in our regulatory approval efforts and significantly increase our costs. To the extent that any disruption or security breach were to result in a loss of or damage to our data, or inappropriate disclosure of confidential or proprietary information, we could suffer reputational harm or face litigation, or adverse regulatory action and the development of our product candidates could be delayed.

**Risks Relating to Intellectual Property**

***Patent protection for our technologies is both important and uncertain.***

Our commercial success may depend in part on our obtaining and maintaining patent protection for our technologies in the United States and other jurisdictions, as well as successfully enforcing and defending this intellectual property against third-party challenges. If we are not able to obtain or defend patent protection for our technologies, then we will not be able to exclude competitors from developing or marketing such technologies, and this could negatively impact our ability to generate sufficient revenues or profits from product sales and/or licensing to justify the cost of development of our technologies and to achieve or maintain profitability. Our currently issued patents relate to our historical business as well as two patents on our C3003 gene in-licensed from the University of Massachusetts and our C4001 U.S. patent, both of

which were issued in 2019 and have expiration dates ranging from 2020 through 2035, plus any patent extensions which may be granted in the U.S. for regulatory approval delays. New outstanding patent applications owned by or licensed to us relating to crop yield improvements have filing dates ranging from 2013 through 2019, including a new patent application on a breakthrough technology for producing PHA biomaterials in crops. This patent would have an expiration date in 2040 if granted, however, we may not be able to obtain sufficiently broad claims to cover the new invention.

Our patent position involves complex legal and factual questions. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. Patents may not be issued for any pending or future pending patent applications owned by or licensed to us, and claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Moreover, we may be unable to protect certain of our intellectual property in the United States or in foreign countries. Foreign jurisdictions may not afford the same protections as U.S. law, and we cannot ensure that foreign patent applications will have the same scope as the U.S. patents. There will be many countries in which we will choose not to file or maintain patents because of the costs involved. Competitors may also design around our patents or develop competing technologies.

Additionally, any issued patents owned by or licensed to us now or in the future may be challenged, invalidated, or circumvented. We could incur substantial costs to bring suits or other proceedings in which we may assert or defend our patent rights or challenge the patent rights of third parties. An unfavorable outcome of any such litigation could have a material adverse effect on our business and results of operations.

***Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.***

Various U.S. and foreign issued patents and pending patent applications owned by third parties exist in areas relevant to our products and processes under the development. We could incur substantial costs to challenge third-party patents. If third parties assert claims against us or our customers alleging infringement of their patents or other intellectual property rights, we could incur substantial costs and diversion of management resources in defending these claims, and the defense of these claims could have a material adverse effect on our business. In addition, if we are unsuccessful in defending against these claims, these third parties may be awarded substantial damages, as well as injunctive or other equitable relief against us, which could effectively block our ability to make, use, sell, distribute, or market our technologies and services based on our technologies in the United States or abroad. Alternatively, we may seek licenses to such third-party intellectual property. However, we may be unable to obtain these licenses on acceptable terms, if at all. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of some of our products based on our technologies and, therefore, could have a material adverse effect on our business.

***Portions of our crop science technology are owned by or subject to retained rights of third parties.***

We have licensed and optioned from academic institutions certain patent rights that may be necessary or important to the development and commercialization of our crop science technology. These licenses and options may not provide exclusive rights to use such intellectual property in all fields of use in which we may wish to develop or commercialize our technology. If we fail to timely exercise our option rights and/or we are unable to negotiate license agreements for optioned patent rights on acceptable terms, the academic institutions may offer such patent rights to third parties. If we fail to comply with our obligations under these license agreements, or if we are subject to a bankruptcy or insolvency proceeding, the licensor may have the right to terminate the license. In some circumstances, we may not have the right to control the preparation, filing and prosecution of licensed patent applications or the maintenance of the licensed patents. Therefore, we cannot be certain that these patents and applications will be prosecuted, maintained and enforced in a manner consistent with the best interests of our business. Furthermore, the research resulting in certain of our licensed and optioned patent rights was funded by the U.S. government. As a result, the government may have certain rights to such patent rights and technology.

***We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.***

We may be unable to acquire or in-license additional technologies from third parties that we decide we need in order to develop our business. A number of more established companies may also pursue strategies to license or acquire crop science technologies that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater development and commercialization capabilities. Any failure on our part to reach an agreement for any applicable intellectual property could result in a third party acquiring the related rights and thereby harm our business.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire relevant crop science technologies on terms that would allow us to make an appropriate return on our investment.

We expect that competition for acquiring and in-licensing crop science technologies that are attractive to us may increase in the future, which may mean fewer suitable opportunities for us as well as higher acquisition or licensing costs. If we are unable to successfully obtain rights to suitable crop science technologies on reasonable terms, or at all, our business and financial condition could suffer.

***Our license agreements include royalty payments that we are required to make to third parties.***

We are party to license agreements that require us to remit royalty payments and other payments related to our licensed intellectual property. Under our in-license agreements, we may pay upfront fees and milestone payments and be subject to future royalties. We cannot precisely predict the amount, if any, or timing of royalties we may owe in the future. Furthermore, we may enter into additional license agreements in the future, which may also include royalty, milestone and other payments.

***The intellectual property landscape around genome editing technology, such as CRISPR, is highly dynamic and uncertain, and any resolution of this uncertainty could have a material adverse effect on our business.***

The field of genome editing, especially in the area of CRISPR technology, is still in its infancy, and no products using this technology have reached the market. In 2018, we entered into a non-exclusive research license agreement jointly with the Broad Institute of MIT and Harvard and Pioneer, part of Corteva Agriscience™, Agriculture Division of DowDuPont Inc., for the use of CRISPR-Cas9 genome-editing technology for crops in order to demonstrate the utility of our yield trait genes in this field. The joint license covers intellectual property consisting of approximately 48 patents and patent applications on CRISPR-Cas9 technology controlled by the Broad Institute and Corteva Agriscience. Under the agreement, we have the option to renew the license on an annual basis and the right, subject to specified conditions, to convert the research license to a commercial license in the future, although there can be no assurance that we will be able to secure such commercial license on acceptable terms. CRISPR technology is uniquely suited to agricultural applications as it enables precise changes to plant DNA without the use of foreign DNA to incorporate new traits. Plants developed using CRISPR genome-editing technology have the potential to be considered not regulated by USDA-APHIS under 7 CFR part 340 for development and commercialization in the U.S., which could result in shorter developmental timelines and lower costs associated with commercialization of new traits in the U.S. as compared to regulated crops. Due to the intense research and development that is taking place by several companies, including us and our competitors, in this field, the intellectual property landscape is in flux, and it may remain uncertain for the coming years. There has been, and may continue to be, significant intellectual property related litigation and proceedings relating to this area in the future. If it is later determined that the patent rights using the CRISPR technology that we obtained under license are invalid or owned by other parties, this could have a material adverse effect on our business.

***We rely in part on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could harm our business.***

We rely on trade secrets to protect some of our technology and proprietary information, especially where we believe patent protection is not appropriate or obtainable as is the case for our GRAIN trait gene discovery platform. However, trade secrets are difficult to protect. Litigating a claim that a third party

had illegally obtained and was using our trade secrets would be expensive and time consuming, and the outcome would be unpredictable. Moreover, if our competitors independently develop similar knowledge, methods and know-how, it will be difficult for us to enforce our rights and our business could be harmed.

**Risks Relating to Owning our Common Stock**

***Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.***

Execution of our business plan requires additional financing. If we raise additional funds through equity offerings or offerings of equity-linked securities, including warrants or convertible debt securities, we expect that our existing stockholders will experience significant dilution, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may subject us to restrictive covenants that could limit our flexibility in conducting future business activities, including covenants limiting or restricting our ability to incur additional debt, dispose of assets or make capital expenditures. We may also incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance. If we raise additional funds through strategic partnerships or licensing agreements with third parties, we may have to relinquish valuable rights to our technologies or grant licenses on terms that are not favorable to us.

***Trading volume in our stock can fluctuate and an active trading market for our common stock may not be available on a consistent basis to provide stockholders with adequate liquidity. Our stock price may be extremely volatile, and our stockholders could lose a significant part of their investment.***

The public trading price for our common stock will be affected by a number of factors, including:

- any change in the status of our Nasdaq listing;
- the need for near-term financing to continue operations;
- reported progress in our efforts to develop crop related technologies, relative to investor expectations;
- changes in earnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' earnings estimates;
- quarterly variations in our or our competitors' results of operations;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- future issuances and/or sales of our securities;
- announcements or the absence of announcements by us, or our competitors, regarding acquisitions, new products, regulatory developments, significant contracts, commercial relationships or capital commitments;
- commencement of, or involvement in, litigation;
- any major change in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- announcements related to patents issued to us or our competitors and to litigation involving our intellectual property;
- a lack of, or limited, or negative industry or security analyst coverage;
- uncertainty regarding our ability to secure additional cash resources with which to operate our business;
- a decision by our significant stockholders to increase or decrease their holdings in our common stock;
- short-selling or similar activities by third parties; and

- other factors described elsewhere in these risk factors.

As a result of these factors, our stockholders may not be able to resell their shares at, or above, their purchase price. In addition, the stock prices of many technology companies have experienced wide fluctuations that have often been unrelated to the operating performance of those companies. Any negative change in the public's perception of the prospects of industrial or agricultural biotechnology companies could depress our stock price regardless of our results of operations. These factors may have a material adverse effect on the market price and liquidity of our common stock and affect our ability to obtain required financing.

***Provisions in our certificate of incorporation and by-laws and Delaware law might discourage, delay or prevent a change of control of our company or changes in our management and, therefore, depress the trading price of our common stock.***

Provisions of our certificate of incorporation and by-laws and Delaware law may discourage, delay or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which our stockholders might otherwise receive a premium for their shares of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management.

In addition, Section 203 of the Delaware General Corporation Law ("DGCL") prohibits a publicly-held Delaware corporation from engaging in a business combination with an interested stockholder, which generally refers to a person which together with its affiliates owns, or within the last three years has owned, 15 percent or more of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

The existence of the foregoing provisions and anti-takeover measures could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our company, thereby reducing the likelihood that our stockholders could receive a premium for their common stock in an acquisition.

***Concentration of ownership among our officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.***

Based on the number of shares outstanding as of January 28, 2021, our officers, directors and stockholders who hold at least 5% of our stock beneficially own a combined total of approximately 45.5 percent of our outstanding common stock, including shares of common stock subject to stock options and warrants that are currently exercisable or are exercisable within 60 days after January 28, 2021. If these officers, directors, and principal stockholders or a group of our principal stockholders act together, they will be able to exert a significant degree of influence over our management and affairs and control matters requiring stockholder approval, including the election of directors and approval of mergers, business combinations or other significant transactions. The interests of one or more of these stockholders may not always coincide with our interests or the interests of other stockholders. For instance, officers, directors, and principal stockholders, acting together, could cause us to enter into transactions or agreements that we would not otherwise consider. Similarly, this concentration of ownership may have the effect of delaying or preventing a change in control of our company otherwise favored by our other stockholders. As of January 28, 2021, Jack W. Schuler (and his related entities) beneficially owned approximately 37.1 percent of our common stock. To the extent that this or any other significant stockholders oppose any proposal put forth for stockholder approval by our board of directors, they control a sufficient percentage of our outstanding shares to cause such proposal to either fail or be very difficult to achieve without their support. This, in turn, could have a negative effect on the market price of our common stock. It could also prevent our stockholders from realizing a premium over the market price for their shares of common stock. The concentration of ownership also may contribute to the low trading volume and volatility of our common stock.

**Risks Relating to COVID-19**

***Our financial condition, research and development efforts, and results of operations could be further adversely affected by the ongoing coronavirus outbreak.***

Any outbreak of contagious diseases, such as COVID-19, or other adverse public health developments, could have a material and adverse effect on our business operations. In response to the ongoing coronavirus pandemic, we have modified our business practices, including in response to legislation, executive orders and guidance from government entities and healthcare authorities. These directives include the temporary closing of businesses deemed "non-essential," travel bans and restrictions, social distancing and quarantines. Since March 2020, we have limited employee, researcher and supplier access to the research facility we share with the National Research Council of Canada and our other leased facilities located in Saskatchewan, Canada. Our Canadian operations have not yet been significantly impacted by the coronavirus pandemic. Our research and development facility in Woburn was closed from March through late May 2020, and to date, we have operated our laboratories on a staggered schedule in order to help prevent the spread of disease. To date, we have also been able to move forward with planning and operational steps required to initiate our planned 2020 field trials in Canada and the United States. It is possible, however, that current and potential future closures of our research facilities, if they continue for an extended time period, could adversely impact our anticipated time frames for completing field trials and other work we have planned to accomplish during 2020.

Additional adverse effects of the coronavirus pandemic could include quarantines, disruptions of or restrictions on our ability and/or the ability of our collaborators' personnel to travel or conduct normal business activities, as well as additional closures of our facilities or the facilities of our collaborators for an indefinite period of time.

As COVID-19 continues to affect individuals and businesses around the globe, we will likely experience disruptions that could severely impact our business, research and field testing trials, including:

- interruption of field testing activities due to quarantines or other limitations on travel imposed or recommended by federal or state governments, employers and others;
- limitations on employee resources that would otherwise be focused on the conduct of our research and field testing, including because of sickness of employees or their families or requirements imposed on employees to avoid contact with large groups of people;
- delays in receiving approval from regulatory authorities related to our seed traits;
- delays in field testing sites receiving the supplies and materials needed to conduct our trials;
- interruption in global shipping that may affect the transport of materials needed for our research; and
- limitations on government and academic grants that support our research programs.

Additionally, our results of operations could be adversely affected to the extent that COVID-19, or any other epidemic, harms our business or the economy in general either domestically or in any other region in which we do business. The extent to which COVID-19 affects our operations will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the outbreak, new information that may emerge concerning the severity of COVID-19 and the actions to contain COVID-19 or treat its impact, among others, which could have an adverse effect on our business and financial condition. Current predictions suggest that the impact of sustained business closures and quarantines resulting from the coronavirus on the global economy will be severe, and this may have a material adverse effect on our business and our ability to secure funding. As we continue to actively monitor the situation, we may take further actions that affect our operations.

## USE OF PROCEEDS

We expect to receive net proceeds of approximately $12 million from this offering, after deducting the underwriting fees and discounts and estimated offering expenses payable by us.

We intend to use the net proceeds from this offering for general corporate purposes, including working capital.

## DILUTION

As of September 30, 2020, our net tangible book value was approximately $11.9 million, or $3.56 per share of our Common Stock. Net tangible book value per share represents the amount of our total tangible assets less our total liabilities, divided by the total number of shares of our Common Stock outstanding as of September 30, 2020.

After giving effect to the sale of 1,040,000 shares of our Common Stock in this offering at an offering price of $12.25 per share, and after deducting estimated offering fees and expenses payable by us, our net tangible book value as of September 30, 2020 would have been approximately $5.46 per share of Common Stock. This represents an immediate increase in net tangible book value of $1.90 per share to our existing stockholders and an immediate dilution in net tangible book value of $6.79 per share to investors participating in this offering. The following table illustrates this dilution per share of Common Stock to investors participating in this offering:

| | | |
|---|---|---|
| Public offering price | | $12.25 |
| Net tangible book value per share as of September 30, 2020 | $3.56 | |
| Increase in net tangible book value per share attributable to new investors | $1.90 | |
| Adjusted net tangible book value per share after giving effect to the offering | | $ 5.46 |
| Dilution per share to new investors in this offering | | $ 6.79 |

The foregoing illustration does not reflect the potential dilution from the exercise of outstanding options or warrants to purchase shares of our Common Stock.

# BUSINESS

## Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company that is using its differentiated trait gene discovery platform, which we refer to as the Trait Factory, to develop improved Camelina varieties to produce proprietary products, and to produce other high value seed traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. Our goals are to efficiently develop and commercialize a high value crop products business based on developing superior varieties of Camelina for the production of feedstock oils, nutritional oils, and PHA bioplastics, and to license our yield traits to major seed companies for commercialization in commercial row crops, including corn, soybean and canola.

*Camelina sativa* (Camelina) is an annual oilseed plant in the mustard family that is native to Europe, and that we deploy as an essential component of our Trait Factory. It has several excellent agronomic traits, including low water and fertilizer input, drought resistance, and a short life cycle, making it suitable as a rotation crop in the U.S. northwest, and as a cover crop with corn and soybean in the U.S. Midwest. In addition, it produces a relatively abundant harvest of oil-containing seeds. For approximately ten years, Yield10 has been conducting research in Camelina, identifying and deploying new gene traits, evaluating the performance of these novel traits in field tests, developing PHA bioplastics in seed, and securing exclusive rights to omega-3 oils technology.

We are beginning to prepare for the commercial launch of our products business based on current Camelina varieties to supply oil and protein meal markets. We anticipate that this will be followed by the launch of two proprietary higher value products, omega-3 (DHA+EPA) oils, which we are developing pursuant to an agreement for technology in development with Rothamsted Research (“Rothamsted”), and PHA bioplastics. We expect the sequential launch of these products to allow us to establish the operating foundation of the commercial products business, to grow revenues and margins based on sales of omega-3 oil products and to generate cash flow to fund the commercialization of PHA bioplastics.

We are pursuing the development of elite Camelina germplasm exhibiting herbicide tolerance, disease resistance and other traits that will form a core Camelina germplasm foundation for deploying our product traits to reduce grower costs and increase value. Based on our research and development activities in Camelina, Yield10 has a pipeline of more than 10 novel yield traits currently in research and development. We have agreements in place for a number of our current yield trait gene candidates, including with the Bayer Crop Science division of Bayer AG (“Bayer”), GDM Seeds (“GDM”), Forage Genetics International, LLC, a division of Land O’Lakes, Inc. (“Forage Genetics”) and JR Simplot Company (“Simplot”). These companies are currently progressing the development of Yield10 traits in soybean, forage sorghum, and potato, respectively. We expect to generate several proof points for our traits in various crops over the next two years and plan to find partners to license our traits for canola, corn and other crops as we generate additional data.

We believe the market opportunity for our Camelina varieties, proprietary products in development, and performance traits is significant. We are targeting uses for our Camelina products in applications such as: oils for animal and human nutrition; use as cover crops; feedstock oils for renewable diesel, omega-3 oils for aquaculture, and PHA bioplastics in a range of applications. Leading seed companies are the potential clients for our performance trait innovations in major crops. Each of these product targets is well-aligned with trends in food security, social responsibility, and sustainability, including the need for:

- *Low-carbon index feedstocks for renewable diesel biofuel;*
- *New sources of oil and protein meal for animal feed;*
- *Nutritional oils for human consumption;*
- *Land-based omega-3 fatty acid oils to replace diminishing world supplies of fish oil for aquaculture;*
- *Biobased, biodegradable bioplastics for feed, water treatment and to reduce plastic waste;*
- *Increasing the organic carbon content of soil in farming; and*

- *Performance traits to increase yield per acre of major agricultural crops.*

We are building a portfolio of intellectual property around our crop yield technology and traits. As of December 31, 2020, we owned or held exclusive rights to 22 patents issued or pending patent applications worldwide related to advanced technologies for increasing crop performance and composition traits in oils and PHA bioplastics. As part of our agreement with Rothamsted, we have exclusive rights to the original patent filing for the production of EPA/DHA oil in Camelina and two improvement patents filed after the agreement was signed.

**The Unmet Need: Global Food Supply, Reducing Carbon Emissions and Producing Sustainable Products**

According to a number of studies, including a recent report entitled "The Future of Food: Complexities and Compromises," published December 6, 2020 by Morgan Stanley, the agri-food system needs to transform to produce 50% more food, eliminate malnutrition and cut 13 gigatons of greenhouse gas emissions by 2050. Agriculture will also have to be a source of low carbon feedstocks for fuels, chemicals and plastics. This will result in increased demand for feed grains, edible oil and forage crops, demand that will need to be met with an increasing emphasis on sustainable growth metrics and climate change, as highlighted in the Morgan Stanley report. Yield10 is focused on addressing the yield gap for major crops by using our Trait Factory to optimize photosynthesis and carbon efficiency in crops to increase grain or biomass yield using our novel traits. We have been working in the area of increasing photosynthetic carbon capture and crop yield technologies since 2012, and we have identified several potentially promising genes for increasing yield or improving crop performance.

*Cover Crops:* To meet growing demand for oils and protein, and to mitigate the negative environmental impacts of current farming practices, particularly in the corn belt, the development of cash cover crops or relay crops is another means to increase land productivity and address growing demand. Cover or relay crops are planted between harvest and sowing of major commodities, such as soybean, in effect increasing the number of harvests per growing season. Yield10 believes that Camelina, with its short growing season, has considerable potential to be used as a cover crop to reduce soil erosion, improve soil quality, and control diseases and pests and nutrient run-off from land that is used for row crop production. Third party estimates indicate that Camelina has up to 30 million acres of potential as a cover crop in the mid-west of the United States, and we believe that the product value-add from Yield10's proprietary products will be a key differentiator for farmers making planting decisions.

*High Protein Meal:* There is a growing global demand for additional protein sources for feed and food applications. Camelina seed can be processed in existing oilseed processing facilities to extract the oil, and what remains is a protein. On a dry basis, the meal contains approximately 30-35% protein with a good amino acid profile for feed applications. Camelina meal has been approved for use in some animal feed applications, and we expect with additional accelerated breeding using genome editing, the meal quality can be further enhanced to further expand this application.

*Edible oils:* Edible oils or vegetable oils are derived from fruits and vegetables, such as palm, soybean, rapeseed (canola) and sunflower. These oils are used in frying, baking, other types of cooking and in food preparation and flavoring such as salad dressings and bread dips. Edible oils are of increasing importance among health-conscious consumers as key functional ingredients which may reduce the risk of cardiovascular disorders along with potentially lowering the possibility of certain kinds of breast cancer. Based on these drivers, the global edible oil market is anticipated to witness a substantial growth in demand for unrefined, unprocessed, healthy, and organic oil.

*Renewable diesel:* Renewable diesel is the second-largest consumer biofuel in the U.S. behind ethanol. Renewable diesel is chemically identical to diesel, so it can be used in the existing diesel infrastructure. Also, it is one of the most viable carbon reduction alternatives to other fuel sources. Vegetable oil can be used as a feedstock for renewable diesel, and a growth in the availability of oils suitable for this use could contribute to growth in this market. Publicly available data for 2019 indicates that total U.S. renewable diesel consumption was approximately 900 million gallons. At the federal level, biomass-based diesel qualifies as an advanced biofuel under the U.S. Environmental Protection Agency's Renewable Fuel Standard (RFS) program, which requires renewable fuels to be blended into the nation's fuel supply. Biomass-based diesel also

generates credits under California's Low Carbon Fuel Standard (LCFS) and is increasingly used to meet the increasing fuel standards in the LCFS because of its favorable greenhouse gas reduction score.

*Omega-3 (DHA+EPA) Oils:* The aquaculture sector will play a major role in meeting the demand for fish, and sustainable land-based sources of key feed ingredients will need to be developed and adopted. This includes high value specialty ingredients, including in particular land- based sources of omega-3 oils to replace oil from harvested fish. The aquaculture sector is expected to grow at 5% CAGR over the next ten years, to reach revenues of over $300 billion. Fish oil supply from ocean harvested fish is particularly important for farmed salmon. At this time, the growth of the salmon farming sector along with additional demand from new nutraceutical markets for direct human consumption is expected to exceed sustainable supply. In 2019, 4.5 million tonnes of fish feed was used globally for salmon farming. Although it can vary by geographic location, fish oil represents 24% of the contents making up this fish feed. This equates to 2,380 million pounds of fish oil consumed in salmon feed production. The combined omega-3 market is expected to double in the next 5 years. The demand from salmon farming alone is expected to be approximately 7% per year going forward, according to the 2020 Salmon Handbook.

*PHA Bioplastic; Feed Additives:* The first patent on the use of PHA in oilseed meal in animal feed was filed by our predecessor company Metabolix in the mid-1990s, and has since expired. However, chicken feeding studies described in that application demonstrated that the PHA in the feed was bioavailable as an *energy source.* Since then, there have been several other reports on the use of PHA in both animal and aquaculture feed where the inclusion of microbially produced PHA at low levels has been demonstrated to have beneficial pre-biotic effects, providing some level of protection against pathogens, and in chicken feeding studies the low levels of PHA have been shown to improve the feed conversion efficiency. We believe this may be an interesting opportunity to progress two common goals:1) developing fundamental data for FDA and/or Canadian Food Inspection Agency (CFIA) regulatory approval of PHA in animal feed to assist in the approval of protein meal left over from PHA extraction in feed applications and 2) developing a potentially near-term market opportunity for the current Camelina lines, which we have shown to produce 4-6% PHA in seed in our recent small scale field trials.

*PHA Bioplastic, Water Treatment:* In water treatment, the PHA biomaterial acts as a growth substrate and energy source for denitrifying bacteria, which convert nitrate, a primary cause of water pollution and algal growth, to nitrogen gas which returns to the air. This application is technically straight-forward, requiring only the production and shipment of PHA biomaterials in pellet form. The model for this business is to supply the continuous replenishment of the PHA pellets. We believe that this application is not very demanding on the purity and quality of the PHA produced and represents a more favorable technical path to commercialization for PHA Camelina than bioplastics. This application may also serve as a market for PHA produced in the future for bioplastics applications which does not meet the product specifications or ultimately as a way to generate value by "upcycling" post-consumer PHA bioplastic. Yield10 is in the early stages of developing the business model for this opportunity.

*PHA Bioplastic; Alternatives to Plastic:* Global plastic waste is estimated at 380 million tonnes per year. The largest market for plastics today is for packaging materials, and it accounts for nearly half of all plastic waste generated globally, where most of it is never recycled or incinerated. We believe there may be significant market opportunity for producing PHA biomaterials in Camelina in the future. PHA biomaterials (PHAs) are natural microbial high molecular weight polymeric storage polymers. These polymers are natural polyesters and can be recovered from the microbes which produce them and processed using standard plastics processing equipment into a range of product forms. PHAs have applications in a wide range of markets including animal nutrition, wastewater treatment and the replacement of petroleum plastics. Commercialization of PHAs based on fermentation technologies continues to receive considerable media and investment interest, even though this approach has proven challenging due to the high capital and operating costs. In the longer term, the production of PHA biomaterials in Camelina would represent an entirely new market opportunity for farmers. This opportunity could provide economic returns for farmers to justify large acreage adoption of Camelina as a cover crop and enable the low-cost production of this product for new markets including water treatment and sustainable biodegradable plastics replacement applications.

*Trait Development and Licensing*: Using our Trait Factory, we have identified and are evaluating novel yield trait genes to improve the field performance of Camelina for our products business and to improve the

yield and performance of major food and feed crops. Improvements in yield to the levels targeted by Yield10, for example 10-20 percent increases seed yield in Camelina, would significantly enhance the value of our Camelina products and would be expected to generate significant increases in yield in the major food and feed crops. For example, Yield10 is targeting an approximately 10-20 percent increase in canola and soybean yields, which, if successfully deployed across North American acreage, could result in annual incremental crop value of up to $10 billion. In the licensing model, Yield10 would expect to receive up-front payments on the execution of a commercial license, milestone payments and royalties based on seed sales. By ultimately increasing the output of major food and feed crops and potentially reducing strains on scarce natural resources, we believe that Yield10's technologies will also contribute to addressing global food security.

**Business Strategy**

We are using our proprietary Trait Factory trait gene discovery platform to develop the oilseed Camelina to produce proprietary products and high value seed traits for the agriculture and food industries. Our goal is to commercialize a series of higher value Camelina products and license our yield traits to major seed companies for major row crops including corn, soybean and canola. Although our Camelina products will address key sustainability drivers, we believe first and foremost that they should increase profitability across the value delivery chain. We believe that any sustainability benefits will provide a marketing advantage for our future customers and potential upside from any available government credits. We also plan to continue to seek non-dilutive financing opportunities from government grants and funded partnerships. Although our Trait Factory may enable multiple commercial opportunities going forward, we will retain our capital efficient approach, focusing internal resources on developing elite varieties of Camelina germplasm and PHA. We plan to rely on Rothamsted for the development of the Camelina omega-3 trait and on major seed companies for the development of our traits in the major crops. Using this approach, we are developing the following three potential revenue streams:

- Camelina Products Business;
- Trait development and licensing; and
- R&D revenue from government grants and/or partners.

**Camelina Products Business**

Our long-term vision for Camelina is as a high value large acreage cover crop for the corn belt which reduces nutrient pollution from fertilizer use, increases soil carbon content, increases farm revenue and produces low carbon sustainable products. In the near term, we are using our current spring varieties of Camelina to establish our products operating business, with winter varieties, for larger scale adoption as cover crops, to follow. Our plan is to execute the sequential launch of our products from our Camelina oilseed platform as follows:

***Elite Camelina Varieties:*** In launching our Camelina products business, we plan to provide our seed to growers under contracts with Yield10, use existing oilseed processing assets through toll arrangements and arrange offtake agreements with end users for the oil and protein meal to address current markets, such as for animal feed. Our technology team will continue to develop improved varieties of elite Camelina germplasm with the herbicide tolerance, disease resistance, seed yield and oil content traits currently progressing in our trait pipeline. Elite Camelina varieties will be core to the current markets and the commercialization of our omega-3 and PHA bioplastic traits, which we will develop separately and introduce into the elite varieties by plant breeding. In order to position Yield10 to execute on this plan, we harvested our first 50 acres of Camelina seed grown under contract in Montana in 2020. We also began work to scale up new varieties, including both spring and winter Camelina.

***Omega-3 Trait — Products are fish oil and protein meal:*** Currently, we believe the first proprietary product we will launch commercially will be based on technology developed over the last 10 years by the Rothamsted in the UK. Yield10 signed an Exclusive Collaboration and Option Agreement for this technology with Rothamsted in November 2020. Rothamsted has progressed the omega-3 trait far beyond proof of concept stage with the completion of multiple field trials, oil production, aquaculture and human nutrition studies. Under its agreement with us, Rothamsted is responsible for making improvement and further

optimization of this exciting trait at their facilities in the UK. We believe that the current omega-3 trait is already at a sufficient technology readiness level to begin commercialization. Due to intellectual property considerations, Yield10 will continue its focus on developing elite varieties of Camelina with herbicide tolerance, disease resistance, higher yield and oil content, with the intention to breed the Rothamsted omega-3 trait into this germplasm in the future. In the near term Yield10 is exploring commercial activities for this technology in South America to serve the salmon feed market in Chile, which currently represents around 30% of the global salmon feed market for fish oils. Over the past ten years, this global market for fish oils has experienced a CAGR of 7%. Our strategy is to form relationships with service providers in South America and to increase business development activities with the companies in the aquafeed sector. The major feed suppliers in Chile are also the leading feed suppliers for North America and Norway. We believe that producing omega-3 product in South America to obtain regulatory approval in salmon feed and validation of the value of this use will pave the way for future production in North America, which we currently anticipate would begin in the 2025 spring planting season in Canada.

***PHA trait — PHA, oil and meal:*** The second proprietary product we are developing is based on new technology for the large scale, low-cost sustainable production of natural biodegradable PHA biomaterial as a third Camelina seed component. By reprogramming Camelina to produce PHA in the seed, the harvested seed can then be processed to produce three products: oil, protein meal for animal feed, and PHA biomaterial. The typical costs for producing edible oils are a useful benchmark for the potential long-term cost structure for crop based PHAs. In this scenario, crop based PHAs would have a cost advantage over petroleum-based plastics. We successfully field-tested prototype PHA bioplastic trait Camelina lines in field tests during the 2020 growing season. Although we plan to field test the two best-performing PHA Camelina lines at larger scale during the 2021 growing season, we recognize that our PHA trait is at an earlier technology readiness level. We believe that by producing PHA bioplastic in Camelina seed as a third seed product along with processing the seed to produce oil, protein meal, we can achieve a cost structure with the benefits of integrated economics. This is essentially an integrated feed (protein meal), low carbon fuel (oil) and bioplastics platform which may facilitate optimization of revenue as each market fluctuates according to demand.

**Trait Development and Licensing:** Our approach to capturing value for our traits in major food and feed crops is by licensing our traits to major seed players to maximize the numbers of acres on which they are adopted. Yield10's capital efficient approach for trait development in major food and feed crops is to utilize field results obtained from our work with traits in Camelina to create interest from major seed companies. We then execute non-exclusive research licenses for traits of interest, enabling these companies to progress our traits within the crop(s) of interest. These agreements have a limited term and contain clauses requiring data sharing with Yield10 and provide the seed companies with the right to negotiate a commercial agreement. In December 2017 we signed our first agreement with the Crop Science division of Bayer AG ("Bayer") (formerly Monsanto Company), to test C3003 and the first version of C3004 in soybean. In 2019, the license was expanded to cover a new discovery and intellectual property related to a new version of C3004. Similarly, in 2018 we signed a non-exclusive research license with Forage Genetics, to test a series of traits in forage sorghum. In 2019 we signed a non-exclusive research license with Simplot for the evaluation of our traits in potato. In 2020, we signed a non-exclusive research license with GDM for the evaluation of three traits in soybean. We plan to look for partners for our traits in canola and corn during 2021.

***Traits Being Developed by Licensees*[(1)]**

| Partner | Crop/Trait | Agreement | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|
| Bayer Crop Science | Soybean/C3003<br>Soybean/C3004 | Research<br>License<br>Collaboration | → | → | → | → |
| GDM | Soybean<br>Multiple traits | Research<br>License<br>Collaboration | | | → | → |
| Forage Genetics | Sorghum<br>Multiple traits | Research<br>License<br>Collaboration | → | → | → | → |
| JR Simplot | Potato<br>Multiple Traits | Research<br>License<br>Collaboration | | → | → | → |
| Corn Seed Company | Corn<br>Multiple Traits | Fee for Service | → | → | → | → |

(1) The timeline shown in the chart reflects the duration of each partner's research license agreements.

**R&D revenue from government grants and/or partners:** Yield10 has historically sought and participated in government grants in collaboration with leading academic institutions to develop early crop innovations and to secure rights to intellectual property. We are a participant in a grant from the Department of Energy with Michigan State University, which is a current primary source of grant revenue. It is our intention to continue this practice where the grant opportunities are consistent with progressing our commercial goals. Other potential sources of non-product revenue include funded partnerships or collaborations with companies interested in the use of our GRAIN platform to identify gene targets for traits in crops of commercial interest and potential partners or customers in the Camelina products value chain.

***Our History***

***We have a significant track record and expertise in the metabolic engineering (synthetic biology) of plants.***

Our predecessor company Metabolix was a pioneer in the development of advanced PHA bioplastics production technology using engineered microbes and fermentation, and as a result developed deep experience across the PHA bioplastics value chain. In addition, Metabolix supported a crop science research program to produce PHA biomaterials in crops as a potential low-cost production system. Historically, these efforts were focused on producing the simplest member of the PHA family, known as PHB, which is a microbial carbon storage biopolymer, in high concentration in the seeds of oilseed crops or in the leaves of biomass crops such as switchgrass. The PHB biomaterial is useful as a natural water treatment product and as a replacement for petroleum-based plastics.

***Our Approach***

***Our GRAIN platform provides us with a unique approach for discovering novel yield trait genes and producing higher value sustainable products in Camelina.***

We have integrated advanced metabolic flux modeling capabilities with transcriptome network analysis to form the foundation of our GRAIN (Gene Ranking Artificial Intelligence Network) big data mining gene discovery platform. This discovery platform is the core of our Trait Factory. In the case of crops, the levers to increase seed yield are the metabolic infrastructure through which carbon flows from photosynthesis to seed production and the gene regulators or transcription factors which control various pathways of plant metabolism. Over the last 20 years, the agricultural sector has generated vast numbers of data points. During

this same period, there have been very few new crop traits produced. GRAIN efficiently mines big data sets and prioritizes actionable gene targets to improve crop productivity. We have employed this approach to discover a range of potential yield trait genes.

***We developed a "Fast Field Test" model system to characterize, evaluate and de-risk novel trait genes in Camelina and simultaneously develop improved varieties for the production of proprietary products.***

One of the challenges the agricultural industry has faced over the years is translating early crop science discovery into value generating traits. In part this is because results from greenhouse studies in model plants have not translated well into field results in major crops. Translating success with non-plant genes in major crops has been successful for traits such as insect resistance and herbicide tolerance, and the current biotechnology seed sector, which accounted for 467 million acres of crops worldwide in 2016, is based on using microbial genes in plants. The long timelines to progress early discoveries successfully into major crops and generate field data adds to the challenge.

For these reasons, Yield10 has put in place a process we call "Fast Field Testing" based on our Camelina oilseed platform. Camelina is well-suited to field trials based on its short growing time to maturity, and we believe it holds potential as a new crop for farmers. It is also very fast to modify, develop genetically stable seed and scale up seed for field planting. Ideally, we hope to be able to progress from trait identification to field planting in about 12 months. Results from our field studies in Camelina have enabled us to generate partner interest in progressing our traits in corn, soybean, canola and other crops through research license agreements.

***We believe Camelina has high potential to become a large acreage commercial crop for producing renewable diesel feedstocks, nutritional oils including omega-3 (DHA+EPA) oils and PHA bioplastics in North and South America.***

Camelina is currently in limited cultivation in North America and Europe. Camelina oil has historically been used in food, and production is increasing because of its natural omega-3 (ALA) fatty acid content. Results from a randomized controlled study published in 2018 in the journal *Molecular Nutrition and Food Research* have shown that Camelina sativa oil, but not fatty fish or lean fish, improved the serum lipid profile in subjects with impaired glucose metabolism. Camelina protein meal left over following oil extraction by cold crushing has been approved by regulatory authorities for use in animal feed applications in the U.S. and Canada. In the cold crushing process to extract oil, some of the omega-3 (ALA) oil remains in the meal, making it attractive for use as chicken feed because it increases the omega-3 content of eggs. Camelina also has the potential to be a low carbon index source of feedstocks for renewable diesel and as a platform crop for the production of proprietary crop products.

In November 2020, Yield10 signed an exclusive collaboration and option agreement with Rothamsted for technology related to producing omega-3 (DHA+EPA) in Camelina.

We believe that our Camelina development capabilities, together with our yield and oil content trait improvements, will enable an attractive Camelina products business focused on nutritional oils in the near-term. In the longer term, the potential for production of PHA biomaterials in Camelina could provide economic returns for farmers to justify very large acreage adoption and enable the low-cost production of this product. PHA biomaterials with the right cost structure have applications in very large markets not currently served by agriculture, including water treatment and biodegradable bioplastic applications. We believe crop-based production will enable broad-based global adoption of these materials.

***We have assembled a pipeline of crop yield traits for development that are applicable to both Camelina and major commercial crops and established agreements with major seed companies.***

Our unique approach to crop yield trait discovery utilizing our GRAIN platform, which integrates advanced metabolic engineering concepts to address critical bottlenecks in carbon metabolism, has enabled us to discover a series of yield genes with potential use for producing step-change improvements in crop yield. Through our research and early development efforts we have identified and begun characterizing our C3000 and C4000 series of traits. To initially characterize the potential yield trait genes, we test our yield trait candidates using our Camelina platform. As a yield trait innovator, our objective is to identify novel yield

traits that act at a fundamental level in crop metabolism to provide the potential for broad deployment of our traits across multiple crop types. Following our work with these trait genes in Camelina, our approach is to enter into license agreements or form collaborations with major agricultural companies so they can incorporate our novel yield traits into their seed products.

***We believe our business model will allow us to develop our Camelina products business and capture value for important new yield traits for major crops.***

We are working to advance our own developments as well as form business alliances to progress our traits through development, launch and commercialization. Key to our strategy is to retain, where practical, control of timelines and maximize, where possible, the opportunity for value creation and optionality around future value realization strategies. We are focused on identifying and signing additional research and development collaborations to accelerate commercial development of our promising yield traits. Based on this strategy, Yield10 intends to focus internal resources on trait gene discovery and developing an independent Camelina based products business.

***We have signed non-exclusive research licenses for our novel yield traits with agriculture industry leaders.***

In 2017 we granted a non-exclusive global research license to Bayer to evaluate our novel yield traits C3003 and C3004 in soybean. The license was expanded in 2019 to include a new discovery and intellectual property for C3004. Bayer is a leader in the development and commercialization of biotech-derived soybean seed. In 2018, we granted a research license with a similar structure to Forage Genetics, a leader in forage crops used for animal feed, to evaluate five traits in forage sorghum. In 2019 we granted a research license with a similar structure to Simplot, a leader in potato. In 2020, we signed a non-exclusive research license with GDM for the evaluation of three traits in elite soybean germplasm.

These licenses are intended to provide market leaders in their respective crops with an attractive opportunity to test our traits and develop data at their own expense. At any time during the term of the license, they have the option to negotiate a broader agreement with us. At the same time, we have the right to sign licenses with other companies for these traits. This structure allows us the flexibility to expand the testing of our traits with investment by other companies and to potentially enter negotiations for development and commercial licenses when the value of our traits is better understood. In 2021, we plan to continue to explore additional opportunities to expand the testing of our traits through similar arrangements with other companies, and as part of our evolving strategy, we now plan to look for partners to progress our yield traits in canola and corn.

***Our Oilseed Operation based in Canada provides us with unique capabilities in the development of Camelina oilseed crops.***

We established our oilseeds subsidiary in Canada in 2010 to produce robust oilseed germplasm with engineered value-added traits for commercial crop production in western North America. Our oilseeds team is based in Saskatoon, Saskatchewan, with laboratories in the National Research Council (NRC) — Saskatoon facility and commercial greenhouse and laboratory facilities at nearby Innovation Place. Our team has developed and implemented technology to improve and accelerate engineering and trait evaluation of Camelina and canola. The team also plays a key role in designing and conducting greenhouse and field tests required to effectively evaluate novel yield traits.

***We have a network of commercial and science advisors to provide us with insight and opportunities to advance our industry alliances, crop research and development, and key intellectual property.***

Yield10 has pursued academic collaborations that have led to the discovery of novel yield trait genes. Researcher Danny Schnell, Ph.D. discovered the C3003 trait in an ARPA-e (a division of the U.S. Department of Energy (“DOE”)) funded collaborative project at the University of Massachusetts in which Yield10 was a partner. In 2015, Prof. Schnell moved to Michigan State University where he is Chairperson, Department of Plant Biology and remains a collaborator on C3003. In 2018 and 2019, Yield10 announced signing global license agreements with the University of Missouri for advanced technology to boost oil content in oilseed crops, including C3007, C3010, and C3012, which are based on the discovery of a key regulatory mechanism controlling oil production in oilseed crops which can be used to increase oil content. Jay J. Thelen, Ph.D.,

Professor of Biochemistry at the University of Missouri, who discovered this mechanism, joined our Scientific Advisory Board in 2018. In conjunction with the Rothamsted collaboration agreement signed in 2020, Yield10 is providing financial support to Prof. Johnathan Napier, a leading pioneer in plant biology at Rothamsted, to fund ongoing research, including further improvement of the omega-3 (DHA+EPA) trait, field testing, and nutritional studies.

***We plan to seek U.S. and Canadian government grants to support our research and development goals.***

Yield10 has been awarded grants over the last several years supporting research on strategies to improve the efficiency of photosynthesis, increase seed oil content, identify novel yield traits and test these novel traits in Camelina. This work is valuable because traits developed in Camelina also have the potential to be developed and deployed in other oilseed crops. For example, in 2017, we were selected as a sub-awardee on a new DOE grant led by Michigan State University to conduct research aimed at boosting oilseed yield in Camelina. We plan to continue to pursue government grants to defray research costs associated with our research and development activities.

***We are operating with a lean organizational footprint which is evaluating our novel yield traits in greenhouse and field tests while maintaining efficient use of cash resources.***

As of December 31, 2020, we had 25 full-time employees, with the majority directly involved with our research and development activities. We believe that our organizational capabilities are aligned with our research priorities and are complemented by our use of third-party infrastructure and certain service providers. With this approach we can leverage third-party infrastructure and capability without having to spend the time and capital needed to recreate them in-house. This is allowing us to focus our limited resources on deploying our core strengths against our key development goals. We expect to grow our research and development operations over time commensurate with building value in our business and advancing our traits through development while at the same time tightly managing overhead costs.

**Target Crop: The Oilseed Camelina sativa**

Camelina (*Camelina sativa*) was grown extensively in Europe, Russia and Central Asia since medieval times for oil and protein but was replaced by cultivation of rapeseed during the 1940s. Camelina has the potential to replicate the development of modern canola from rapeseed on an accelerated timeline based on modern technologies including genomics, the Trait Factory and genome editing. Starting in the 1960s, the breeding of canola from rapeseed to the first generations of canola was not completed until 1982 based on improving the oil for human consumption (low euricic acid in the oil) and improving the protein meal (low glucosinolates) for use in animal feed. This was followed by incorporating herbicide tolerance and hybrid technologies in the 1990s. Today, canola is grown on 20 million acres in Canada and is estimated to generate around $25 billion for the Canadian economy, according to the Canola Council of Canada.

Camelina has not been subject to intensive plant breeding efforts or crop production improvements, so the full potential of this crop has not yet been achieved. Initial interest in using Camelina oil in biofuels resulted in additional investment in the development of the crop in North America beginning in the mid-2000s. This work demonstrated that Camelina has several beneficial attributes. Camelina is amenable to production practices used for canola, grows on marginal lands, has enhanced drought and cold tolerance, displays early maturation and requires fewer inputs than other oilseed crops. Camelina is also naturally resistant to diseases that impact canola, and its fast growth cycle makes this crop suitable for spring planting in the Northwest U.S. and into Canada. In addition, the short growing season makes it a cash relay or cover crop candidate suitable for the upper mid-west corn belt.

Our vision is to use our proprietary gene traits to improve Camelina seed oil content and yield and combine those with herbicide and disease traits currently in development to produce oil and protein meal for current markets. This will be followed by the development of the high value omega-3 Camelina regulated trait based on our November 2020 agreement with Rothamsted. This is at a high technology readiness level and we believe suitable to begin commercialization activities. In the longer term, we believe optimizing the production of the PHA bioplastics in Camelina will enable large acre production, initially in spring varieties, and over time, in winter varieties for use as a cash cover crop. Some estimates from USDA indicate

a potential of up to 30 million acres in the upper corn belt of the U.S., which would potentially make PHA Camelina the third largest crop in the U.S.

Camelina is an attractive choice of crop for the following reasons:

- Camelina, as an underdeveloped crop, has high technology upside potential to improve agronomics (including herbicide tolerance), seed yield and seed value.
- There is a growing demand for crops that diversify the crop landscape, have lower environmental footprints and have the potential to produce high value secondary products, opening new opportunities for farmers.
- Camelina oil is rich in an omega-3 fatty acid (ALA) which is currently creating demand for the oil as a substitute for fish oil in aquaculture, a near term market.
- Camelina is readily segregated from the major row crops and readily engineered using genetic engineering tools, making it an ideal platform for producing novel seed products.
- Camelina has been engineered to produce high levels of omega-3 (DHA+EPA) fatty acids as a drop-in replacement oil for fish oil in aquafeed markets, this will replace the use of generic Camelina oil in this market,
- We have demonstrated the successful deployment of novel traits to increase seed yield and seed oil content of Camelina.
- We have recently demonstrated proof of concept for PHA bioplastics in Camelina in our 2020 field tests providing us with the potential to link a new high value Camelina crop with very large non-traditional markets in water treatment and plastics. Our internal analysis indicates this could drive very large acreage adoption. The higher per acre value enabled by Yield10's agronomic and product traits could make Yield10 the preferred production contractor for growers.

**Our "GRAIN" Technology Platform**

In the last two decades there has been a dramatic expansion of new genetic engineering and systems biology tools: genomics data, metabolic engineering, high-throughput analytical tools, including whole organism gene expression analysis and metabolomics, and powerful genome editing technologies. As a result, the seed sector has tested thousands of single genes and generated billion if not trillions of data points, yet step change improvements in crop yield have remained elusive. Yield10 is bringing new approaches and innovation based on over 30 years of experience in advanced synthetic biology and metabolic systems modelling to improve inherent yield of major food and feed crops.

At a fundamental level, increasing crop yield is a complex two-step carbon optimization problem. Harvested seed is mostly carbon fixed from carbon dioxide in the air by photosynthesis with oxygen coming from water in the soil and smaller amounts of nitrogen and phosphate both of which are applied as fertilizer. Based on our experience optimizing carbon flow in living systems, we know that increasing seed yield will likely require multiple trait genes to increase carbon fixation by photosynthesis at the front-end and direct the increased fixed carbon to the seed.

Plant growth is based on a series of chemical reactions and these can be modeled to determine the best ways to optimize the yield of the targeted product. We have integrated advanced metabolic flux modeling capabilities with transcriptome network analysis to form the foundation of the GRAIN gene discovery platform. GRAIN is a powerful data mining tool which the company has protected as a trade secret. Yield10 has used GRAIN to identify a pipeline of traits it is developing in Camelina to determine performance and then through a series of license arrangements with major seed companies in other crops. We also believe our integrated GRAIN platform can be used to successfully identify new targets for improving crop yield and are working to leverage the platform in the near-term to secure research and development funding from industry partners.

**Traits in Development**

Yield10 has established a strong pipeline of performance and product traits in development and has recently added programs for herbicide tolerance and disease resistance traits for Camelina into our pipeline.

**Novel Yield Trait Gene C3003**

C3003 is an algal gene, in-licensed from the University of Massachusetts. We believe based on GRAIN modelling that C3003 reduces the well-understood yield losses that occur through photorespiration, a side reaction of photosynthesis in C3 crops based on early positive results. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, including canola, soybean, rice, wheat and potato. Yield10 is progressing the introduction of the C3003 trait gene as well as improvements to the C3003 trait in Camelina, canola, and corn. Yield10 has elected to defer further work with canola and corn and seek partners for C3003 and other traits in these crops. Bayer and JR Simplot are working with C3003 in their soybean and potato programs, respectively.

**Novel Yield Trait Gene C3004**

We began our investigation of C3004 by preparing genetic constructs to increase the expression of the C3004 gene in Camelina. Stable C3004 Camelina lines were developed and we performed yield studies in a greenhouse and a controlled environment growth chamber. In these studies, increased expression of C3004 in Camelina resulted in a significant increase in plant growth and vigor, increased branching and seed yield, and in some cases increased individual seed weight. In 2019 we continued the development of additional C3004 Camelina lines, conducted greenhouse studies and our first field tests.

Our 2019 greenhouse studies included additional C3004 Camelina lines with different Camelina genetic backgrounds. We again observed increased vigor, branching and increases in seed yield consistent with our 2018 observations. In our 2019 field tests, photosynthetic measurements were taken during the growing season on C3004 Camelina lines at similar developmental stages. Five lines tested showed statistically significant increases in several important photosynthetic parameters for plants, including $CO_2$ fixation, electron transport rate, and the conversion of light energy to chemical energy (effective quantum yield). In 2020, Yield10 conducted field testing C3004 Camelina lines at an expanded number of sites to collect agronomic and seed yield data. We currently have research license agreements in place with seed companies to evaluate the Camelina C3004 gene in soybean and potato,

**Oil Enhancing Traits: C3007, C3008, C3009, C3010 and C3012**

Yield10 is progressing a series of traits targeted at increasing the oil content in Camelina where the oil is the main value driver. Based on the results we obtain with Camelina we may be able to license these traits to seed companies for use in other oilseed crops including canola and soybean. Yield10 is building significant capabilities and intellectual property around key oil biosynthesis pathways in plants based on technologies for increasing oil content in seeds. In cases where the oil is the primary economic value driver for the crop, increasing oil content is a valuable trait. Improving the oil content and yield of Camelina seed would increase the value per acre for this crop for the production of both generic and omega-3 (DHA+EPA) oils. We began the technical work in Camelina in 2016 with our C3008a, C3008b and C3009 traits which regulate the production and degradation of oils in oilseed crops. In 2017 and 2018, we received confirmation from USDA-APHIS's Biotechnology Regulatory Services (BRS) that two types of our genome-edited Camelina plant lines developed using CRISPR/Cas-9 genome editing technology for increased oil content were not considered to be regulated under 7 CFR part 340, clearing the way for field testing in the U.S. The first type is based on the inactivation of an enzyme expected to decrease turnover of oil in mature seeds and reduce free fatty acids in oil, a trait we have designated as C3008a. The other type is based on the inactivation of three enzymes to both enhance the production of oil and decrease turnover of oil in mature seeds and is designated as our triple edit, or C3008a, C3008b and C3009 trait containing line. We completed our first field trial with these edited Camelina lines in the U.S. during the 2019 growing season. Some of the Camelina lines with edits to the three genes produced an increase in oil content in individual seeds as well as an increase in seed oil content as a percentage of seed weight as compared to control plants. The best performing line produced an average 11.8 percent increase in oil per individual seed, an 8.7 percent increase in individual seed weight, and a 4.7 percent increase in seed oil content as a percentage of overall seed weight. No significant change in oil composition was observed. Yield10 conducted additional field tests with the best Camelina line (E3902) in the 2020 growing season and is scaling-up pure seed production in anticipation of potential commercial use.

In 2018, we signed an exclusive global license agreement with the University of Missouri for advanced oilseed technology including the C3007 and C3010 gene traits, promising targets focused on the central role of Acetyl-CoA Carboxylase ("ACCase") a key metabolic control point for oil production. In 2019, we signed an additional exclusive global license with University of Missouri for another ACCase related gene target we named C3012. We have produced genome edited versions of C3007 in Camelina and canola. Camelina contains three copies of three different BADC genes, BADC-1, BADC-2 and BADC-3. We successfully edited combinations of two of the three BADC genes and obtained confirmation through the "Am I Regulated?" process that USDA-APHIS BRS does not consider these Camelina lines to be regulated under 7 CFR part 340. These lines were grown in our 2020 field tests. We later succeeded in editing the three copies of the remaining BADC gene and data for a portion of these lines, with only one of the three copies edited, has been submitted to the USDA-APHIS BRS Confirmation of Exemption Process, under the new SECURE Rule that took effect in May 2020. This submission is currently under regulatory review. We expect to provide additional submissions to USDA-APHIS BRS containing edited versions of all three copies of this last BADC gene either under rule §340.1 (b) (4), or the Regulatory Status Review (RSR) process, which is expected to become available for Camelina in fourth quarter 2021. We also constructed edited versions of C3007 in the canola genome and obtained confirmation in 2020 through the "Am I Regulated?" process that USDA-APHIS BRS does not consider these canola lines to be regulated under 7 CFR part 340, thereby enabling future field testing of the lines.

**Omega-3 (DHA+EPA) oil trait**

The omega-3 (DHA+EPA) oil trait for which Yield10 has secured rights is being developed by the research team at Rothamsted as part of their program to develop a sustainable drop-in replacement for fish oil used in the production of aquaculture feed. Yield10 is providing financial support to the ongoing Rothamsted program and has secured an exclusive option to commercialize the technology and improvements made during the term of the agreement.

The most important omega-3 fatty acids for human health are ALA, DHA and EPA and the primary source of these is fish in the diet. These omega-3 fatty acids are produced by algae where they are thought to protect the cell membranes in cold water. The algal omega- 3's then progress up the food chain and accumulate in fish and into the human diet. Northern hemisphere fish oil contains around 10% DHA and 10% EPA. Camelina oil already contains the omega-3 fatty acid ALA and the Rothamsted Institute has developed engineered Camelina lines which produce approximately 20% of EPA +DHA fatty acids, similar to the composition of Northern Hemisphere fish oil. A number of these Camelina lines have been successfully field tested for the last four years at different locations in the UK, Canada and the US and oil samples produced for salmon and human feeding studies. Rothamsted is continuing its research program to further improve the oil composition of Camelina oil with the goal of developing a land based production system for a Camelina oil composition as a drop in replacement for Southern Hemisphere fish oils, which has an EPA+DHA fatty acid content in the oil of approximately 30 percent.

**PHA Traits: C3014 and C3015**

Yield10 filed a U.S. patent application in 2019 for new technology potentially enabling low-cost production of PHA biomaterials in the seeds of Camelina. The Yield10 patent application describes a discovery around maintaining the viability and vigor of Camelina seed programed to produce high levels of the PHA biomaterial PHB. By introducing the three genes encoding the pathway for producing PHA from the plant metabolite acetyl-CoA, we have demonstrated the production of up to 10 percent PHB in seeds of Camelina with good seedling viability in growth chambers. We currently have two new PHA biomaterial traits, C3014 and C3015, in our development pipeline and we carried out our successful first field tests in 2020. We are now progressing to scale up the two best lines, which showed PHA levels of up to 6% seed weight, to begin early product prototyping and market development studies for feed and water treatment applications. In parallel we plan to start the development of commercial quality lines based on insights from the field tests and our GRAIN platform with a goal to initiate commercial launch in the timeframe of 2024-2026.

We believe crop-based production will enable an advantaged cost structure thereby eliminating a barrier to entry for broad adoption of these materials for use potentially in animal feed, water treatment,

and as a biobased, biodegradable plastics replacement. Seeds are natural, stable storage sites for large amounts of oil and proteins deposited by plants to nourish seedlings following seed germination in the field. The stability of seeds at ambient temperatures allows them to be readily harvested, transported and stored prior to processing and makes them the ideal site in a plant for producing PHA biomaterials.

The key concept was to introduce PHA as a new component of the seed composition and by processing the PHA producing seed, to produce oil, polymer, and protein rich seed meal. The combination of all three products improves the overall value proposition and we believe that in time this will result in PHA bioplastics costs in line with canola and soybean oils. Yield10 plans to develop and commercialize Camelina seed based PHA biomaterials for water treatment applications and look for commercial partnering opportunities for plastics replacements markets.

**C4000 Series Traits**

We used our GRAIN platform to study global transcription factors and identify novel yield traits in the C4000 series. These traits may be powerful regulators of plant growth and represent a potentially valuable resource for identifying genome editing traits for crops. We have recently shown that traits from the C4000 series can significantly increase photosynthetic efficiency, above ground biomass, and below ground biomass production in our switchgrass plants engineered to overexpress the transcription factors. We reported these results for our novel C4001 and C4003 traits in 2018 in the journal *Plant Science*. Switchgrass plants expressing C4001 resulted in a total increase in biomass of 75-100 percent in leaves and stems as compared to controls. Expression of C4003 in switchgrass resulted in a total increase in biomass of 100-160 percent in leaves and stems as compared to control plants. Increasing biomass yield is important for forage crops such as sorghum, silage corn, and alfalfa.

We are progressing the development of certain of our C4000 series of traits in Camelina and corn. Depending on the field performance of the C4000 series Camelina lines, Yield10 plans to integrate them into a commercial Camelina seed business. Recognizing our limited internal capabilities and resources in corn, the Company plans to seek partners interested in progressing these traits in corn under a license agreement like the one in place with Bayer for soybean. Forage Genetics began work with certain of our C4000 series traits through a research license signed in 2018 to assess the potential of our traits to increase biomass in forage sorghum. Simplot is testing the C4001 trait in potato.

We expect evaluation of C4000 series traits in these target crops will continue to advance in 2020. Traits in this series and the proof points we expect to generate may provide us with an opportunity to selectively partner with others for the development of these traits in major commercial food, feed, and forage crops.

**Target Crops for Trait Licensing**

Our research and early development work with our C3000 and C4000 series traits in Camelina and other crops suggests that our technology may be applicable to a wide range of crops harvested for food and animal feed uses. We believe that if novel yield traits could be successfully developed and commercialized in any of these crops, farmers would be able to improve the productivity of their land to meet rising demand for food and feed, thereby creating significant economic value.

The crops we are targeting for development are described below.

**Soybean or *Glycine max*** is an oilseed crop used for food, food ingredients, food additives and animal feed. The soybean can be harvested for oil used in food and industrial applications, and soybean meal is a significant source of protein for use mostly in animal feed but also for direct human consumption. Fermented soy foods include soy sauce and tempeh, and non-fermented food uses include soy milk and tofu. Soybeans are widely cultivated in North and South America, where a majority of the seed planted is genetically modified. An estimated 94.4 million acres of soybean will be planted in the U.S. and Canada in the 2018/2019 growing season. According to the USDA, the U.S., Brazil and Argentina together represent approximately 80 percent of global soybean production. Yield10 is targeting a 20 percent or greater increase in soybean seed yield. Yield 10 has executed research license agreements with Bayer and GDM to enable evaluation of certain traits in soybean.

**Potato** is the most important non-cereal staple food crop for humans after wheat and rice. In the United States the potato harvest acreage is around 1 million acres, the harvest value however is around $6 billion, and the frozen French fry sector has a value of around $20 billion. Yield10 has no in-house R&D activities specific to potato but has executed a research license agreement with Simplot to enable the evaluation of three of our traits in potato.

**Forage Sorghum.**Forage crops are grown expressly for biomass used for feeding livestock. Typical forage crops include both annual and perennial crops such as various grasses, silage corn, alfalfa and sorghum. Biotechnology traits have been previously introduced into silage corn and alfalfa. Other forage crops could be amenable to gene editing strategies to increase biomass yield per acre. We believe that our technology and traits that increase biomass may have application to forage crops. Yield10 has no in-house R&D activities specific to forage sorghum but has executed a research license agreement with Forage Genetics to enable them to evaluate five of our traits in this crop.

**Canola (*Brassica napus)*** is a cultivar of rapeseed which produces a higher value edible oil favored by consumers because it has a healthier fatty acid profile than corn or soybean oil. The canola crop was developed in Canada where it is primarily grown today with additional acreage grown in the U.S. Currently the vast majority of the canola grown in North America contains two seed enhancement technologies, herbicide tolerance and hybrid seed. Both Roundup Ready (Monsanto, now Bayer) and Liberty-Link (Bayer) varieties of canola are grown and were introduced to the market in the 1990s. Approximately 24.7 million acres were planted in Canada and the U.S. in the 2018 growing season. The Canola Council of Canada has set yield goals of 52 bushels/acre for 26 million metric tons of production to meet global market demand for canola by 2025. Yield10 is targeting a 10-20 percent or greater increase in canola seed yield. As one of Canada's major field crops, canola is subject to variety registration, which is a regulatory requirement of the Seeds Act and is also administered by the CFIA. Any future sales of our seed traits or products in Canada would be done by a third-party collaborator or other partner, and that third party would be responsible for complying with registration requirements for the canola varieties, if applicable. Yield10 has field tested traits C3003 and C3004 in canola, and is seeking a collaboration or license to develop and commercialize our traits in corn.

**Corn** is a crop grown globally and used for animal feed and for producing starch which can be used as a raw material for producing food ingredients and food additives, as well as for use in the production of paper, packaging materials and other items. GM maize was grown for the first time in the U.S. and Canada in 1997. Currently, about 80 percent of maize/corn production in the U.S. is genetically modified. It was estimated that more than 83 million acres of corn were planted in North America in the 2018 growing season. The traits commonly used in today's corn cultivars provide insect resistance and herbicide tolerance. In many GM seeds sold today, these traits are stacked ("stacked" refers to the practice of adding multiple traits to an elite plant line). Corn has the more efficient C4 photosynthesis system and Yield10 is targeting a 10 percent yield increase in corn. We have conducted early development of our traits in corn, and are seeking a collaboration or license to develop and commercialize our traits in corn.

**In-License Agreements**

*Exclusive Collaboration Agreement with Rothamsted Research*

On November 12, 2020, Yield10 signed an exclusive collaboration agreement with UK-based Rothamsted Research to support Rothamsted's Flagship Program to develop omega-3 oils in *Camelina sativa*. The technology developed by Rothamsted could enable the sustainable, plant-based production of omega-3 (DHA+EPA) nutritional oils that closely mimic the composition of Southern Hemisphere fish oil, an important ingredient in aquaculture feed. Omega-3 oils are also essential for human nutrition and have demonstrated benefits in heart health. Rothamsted Research is a world-leading nonprofit research center based in Harpenden, UK that focuses on strategic agricultural science to the benefit of farmers and society worldwide. Over the last decade, the team led by Professor Johnathan Napier, Ph.D., Science Director, has demonstrated the production of DHA+EPA oils in Camelina seed. In addition, Prof. Napier's team has carried out multi-year field trials and multiple feeding studies using the DHA+EPA Camelina oil in different fish species including salmon with research partners including at least one major aquafeed company. Under the agreement, Yield10 is providing financial support for Prof. Napier's ongoing research including

further DHA+EPA trait improvement, field testing and nutritional studies. As part of the agreement, Yield10 has an exclusive two-year option to sign a global, exclusive or non-exclusive license agreement to the technology. Under this collaboration Yield10 will monitor ongoing progress by Rothamsted while developing the business plan for the initial commercial launch, probably in South America to serve the salmon feed market in Chile.

*License Agreement with the University of Massachusetts*

Pursuant to a license agreement with the University of Massachusetts ("UMASS") dated as of June 30, 2015, we have an exclusive, worldwide license under certain patents and patent applications, including issued patents covering our yield trait gene C3003, relating to the manufacture of plants with enhanced photosynthesis. The agreement provides an exclusive, worldwide license to make, have made, use, offer for sale, sell, have sold and import any transgenic plant seed or plant grown therefrom or transgenic plant material developed for sale to a farmer or grower for planting in the field, which transgenic plant seed or plant grown therefrom or transgenic plant material is covered by, embodies or is derived from (in whole or in part) one or more issued or pending claims of the licensed patents or patent applications.

Pursuant to the UMASS license agreement, we are required to use diligent efforts to develop licensed products throughout the field of use and to introduce licensed products into the commercial market. In that regard, we are obligated to fulfill certain development and regulatory milestones relating to C3003, including completion of multi-site field demonstrations of a crop species in which C3003 has been introduced, and filing for regulatory approval of a crop species in which C3003 has been introduced within a specified period. Our failure to achieve any milestone provided for under the agreement would give UMASS the right to terminate the agreement, following a notice period, unless we are able to reach agreement with UMASS as to a potential adjustment to the applicable milestone.

We are obligated to pay UMASS milestone payments relating to any regulatory filings and approvals covered by the agreement, royalties on any sales of licensed products following regulatory approval, as well as a percentage of any sublicense income related to the licensed products.

We may terminate the agreement at any time upon 90 days prior written notice to UMASS. Either party may terminate for material breach immediately upon written notice for a breach that is not cured within 60 days after receiving written notice of the breach. In addition, UMASS may terminate this agreement with respect to certain patent rights immediately upon written notice in the event we contest the validity or enforceability of such patent rights.

*License Agreement with the University of Missouri*

Pursuant to a license agreement with the University of Missouri ("UM") dated as of May 17, 2018, we have an exclusive, worldwide license to two novel gene technologies to boost oil content in crops. Both technologies are based on significant new discoveries around the function and regulation of ACCase, a key rate-limiting enzyme involved in oil production. The first technology, named C3007, is a gene for a negative controller that inhibits the enzyme activity of ACCase. The second technology, named C3010, is a gene which, if over-expressed, results in increased activity of ACCase. The UM license was expanded during May 2019 to include an exclusive worldwide license to a third gene in the ACCase complex, that we have designated C3012, that may complement the activity of C3007 to boost oil content in crops.

Pursuant to the UM license agreement, we are required to use diligent efforts to develop licensed products throughout the licensed field and to introduce licensed products into the commercial market. In that regard, we are obligated to fulfill certain research, development and regulatory milestones relating to C3007, C3010 and C3012, including completion of multi-site field demonstrations of a crop species in which C3007, C3010 and C3012 have been introduced, and filing for regulatory approval of a crop species in which C3007, C3010 and C3012 have been introduced within a specified period. Our failure to achieve any milestone provided for under the license agreement would give UM the right to terminate the license agreement or render it nonexclusive, unless we are able to reach agreement with UM as to the potential adjustment of the applicable milestone.

We are obligated to pay UM a license execution payment, milestone payments relating to any regulatory filings and approvals covered by the license agreement, royalties on any sales of licensed products following regulatory approval, as well as a percentage of any sublicense royalties related to the licensed products.

We may terminate the license agreement at any time upon 90 days' prior written notice to UM. Either party may terminate the license agreement upon written notice for a breach that is not cured within 30 days after receiving written notice of the breach. In addition, UM may terminate the license agreement with respect to certain patent rights immediately upon written notice in the event we contest the validity or enforceability of such patent rights.

**Competitive Landscape for our Business**

- Camelina Oilseed and Alternative Cover Crops
- Omega-3 Oil
- PHA Biomaterials
- Trait Licensing: Agricultural Industry Landscape

***Camelina Oilseed and Alternative Cover Crops:*** Camelina has been of interest for large scale production in North America to produce feedstocks for biodiesel since the biofuels boom in the early 2000's because it is not a major food crop. This interest changed over the ensuing years as more information was developed about its potential for food oils and as a supplement for fish oil in the production of aquafeed due to its natural content of the omega-3 fatty acid ALA. We anticipate that the growing interest in sourcing non-food, low carbon index feedstocks for renewable diesel will create renewed interest and potentially competition in Camelina. This may be particularly true of its use as a winter cover crop, enabling a second oil harvest for each acre. The general interest in cover crops has been steadily increasing over the last several years and this has resulted in at least one venture funded company actively developing alternatives to Camelina. The St. Louis, Missouri company CoverCress Inc. has been active for several years developing the oilseed pennycress as a cover crop for the mid-west corn and soybean belt.

***Omega-3 Oil:*** The growing demand for alternative sustainable sources of fish oil for human nutrition, pharmaceutical, and aquafeed applications has made this an attractive area for investment by several companies. Alternative sources include microbial fermentation processes commercialized by Veramaris (the joint venture between Evonic and DSM, with a production facility in Blair Nebraska) and Archer Daniels Midland Co. (with a production facility in Clinton, Iowa). On the crop-based production side, two different genetically engineered varieties of the oilseed canola have been developed and approved by USDA-APHIS to address this growing demand. BASF Plant Sciences has developed a canola variety that produces low amounts of the omega-3 fatty acid EPA and the Australian company Nuseed has developed a canola variety that produces the omega-3 fatty acid DHA in the oil. BASF currently has patents on genes for the production of omega-3 oils in canola dating back to applications made on or before 2005. NuSeed exclusively licensed patents on the production of omega-3 oils in canola from Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO). We believe the Rothamsted technology which enables production of omega-3 DHA+EPA oil has higher potential as a drop-in replacement for fish oil in aquafeed.

***PHA Biomaterials:*** Third party PHA producers are pursuing fermentation-based production systems to produce PHA bioplastics for the biodegradables market. These include Cheil Jedang, or CJ, of South Korea (which acquired the fermentation and polymer processing technology from Yield10 in 2016 when we were still named Metabolix Inc.), Kaneka of Japan, and Danimer Scientific of Atlanta, Georgia (which acquired the PHA assets of P&G in 2007). Danimer has a revenue generating bioplastics compounding business, produced PHAs using fermentation of seed oils and has relationships in place with a number of brand owners and consumer products companies. In 2020, Danimer (NYSE: DNMR) went public through a SPAC transaction on the NYSE. There are also a number of much smaller pre-commercial PHA bioplastic companies all of which, to our knowledge, are based on fermentation platforms in North America and in China. Although these companies use genetically engineered microbes and feedstocks from GMO crops for their fermentation processes, some brand owners may prefer to accept the higher cost structure for their PHA bioplastic as compared to PHA Camelina because they are not made in a GMO crop.

***Trait Licensing: Agricultural Industry Landscape:*** Following advances in biotechnology in the 1970s through the early 1990s, the first genetically modified ("GM") crops were commercially introduced in the U.S. in the years 1994 and 1995. Today, the U.S. leads the world in the adoption of GM crops in terms of crop value and acreage planted. GM crops (also referred to as GMO or Agbiotech) have had both their supporters and their detractors over the years. Consumer sentiment including concerns about the safety of GM crops have limited the introduction and adoption of GM crops in Europe. However, recent studies by the National Academy of Science continue to support the 20-year history of safe use of GM crops.

The International Service for the Acquisition of Agri-Biotech Applications (ISAAA), an industry research group, reported that 457 million acres worldwide were planted with GM crops in 2016, the most recent year for which data is available. The planting of GM crops is centered in the Americas with North America at approximately 45 percent of the acres and South America at approximately 43 percent. China and India follow with approximately 8 percent and the balance of the total worldwide GM crop acreage in 2016 was planted in the EU and the rest of world. The primary GM crops in the U.S. are corn, soybean, cotton and sugar beet. In Canada, the oilseed crop canola is the primary GM crop. Cotton is the primary GM crop grown in India and China.

In contrast to the Americas, the EU has been resistant to the adoption of GM crops and has relied heavily on plant breeding programs for capturing crop yield improvements over the last 20 years. In 2016, Spain was the largest producer of GM crops in Europe, based on cultivation of GM corn representing approximately 20 percent of the country's crop that year. Certain GM crops have been approved for cultivation in some European countries, while other countries have imposed outright bans on cultivation of GM crops.

According to the market research firm, Research and Markets, the total global seed business was estimated at $68 billion in 2017 and is projected to grow to more than $100 billion by 2022. According to an ISAAA report, the global GM seed business represented a $17.2 billion market in 2017 and biotech crops were grown on approximately 469 million acres that year. The traits being commercialized today by the agricultural industry mainly address crop protection, which involves preventing crop damage by weeds, insects and other pests that lower expected crop yield. As technology has advanced, "trait stacking," or the practice of adding multiple traits to an elite plant line, has become commonplace as a strategy to protect yield. As the industry has developed, the practice of inter-licensing traits between research and development driven seed companies has led to a proliferation of branded seed products on the market today.

The GM seed business is dominated by large multinational companies and their subsidiaries including BASF Corporation, Bayer, DuPont de Nemours, Inc., Syngenta AG and AgReliant Genetics, LLC. These companies have significant resources, experience and track records of successfully developing, testing and commercializing high performing seed lines as well as new traits for GM crops. They offer farmers conventional and biotechnology seeds as well as crop protection chemicals, biologicals, fertilizers and other products and technologies aimed at supporting the on-farm efficiency of managing crops in the field as well as managing the overall cost of crop production to successful harvest. Many of these companies were recently involved in consolidation of the sector with the merger of DuPont de Nemours, Inc. and Dow Chemical Company, the acquisition of Syngenta AG by the China National Chemical Corporation, and the acquisition of The Monsanto Company by Bayer in 2018.

Privately owned, U.S. retail seed companies play a key role in the industry by developing, marketing and selling high performing seed to U.S. farmers. These companies include Beck's Hybrids and Stine Seed. These companies have capabilities in both biotechnology and plant breeding. They source traits from the multinational companies and input these traits into elite plant germplasm to produce seeds optimized for a variety of soil, climate and field conditions. Both companies offer a broad arrange of GM corn and soybean products to their customers.

Recent advances in biotechnology including gene editing have led to the formation of companies focusing on yield trait discovery, biologicals for pest control, agbiome strategies and precision agriculture. There are startups, privately held and publicly traded companies involved in this space. Such companies include AgBiome LLC, Arcadia Biosciences, Inc., Benson Hill Biosystems, Inc., BioCeres S.A., Calyxt, Inc., Cibus Ltd., Evogene Ltd., Inari Agriculture, Inc., Indigo Agriculture, Inc., Kaiima Bio-Agritech Ltd., Marrone Bio Innovation, Inc., and Pairwise Plants LLC, many of which have greater resources and

experience than we have. Both Calyxt (Nasdaq: CLXT) and the private company Cibus recently changed their business models to focus on trait discovery and development.

**Intellectual Property**

Our continued success depends in large part on our proprietary technology. As of December 31, 2020, we owned or held exclusive rights to 22 patents and pending patent applications worldwide related to advanced technologies for increasing yield in crops. As part of the agreement with Rothamsted Research, we have an option on three patent families. Our portfolio of patent applications includes plant science technologies we have in-licensed globally and exclusively from the University of Massachusetts related to the yield trait gene C3003 and other advanced technologies based on advanced metabolic engineering methods to improve carbon capture and selectively control carbon partitioning in plants. Our portfolio of patent applications also includes advanced technologies for oilseed crops that we in-licensed globally and exclusively from the University of Missouri in 2018 and 2019 related to the yield trait genes C3007, C3010 and C3012.

We continue to seek, develop and evaluate new technologies and related intellectual property that might enhance our business strategy, industry position or deployment options.

**Employees**

As of December 31, 2020, we had 25 full-time employees. Of those employees, 21 were in research and development. Among our staff, 11 hold Ph.D.'s and 12 hold masters' or bachelors' degrees in their respective disciplines. Our technical staff has expertise in the following areas: plant genetics, plant biology, microbial genetics, bioinformatics, metabolic engineering and systems biology. Our headquarters are located in Massachusetts, and we maintain a research and development facility, including greenhouse facilities, in Saskatoon, Canada. None of our employees are subject to a collective bargaining agreement. We consider our relationship with our employees to be good.

**Corporate History and Investor Information**

In 1992, our Company was incorporated in Massachusetts under the name Metabolix, Inc. In September 1998, we reincorporated in Delaware and in January 2017 we changed our name to Yield10 Bioscience, Inc. to reflect our change in mission around innovations in agricultural biotechnology focused on developing disruptive technologies for step-change improvements in crop yield. Financial and other information about our Company is available on our website at www.yield10bio.com.

We make available on our website, free of charge, copies of our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the Securities and Exchange Commission (the "SEC").

In addition, the SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our filings with the SEC may be accessed through the SEC's website at http://www.sec.gov.

## DESCRIPTION OF CAPITAL STOCK

### General

The following summary of our capital stock is based on certain provisions of our amended and restated certificate of incorporation and bylaws and on the applicable provisions of the Delaware General Corporation Law, or DGCL. This summary does not purport to be complete and is qualified in its entirety by reference to the applicable provisions our amended and restated certificate of incorporation and bylaws and the DGCL. For information on how to obtain copies of such documents, please refer to the heading "Where You Can Find More Information" in this prospectus.

Our authorized capital stock consists of 65,000,000 shares, with a par value of $0.01 per share, of which:

- 60,000,000 shares are designated as Common Stock; and
- 5,000,000 shares are designated as undesignated preferred stock.

### Common Stock

The holders of our Common Stock are entitled to one vote per share on all matters submitted to a vote of our stockholders and do not have cumulative voting rights. Subject to preferences that may be applicable to any preferred stock outstanding at the time, the holders of outstanding shares of Common Stock are entitled to receive ratably any dividends declared by our board of directors out of assets legally available. Upon our liquidation, dissolution or winding up, holders of our Common Stock are entitled to share ratably in all assets remaining after payment of liabilities and the liquidation preference of any then outstanding shares of preferred stock. Holders of Common Stock have no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to our Common Stock.

### Preferred Stock

Our amended and restated certificate of incorporation, as amended, provides for a class of its authorized stock known as preferred stock, consisting of 5,000,000 shares, $0.01 par value per share, issuable from time to time in one or more series. Our board of directors may designate the rights, preferences, privileges and restrictions of the preferred stock, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preference, sinking fund terms and the number of shares constituting any series or the designation of any series. As of January 28, 2021, there were no shares of Preferred Stock issued or outstanding.

### Warrants

As of January 28, 2021, we had warrants outstanding to purchase 2,616,874 shares of our Common Stock.

#### *Anti-Takeover Provisions*

Certain provisions of the DGCL and our amended and restated certificate of incorporation and bylaws may have the effect of delaying, deferring or discouraging another party from acquiring control of our company. These provisions, which are summarized below, may discourage certain types of coercive takeover practices and inadequate takeover bids and encourage anyone seeking to acquire control of our company to first negotiate with our board of directors. These provisions might also have the effect of preventing changes in our management and could make it more difficult to accomplish transactions that stockholders might otherwise deem to be in their best interests. However, we believe that the advantages gained by protecting our ability to negotiate with any unsolicited and potentially unfriendly acquirer outweigh the disadvantages of discouraging such proposals, because, among other reasons, the negotiation of such proposals could result in improving their terms.

***Amended and Restated Certificate of Incorporation and Bylaw Provisions***

Our amended and restated certificate of incorporation, as amended, and amended and restated by-laws include a number of provisions that may have the effect of delaying, deferring or discouraging another party from acquiring control of our company or preventing changes in our management, including the following:

- Issuance *of Undesignated Preferred Stock.* Our board of directors has the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights, preferences and privileges designated from time to time by our board of directors without further action by stockholders. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences and sinking fund terms, any or all of which may be greater than the rights of common stock.
- Size *of the Board of Directors and Filling Vacancies.* The number of directors constituting our board of directors may be set only by resolution adopted by a majority vote of our entire board of directors. Any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of the board of directors, may only be filled by the affirmative vote of a majority of our directors then in office, even if less than a quorum.
- Classified *Board.* Our board of directors is divided into three classes of directors, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms.
- No *Cumulative Voting.* Our amended and restated certificate of incorporation, as amended, and amended and restated by-laws do not permit cumulative voting in the election of directors. Cumulative voting allows a stockholder to vote a portion, or all of its shares for one or more candidates. The absence of cumulative voting makes it more difficult for a minority stockholder to gain a seat.
- Removal *of Directors.* Directors can only be removed by our stockholders for cause and removal of a director will require a 75% stockholder vote.
- No *Written Consent of Stockholders.* All stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting. Stockholders may not take action by written consent in lieu of a meeting. The inability of stockholders to take action by written consent means that a stockholder would need to wait until the next annual or special meeting to bring business before the stockholders for a vote.
- Special *Meetings of Stockholders.* Special meetings of our stockholders may be called only by our board of directors acting pursuant to a resolution approved by the affirmative vote of a majority of the directors then in office. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of our stockholders.
- Advance *Notice Requirements for Stockholder Proposals and Director Nominations.* Our amended and restated by-laws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. These procedures provide that notice must be given in writing not later than the close of business on the 90th day nor earlier than the close of business on the 120th day prior to the first anniversary of the preceding year's annual meeting. These procedures may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempt to obtain control of us.
- Amendment *to Amended and Restated Certificate of Incorporation and By-laws.* Any amendment, repeal or modification of certain provisions of our amended and restated certificate of incorporation or amended and restated by-laws requires a 75% stockholder vote. Provisions requiring such supermajority vote include, among other things, any amendment, repeal or modification of the provisions relating to the classification of our board of directors, the requirement that stockholder actions be effected at a duly called annual or special meeting of our stockholders and the designated parties entitled to call a special meeting of our stockholders.

**Section 203 of the DGCL**

We are subject to Section 203 of the DGCL. In general, Section 203 of the DGCL prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless it satisfies one of the following conditions:

- the transaction is approved by the board of directors prior to the time that the interested stockholder became an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced; or

In general, Section 203 defines "business combination" to include the following:

- at or subsequent to such time that the stockholder became an interested stockholder, the business combination was approved by the board of directors and authorized at an annual or special meeting of stockholders by at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.
- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, exchange, mortgage, pledge, transfer or other disposition of the assets of the corporation with an aggregate market value of 10% or more of either the aggregate market value of all assets of the corporation on a consolidated basis or the aggregate market value of all of the outstanding stock of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an "interested stockholder" as an entity or person who, together with the stockholder's affiliates and associates (as defined in Section 203), beneficially owns, or within three years prior to the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

**Treatment of Options Upon Change of Control**

In general, under the terms of our Stock Option and Incentive Plans and our executive employment agreements, in the event of certain change in control transactions, if the successor corporation does not assume our outstanding options or issue replacement awards, or if an optionholder's employment is involuntarily terminated in connection with such change in control, the vesting of the options outstanding under such plans will accelerate.

**Transfer Agent and Registrar**

The transfer agent and registrar for our Common Stock is American Stock Transfer & Trust Company, LLC. The transfer agent's telephone number is (718) 921-8300.

**Stock Exchange Listing**

Our Common Stock is listed on the Nasdaq Capital Market under the symbol YTEN.

## DISCLOSURE OF COMMISSION POSITION ON INDEMNIFICATION FOR SECURITIES ACT LIABILITIES

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers, and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been informed that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable.

## MATERIAL UNITED STATES FEDERAL TAX CONSEQUENCES FOR NON-U.S. HOLDERS

The following discussion is a summary of the material U.S. federal tax consequences relating to the acquisition, ownership and disposition of our Common Stock by non-U.S. holders (as defined below). This discussion is based upon the provisions of the U.S. Internal Revenue Code of 1986, as amended (the "Code"), U.S. Treasury regulations, rulings and judicial decisions, all as in effect on the date hereof. Those authorities may be changed, perhaps retroactively, so as to result in U.S. federal income and estate tax consequences different from those discussed below. There can be no assurance that the U.S. Internal Revenue Service (the "IRS"), will agree with the statements herein.

A "U.S. holder" means a beneficial owner of our Common Stock that is for U.S. federal income tax purposes:

- a citizen or individual resident of the United States;
- a corporation (or other entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if (1) a court within the United States is able to exercise primary supervision over the trust's administration and one or more U.S. persons have the authority to control all of its substantial decisions, or (2) a valid election to be treated as a U.S. person is in effect under the relevant Treasury regulations with respect to such trust.

A "non-U.S. holder" means a beneficial owner of our Common Stock that is neither a U.S. holder nor a partnership (including an entity that is treated as a partnership for U.S. federal income tax purposes).

This discussion deals only with our Common Stock held as a capital asset within the meaning of Section 1221 of the Code (generally, property held for investment). This discussion does not address all of the U.S. federal income and estate tax consequences that may be relevant to a non-U.S. holder in light of such holder's particular circumstances, nor does it deal with special situations, such as:

- tax consequences to non-U.S. holders who may be subject to special tax treatment, such as banks and other financial institutions, insurance companies, partnerships or other entities treated as pass-through entities for U.S. federal income tax purposes, certain former citizens or residents of the United States, "controlled foreign corporations", "passive foreign investment companies", corporations that accumulate earnings to avoid U.S. federal income tax, tax-exempt entities, common trust funds, certain trusts, hybrid entities, foreign governments, international organizations and dealers or traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;
- tax consequences to persons holding our Common Stock as part of a hedging, integrated, constructive sale or conversion transaction or a straddle;
- any gift tax consequences;
- alternative minimum tax consequences, if any; or
- any U.S. state or local or foreign tax consequences.

If an entity treated as a partnership for U.S. federal income tax purposes holds our Common Stock, the tax treatment of a partner or member in the partnership generally will depend upon the status of the partner or member and the activities of the partnership. Prospective investors that are entities treated as partnerships for U.S. federal income tax purposes should consult their own tax advisors regarding the U.S. federal income and estate tax considerations to them and their partners or members of holding our Common Stock.

THIS DISCUSSION IS NOT A LEGAL OPINION. IF YOU ARE CONSIDERING THE ACQUISITION OF OUR COMMON STOCK, YOU SHOULD CONSULT YOUR OWN TAX ADVISOR CONCERNING THE U.S. FEDERAL INCOME TAX CONSEQUENCES TO YOU IN LIGHT OF YOUR OWN PARTICULAR CIRCUMSTANCES, AS WELL AS ANY TAX

CONSEQUENCES ARISING UNDER THE LAWS OF ANY OTHER TAXING JURISDICTION, THE EFFECT OF ANY CHANGES IN APPLICABLE TAX LAW, AND YOUR ENTITLEMENT TO BENEFITS UNDER AN APPLICABLE INCOME TAX TREATY.

**Distributions on Common Stock**

We do not expect to declare or make any distributions on our Common Stock in the foreseeable future. If we make a distribution of cash or other property (other than certain pro rata distributions of our Common Stock) in respect of our Common Stock, the distribution will be treated as a dividend to the extent it is paid from our current or accumulated earnings and profits (as determined under U.S. federal income tax principles). If the amount of a distribution exceeds our current and accumulated earnings and profits, such excess first will be treated as a tax-free return of capital to the extent of the non-U.S. holder's adjusted tax basis in our Common Stock, and thereafter will be treated as capital gain. Subject to the discussion of backup withholding and FATCA below, distributions treated as dividends on our Common Stock held by a non-U.S. holder generally will be subject to U.S. federal withholding tax at a rate of 30%, or at a lower rate if provided by an applicable income tax treaty and the non-U.S. holder has provided the documentation required to claim benefits under such treaty. Generally, to claim the benefits of an income tax treaty, a non-U.S. holder will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or appropriate substitute or successor form) certifying its entitlement to benefits under the treaty.

If, however, a dividend is effectively connected with the conduct of a trade or business in the United States by the non-U.S. holder (and, if an applicable tax treaty so provides, is attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States), the dividend will not be subject to U.S. federal withholding tax (so long as the non-U.S. holder has provided the appropriate documentation, generally an IRS Form W-8ECI (or appropriate substitute or successor form), to the withholding agent), but the non-U.S. holder generally will be subject to U.S. federal income tax in respect of the dividend on a net income basis at regular U.S. federal income tax rates in substantially the same manner as U.S. persons. Dividends received by a non-U.S. holder that is classified as a corporation for U.S. federal income tax purposes and which are effectively connected with the conduct of a U.S. trade or business (and which are not eligible, under the business profits article of an applicable tax treaty, for an exemption from U.S. taxation for business profits that are not attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States (herein not "Treaty Exempt")) may also be subject to a branch profits tax at the rate of 30% (or a lower rate if provided by an applicable tax treaty).

A non-U.S. holder that is eligible for a reduced rate of U.S. federal withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim for a refund together with the required information with the IRS.

**Sale, Exchange or Other Disposition of Common Stock**

Subject to the discussion of backup withholding and FATCA below, a non-U.S. holder generally will not be subject to U.S. federal income tax (including withholding tax) on gain realized on the sale, exchange or other disposition of our Common Stock unless:

- such non-U.S. holder is an individual who is present in the United States for 183 days or more in the taxable year of such sale, exchange or disposition, and certain other conditions are met;
- such gain is effectively connected with the conduct by the non-U.S. holder of a trade or business in the United States and is not Treaty Exempt; or
- we are or have been a "United States real property holding corporation", or a USRPHC, for U.S. federal income tax purposes at any time during the shorter of the five-year testing period ending on the date of such disposition and the non-U.S. holder's holding period of our Common Stock, and certain other conditions are met.

Gain realized by a non-U.S. holder that is effectively connected with such non-U.S. holder's conduct of a trade or business in the United States generally will be subject to U.S. federal income tax on a net income basis at regular U.S. federal income tax rates in substantially the same manner as a U.S. person (except as provided by an applicable tax treaty). In addition, if such non-U.S. holder is a corporation for U.S. federal

income tax purposes, it may also be subject to a branch profits tax at the rate of 30% (or a lower rate if provided by an applicable tax treaty).

Generally, a corporation is a USRPHC if the fair market value of its "United States real property interests" equals or exceeds 50% of the sum of the fair market value of its worldwide (domestic and foreign) real property interests and its other assets used or held for use in a trade or business (all as determined for U.S. federal income tax purposes). For this purpose, real property interests generally include land, improvements and associated personal property. We believe that we are not currently a USRPHC for this purpose. If we were a USRPHC during the applicable testing period, non-U.S. holders owning (directly or indirectly) more than 5% of our Common Stock generally would be subject to U.S. federal income tax on the gain realized on the sale, exchange or disposition of our Common Stock, which would be treated as income effectively connected with a U.S. trade or business (and taxable as discussed above). Even if we were a USRPHC during the testing period, U.S. federal income tax would not apply to gain realized on the sale, exchange or disposition of our Common Stock by a non-U.S. holder that owns (directly or indirectly) 5% or less of our Common Stock so long as our Common Stock is "regularly traded on an established securities market" within the meaning of the applicable U.S. Treasury regulations. Prospective investors should be aware that no assurance can be provided that our Common Stock will be so regularly traded when a non-U.S. holder sells our Common Stock.

**Information Reporting and Backup Withholding**

Dividends and proceeds from the sale, exchange or other disposition of our Common Stock are potentially subject to backup withholding at the applicable rate. In general, backup withholding will not apply to dividends on our Common Stock paid by us or our paying agents, in their capacities as such, to a non-U.S. holder if the holder has provided the required certification that it is a non-U.S. holder, such as by providing an IRS Form W-8BEN, W-8BEN-E or IRS Form W-8ECI (or appropriate substitute or successor form) and neither we nor our paying agent has actual knowledge (or reason to know) that the holder is a U.S. holder that is not an exempt recipient.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules will be allowed as a refund or a credit against a non-U.S. holder's U.S. federal income tax liability, provided the required information is furnished on a timely basis to the IRS.

Non-U.S. holders should consult their tax advisors regarding the application of the information reporting and backup withholding rules to them.

**Foreign Account Tax Compliance Act**

The Foreign Account Tax Compliance Act (generally referred to as "FATCA"), when applicable, will impose a U.S. federal withholding tax of 30% on certain payments to "foreign financial institutions" (which are broadly defined for this purpose and generally include investment vehicles) and certain other non-U.S. entities unless various U.S. information reporting and due diligence requirements (generally relating to ownership by U.S. persons of certain interests in or accounts with those entities) have been satisfied. Payments subject to withholding tax under FATCA include dividends on common stock of U.S. corporations (such as our Common Stock). Although under the Code payments subject to withholding tax under FATCA also include the gross proceeds of a disposition of stock (including a liquidating distribution from a corporation) or debt instruments, in each case with respect to any U.S. investment, proposed Treasury Regulations published on December 18, 2018, provide that such gross proceeds are not "withholdable payments" under FATCA and therefore not subject to withholding tax. Such proposed Treasury Regulations provide that Taxpayers generally may rely on the proposed Treasury Regulations until final Treasury Regulations are issued. Under certain circumstances, a non-U.S. holder might be eligible for refunds or credits of amounts withheld. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this paragraph. Non-U.S. holders should consult their own tax advisors regarding the potential application and impact of these requirements based upon their particular circumstances.

**U.S. Federal Estate Tax**

Common stock owned or treated as owned by an individual who is not a citizen or resident of the United States (as specifically defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and may be subject to U.S. federal estate tax unless an applicable estate tax treaty provides otherwise.

## UNDERWRITING

Maxim Group LLC (the "representative") is acting as sole book-running manager of this offering. We have entered into an underwriting agreement dated January 31, 2021 with the representative. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to each underwriter named below, and each underwriter named below has severally agreed to purchase from us, at the public offering price less the underwriting discounts set forth on the cover page of this prospectus, the number of shares of common stock listed next to its name in the following table.

The underwriting agreement provides for the purchase of a specific number of shares of common stock by each of the underwriters named below. The underwriters' obligations are several, which means that each underwriter is required to purchase a specified number of shares of common stock, but is not responsible for the commitment of any other underwriter to purchase shares. Subject to the terms and conditions of the underwriting agreement, each underwriter has severally agreed to purchase the number of shares of common stock set forth opposite its name below:

| Name | Number of Shares |
|---|---|
| Maxim Group LLC | 1,040,000 |
| Total | 1,040,000 |

The underwriters have agreed to purchase all of the shares offered by this prospectus if any are purchased. Under the underwriting agreement, if an underwriter defaults in its commitment to purchase shares, the commitments of non-defaulting underwriters may be increased or the underwriting agreement may be terminated, depending on the circumstances.

The shares should be ready for delivery on or about February 3, 2021 against payment in immediately available funds. The underwriters are offering the shares subject to various conditions and may reject all or part of any order. The representative has advised us that the underwriters propose to offer the shares directly to the public at the public offering price that appears on the cover page of this prospectus. In addition, the representative may offer some of the shares to other securities dealers at such price less a concession of $0.42875 per share. The underwriters may also allow, and such dealers may reallow, a concession not in excess of $0.01 per share to other dealers. After the shares are released for sale to the public, the representative may change the offering price and other selling terms at various times.

### Discount

The following table shows the public offering price, underwriting discounts and proceeds, before expenses, to us.

| | Per Share | Total |
|---|---|---|
| Public offering price | $12.25 | $12,740,000 |
| Underwriting discount (7%) | $ 0.86 | $ 543,998 |
| Proceeds, before expense, to us | $11.39 | $12,196,002 |

We have agreed to pay the representative an accountable expense allowance of up to $40,000.

Jack W. Schuler, an existing stockholder, and entities affiliated with him has indicated an interest in purchasing an aggregate of 405,600 shares of our common stock in this offering. The underwriter will not receive a fee with respect to the aggregate purchase price of any shares of our common stock to be sold to Mr. Schuler and entities affiliated with him in this offering.

### Lock-Up Agreements

We, our officers and directors have agreed, subject to limited exceptions, for a period of 60 days after the date of the underwriting agreement, not to offer, sell, contract to sell, pledge, grant any option to purchase, make any short sale or otherwise dispose of, directly or indirectly any shares of common stock or any securities convertible into or exchangeable for our common stock either owned as of the date of the underwriting agreement or thereafter acquired without the prior written consent of the underwriters.

**Right of First Refusal**

We have granted the underwriter a right of first refusal for a period of six (6) months from the date of commencement of sales pursuant to this prospectus to act as underwriter and book runner and/or placement for any and all future public or private equity or equity-linked offerings or public debt offerings undertaken by the Company, with a minimum of fifty percent (50%) of the economics in such subsequent offering(s).

**Indemnification**

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act of 1933, as amended.

**Price Stabilization, Short Positions and Penalty Bids**

Rules of the SEC may limit the ability of the underwriters to bid for or purchase shares before the distribution of the shares is completed. However, the underwriters may engage in the following activities in accordance with the rules:

- Stabilizing transactions — The representative may make bids or purchases for the purpose of pegging, fixing or maintaining the price of the shares, so long as stabilizing bids do not exceed a specified maximum.
- Over-allotments and syndicate covering transactions — The underwriters may sell more shares of common stock in connection with this offering than the number of shares that they have committed to purchase. This over-allotment creates a short position for the underwriters. This short sales position may involve either “covered” short sales or “naked” short sales. Covered short sales are short sales made in an amount not greater than the underwriters’ over-allotment option to purchase additional shares in this offering described above. The underwriters may close out any covered short position either by exercising their over-allotment option or by purchasing shares in the open market. To determine how they will close the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market, as compared to the price at which they may purchase shares through the over-allotment option. Naked short sales are short sales in excess of the over-allotment option. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that, in the open market after pricing, there may be downward pressure on the price of the shares that could adversely affect investors who purchase shares in this offering.
- Penalty bids — If the representative purchases the shares in the open market in a stabilizing transaction or syndicate covering transaction, it may reclaim a selling concession from the underwriters and selling group members who sold those shares as part of this offering.
- Passive market making — Market makers in the shares who are underwriters or prospective underwriters may make bids for or purchase the shares, subject to limitations, until the time, if ever, at which a stabilizing bid is made.

Similar to other purchase transactions, the underwriters’ purchases to cover the syndicate short sales or to stabilize the market price of our common stock may have the effect of raising or maintaining the market price of our common stock or preventing or mitigating a decline in the market price of our common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. The imposition of a penalty bid might also have an effect on the price of our common stock if it discourages resales of the shares.

Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of our common stock. These transactions may occur on the Nasdaq Capital Market or otherwise. If such transactions are commenced, they may be discontinued without notice at any time.

*Electronic Delivery of Preliminary Prospectus:* A prospectus in electronic format may be delivered to potential investors by one or more of the underwriters participating in this offering. The prospectus in

electronic format will be identical to the paper version of such preliminary prospectus. Other than the prospectus in electronic format, the information on any underwriter's website and any information contained in any other website maintained by an underwriter is not part of the prospectus or the registration statement of which this prospectus forms a part.

**Notice to Non-US Investors**

**Canada**

The securities may be sold in Canada only to purchasers purchasing, or deemed to be purchasing, as principal that are "accredited investors", as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are "permitted clients", as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the securities must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws. Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor. Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

**European Economic Area**

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive, each, a Relevant Member State, with effect from and including the date on which the European Union Prospectus Directive, or the EU Prospectus Directive, was implemented in that Relevant Member State, or the Relevant Implementation Date, no offer of securities may be made to the public in that Relevant Member State other than:

1. to any legal entity which is a qualified investor as defined under the EU Prospectus Directive;
2. to fewer than 150 natural or legal persons (other than qualified investors as defined in the EU Prospectus Directive), subject to obtaining the prior consent of the representatives; or
3. in any other circumstances falling within Article 3(2) of the EU Prospectus Directive;

provided that no such offer of securities shall require the Company or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive and each person who initially acquires any securities or to whom any offer is made will be deemed to have represented, acknowledged and agreed to and with each of the underwriters and the Company that it is a "qualified investor" within the meaning of the law in that Relevant Member State implementing Article 2(1)(e) of the Prospectus Directive.

In the case of any securities being offered to a financial intermediary as that term is used in Article 3(2) of the Prospectus Directive, each such financial intermediary will be deemed to have represented, acknowledged and agreed that the securities acquired by it in the offer have not been acquired on a non-discretionary basis on behalf of, nor have they been acquired with a view to their offer or resale to, persons in circumstances which may give rise to an offer of any securities to the public other than their offer or resale in a Relevant Member State to qualified investors as so defined or in circumstances in which the prior consent of the representatives has been obtained to each such proposed offer or resale.

For the purposes of this provision, the expression an "offer of securities to the public" in relation to any securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the securities to be offered so as to enable an investor to decide to purchase or subscribe for the securities, as the same may be varied in that Member State by any measure implementing the EU Prospectus Directive in that Member State. The expression "EU Prospectus Directive" means Directive 2003/71/EC (and any amendments thereto, including the 2010 PD Amending

Directive, to the extent implemented in the Relevant Member State) and includes any relevant implementing measure in each Relevant Member State, and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

**United Kingdom**

In the United Kingdom, this document is being distributed only to, and is directed only at, and any offer subsequently made may only be directed at persons who are "qualified investors" (as defined in the Prospectus Directive) (i) who have professional experience in matters relating to investments falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended, or the Order, and/or (ii) who are high net worth companies (or persons to whom it may otherwise be lawfully communicated) falling within Article 49(2)(a) to (d) of the Order (all such persons together being referred to as "relevant persons") or otherwise in circumstances which have not resulted and will not result in an offer to the public of the securities in the United Kingdom.

Any person in the United Kingdom that is not a relevant person should not act or rely on the information included in this document or use it as basis for taking any action. In the United Kingdom, any investment or investment activity that this document relates to may be made or taken exclusively by relevant persons.

## WHERE YOU CAN FIND ADDITIONAL INFORMATION

We file annual, quarterly and other periodic reports, proxy statements and other information with the SEC. You can read our SEC filings over the Internet at the SEC's website at www.sec.gov.

Our Internet address is *www.yield10bio.com*. There we make available free of charge, on or through the investor relations section of our website, annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with the SEC. The information found on our website is not part of this prospectus supplement or the accompanying prospectus.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

We are "incorporating by reference" specific documents that we file with the SEC, which means that we can disclose important information to you by referring you to those documents that are considered part of this prospectus supplement and the accompanying prospectus. Information that we file subsequently with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below, and any documents that we file with the SEC under Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, after the date of this prospectus supplement until the termination of the offering of all of the securities registered pursuant to the registration statement of which the accompanying prospectus is a part (excluding any portions of such documents that have been "furnished" but not "filed" for purposes of the Exchange Act):

1. Annual Report on Form 10-K for the year ended December 31, 2019, filed on March 25, 2020.
2. Quarterly Report on Form 10-Q for the quarter ended March 31, 2020, filed on May 15, 2020.
3. Quarterly Report on Form 10-Q for the quarter ended June 30, 2020, filed on August 11, 2020.
4. Quarterly Report on Form 10-Q for the quarter ended September 30, 2020, filed on November 12, 2020.
5. Current Reports on Form 8-K filed on January 9, 2020, January 15, 2020, January 31, 2020, February 13, 2020, May 20, 2020, June 9, 2020, August 11, 2020, August 25, 2020, November 12, 2020, and January 19, 2021.
6. Proxy Statement on Schedule 14A for the annual meeting of stockholders to be held on May 19, 2020, filed on May 6, 2020.
7. The description of our common stock contained in Item 1 of our Registration Statement on Form 8-A filed with the SEC on November 6, 2006, including any amendments or reports filed for purpose of updating the description.

You may request, and we will provide you with, a copy of these filings, at no cost, by calling us at (617) 583-1700 or by writing to us at the following address:

Yield10 Bioscience, Inc.
19 Presidential Way
Woburn, MA 01801
Attn: Lynne Brum

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this prospectus supplement and the accompanying prospectus to the extent that a statement contained herein or therein, in any other subsequently filed document that also is or is deemed to be incorporated by reference herein and in any accompanying prospectus supplement, modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified and superseded, to constitute a part of this prospectus supplement.

Any statement made in this prospectus supplement and the accompanying prospectus concerning the contents of any contract, agreement or other document is only a summary of the actual contract, agreement or other document. If we have filed or incorporated by reference any contract, agreement or other document as an exhibit to the registration statement, you should read the exhibit for a more complete understanding of the document or matter involved. Each statement regarding a contract, agreement or other document is qualified by reference to the actual document.

## LEGAL MATTERS

Certain legal matters relating to the issuance of the securities offered by this prospectus supplement will be passed upon for us by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts. Pryor Cashman LLP, New York, New York, has acted as counsel for the underwriter.

## EXPERTS

The consolidated financial statements of Yield10 Bioscience, Inc. as of December 31, 2019 and 2018, and for each of the years in the two-year period ended December 31, 2019 incorporated in this Prospectus Supplement by reference to the Yield10 Bioscience, Inc. annual report on Form 10-K filed on March 25, 2020 have been audited by RSM US LLP, an independent registered public accounting firm, as stated in their report incorporated herein by reference, and have been incorporated in this Prospectus Supplement in reliance upon such report and upon the authority of such firm as experts in accounting and auditing.

**PROSPECTUS**


# YIELD10 BIOSCIENCE, INC.

## $25,000,000
## Common Stock
## Preferred Stock
## Warrants
## Subscription Rights
## Units

---

This prospectus relates to common stock, preferred stock, warrants and subscription rights that we may sell from time to time in one or more offerings up to a total public offering price of $25,000,000 on terms to be determined at the time of sale, which securities may be sold either individually or in units. We will provide specific terms of these securities in supplements to this prospectus. You should read this prospectus and any supplement carefully before you invest. This prospectus may not be used to offer and sell securities unless accompanied by a prospectus supplement for those securities.

Our common stock is traded on The Nasdaq Capital Market under the symbol “YTEN.”

These securities may be sold directly by us, through dealers or agents designated from time to time, to or through underwriters or through a combination of these methods. See “Plan of Distribution” in this prospectus. We may also describe the plan of distribution for any particular offering of these securities in any applicable prospectus supplement. If any agents, underwriters or dealers are involved in the sale of any securities in respect of which this prospectus is being delivered, we will disclose their names and the nature of our arrangements with them in a prospectus supplement. The net proceeds we expect to receive from any such sale will also be included in a prospectus supplement.

As of March 30, 2020, the aggregate market value of the voting and non-voting common equity held by non-affiliates, computed by reference to the price at which the common equity was last sold or the average bid and asked price of such common equity on that date, was approximately $5,725,732, based on 1,923,184 shares of outstanding common stock, of which 1,487,203 were held by non-affiliates. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities in a public primary offering with a value exceeding more than one-third of our public float in any 12-month period so long as our public float remains below $75.0 million. We have not offered any securities pursuant to General Instruction I.B.6 of Form S-3 during the 12 calendar months prior to and including the date of this prospectus.

**Investing in our securities involves a high degree of risk. See “Risk Factors” on page 5 of this prospectus. We may include additional risk factors in an applicable prospectus supplement under the heading “Risk Factors.” You should review that section of the prospectus supplement for a discussion of matters that investors in our securities should consider.**

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus or any accompanying prospectus supplement. Any representation to the contrary is a criminal offense.**

Our principal executive office is at 19 Presidential Way, Woburn, Massachusetts 01801, and our telephone number is (617) 583-1700.

The date of this prospectus is April 10, 2020.

**TABLE OF CONTENTS**



**YOU SHOULD RELY ONLY ON THE INFORMATION CONTAINED IN THIS PROSPECTUS, ANY PROSPECTUS SUPPLEMENT OR ANY DOCUMENT TO WHICH WE HAVE REFERRED YOU. WE HAVE NOT AUTHORIZED ANYONE ELSE TO PROVIDE YOU WITH INFORMATION THAT IS DIFFERENT. THIS PROSPECTUS AND ANY PROSPECTUS SUPPLEMENT MAY BE USED ONLY WHERE IT IS LEGAL TO SELL THESE SECURITIES. THE INFORMATION IN THIS PROSPECTUS OR ANY PROSPECTUS SUPPLEMENT IS CURRENT ONLY AS OF THE DATE ON THE FRONT OF THESE DOCUMENTS.**

## ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, or the SEC, using a "shelf" registration process. Under this shelf process, we may sell any combination of the securities described in this prospectus in one or more offerings up to a total public offering price of $25,000,000.

This prospectus provides you with a general description of the securities we may offer. Each time we sell securities, we will provide a prospectus supplement that will contain specific information about the securities being offered and the terms of that offering. The prospectus supplement may also add to, update or change information contained in this prospectus. You should read both this prospectus and any prospectus supplement together with the additional information described under the heading "Where You Can Find More Information" carefully before making an investment decision.

Unless the context otherwise requires, in this prospectus, "Yield10," "the Company," "we," "us," "our" and similar names refer to Yield10 Bioscience, Inc. and its subsidiaries.

## SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and any accompanying prospectus supplement (including any document incorporated by reference herein or therein) contain statements with respect to the Company which constitute "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and are intended to be covered by the "safe harbor" created by those sections. Forward-looking statements, which are based on certain assumptions and reflect our plans, estimates and beliefs, can generally be identified by the use of forward-looking terms such as "believes," "expects," "may," "will," "should," "could," "seek," "intends," "plans," "estimates," "anticipates" or other comparable terms. These forward-looking statements include, but are not limited to, statements concerning potential future collaborations and objectives for research and development, product development, and commercialization of current and future products. Our actual results could differ materially from those discussed in the forward-looking statements. Factors that could cause or contribute to these differences include those discussed in "Risk Factors" in any prospectus supplement and in the documents incorporated by reference herein or therein.

We caution readers not to place undue reliance upon any such forward-looking statements, which speak only as of the date they are made. We disclaim any obligation, except as specifically required by law and the rules of the SEC, to publicly update or revise any such statements to reflect any change in company expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward-looking statements.

**You should read this prospectus and any accompanying prospectus supplement and the documents that we reference herein and therein and have filed as exhibits to the registration statement, of which this prospectus is part, completely and with the understanding that our actual future results may be materially different from what we expect. You should assume that the information appearing in this prospectus and any accompanying prospectus supplement is accurate as of the date on the front cover of this prospectus or such prospectus supplement only. Our business, financial condition, results of operations and prospects may change. We may not update these forward-looking statements, even though our situation may change in the future, unless we have obligations under the Federal securities laws to update and disclose material developments related to previously disclosed information. We qualify all of the information presented in this prospectus and any accompanying prospectus supplement, and particularly our forward-looking statements, by these cautionary statements.**

## ABOUT YIELD10 BIOSCIENCE, INC.

### Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company that uses its "Trait Factory" and the Camelina oilseed "Fast Field Testing" system to develop high value seed traits for the agriculture and food industries. Yield10 is headquartered in Woburn, Massachusetts and has an Oilseed Center of Excellence in Saskatoon, Saskatchewan, Canada. Our goal is to efficiently develop superior gene traits for the major crops including corn, soybean, canola, and other crops to enable step-change increases in crop yield of at least 10-20 percent. Our "Trait Factory" encompasses discovery of gene targets using our GRAIN ("**G**ene **R**anking **A**rtificial **I**ntelligence **N**etwork") big data mining platform, deployment of trait gene targets in the oilseed Camelina and generation of field performance data. The "Trait Factory" enables two complementary commercial opportunities with different paths to market. The first is trait licensing to the major seed companies for corn, soybean, canola and other crops. Data from our trait field testing in Camelina has enabled Yield10 to establish research license agreements with leading seed companies including Bayer Crop Science division of Bayer AG ("Bayer"), Forage Genetics International, LLC a division of Land O'Lakes, Inc. ("Forage Genetics") and JR Simplot Company ("Simplot"). These companies are progressing the development of Yield10 traits in soybean, forage sorghum, and potato, respectively. The second commercial opportunity is to improve the performance and value of Camelina as a platform to develop a commercial crop product business producing nutritional oils and PHA biomaterials. Using this approach, Yield10 can leverage the resources of the major seed companies to efficiently develop superior gene traits for the major crops and focus internal resources on trait gene discovery and the commercial development of Camelina products.

Our focus in the near term is to develop a revenue generating business using Camelina to produce nutritional oils. Yield10 has discovered a series of performance gene traits for Camelina focused on seed yield and oil content, the two primary drivers of value. Our plan is to focus on our traits deployed using genome editing which can be qualified as non-regulated under U.S. Department of Agriculture ("USDA") Animal and Plant Health Inspection Service ("APHIS") rules. In parallel, the Company plans to establish a program to develop herbicide tolerant Camelina lines. We believe this will enable Yield10 to develop a crop oil product business with a clear path to revenue and growth. This foundation will form a strong base to produce PHA biomaterials in the longer term for use in water treatment and plastics replacement applications. Yield10 believes crop based PHA biomaterials represent a compelling new market opportunity for agriculture addressing a non-traditional market with high upside potential.

Yield10 brings a unique history and skill set, captured in our GRAIN data mining gene discovery platform, for developing advanced crop traits and increasing the concentration of specific biochemicals of commercial interest in crops. Our plan is to also use GRAIN to develop a source of revenue from funded research and development collaborations for traits, products and crops not being directly pursued internally. We are currently engaged in a range of discussions with third parties with respect to different crops, traits and products in the feed, food and pharmaceutical sectors.

Over the last four years, we have been evaluating certain of our traits in greenhouse studies and field tests conducted in the United States and Canada. We currently have three non-exclusive research license agreements in place: with the Crop Science division of Bayer, for the evaluation of our C3003 and C3004 traits in soybean; with Forage Genetics for the evaluation of five yield traits in forage sorghum; and with Simplot for evaluation of three of our traits in potato. We have progressed our evaluation of C3003 and C3004 in field tests with Camelina and canola and plan to continue our field testing in the 2020 growing season. In Camelina we have demonstrated the potential of a series of traits, including C3003 and C3004 to significantly increase seed yield and genome edited traits including C3007-C3010 to increase seed oil content and filed a new patent application on a potentially breakthrough technology for producing PHA biomaterials.

According to a United Nations report, crop production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. During that time period, there will be a reduction in available arable land as a result of infrastructure growth and increased pressure on scarce water resources. Consumption of meat, seafood, and dairy products is also expected to increase based on dietary changes associated with increasing wealth and living standards. This will result in increased demand for feed grains and forage crops. Seafood production is

increasingly based on aquaculture where fish diets have been increasingly moving to crop-based feed ingredients due to the limited availability and cost of processed ocean harvested fish as feed. Fish oil is the main source of omega-3 fatty acids which are essential in the human diet. Omega-3 oils have been shown to help prevent heart disease and stroke, may help control lupus, eczema, and rheumatoid arthritis, and may play protective roles in cancer and other conditions. Oils high in omega-3 fatty acids are in increasing demand as the supply of fish oil from ocean harvest is under increasing pressure. Aquaculture and other feed markets represent a growing opportunity for Camelina oil, which is high in the omega-3 fatty acid alpha linolenic acid ("ALA").

Harvestable food production per acre and per growing season must be increased to meet this demand. At the same time, with the increasing focus on health and wellness, food safety and sustainability in developed countries, we anticipate a rise in demand for new varieties of food and food ingredients with improved nutritional properties. With crop intensification (less land available and more production needed), we expect that improved crop genetics based on new gene traits will be a key driver of increased productivity, potentially resulting in the best performing yield traits commanding disproportionate value and disrupting the seed sector. We expect farmers and growers to be the major beneficiaries of these drivers, which represent potential opportunities for increased revenue and crop diversification. Today the global food market has an estimated value of $5 trillion.

Yield10 brings unique capabilities and experience in advanced metabolic engineering and systems biology to optimize photosynthesis and carbon efficiency in crops to increase grain or biomass yield. These capabilities were developed based on sustained investment over many years when the company was named Metabolix. As Metabolix, we solved complex biological problems in the industrial/synthetic biology space to produce bioplastics. By 2012, we had begun work to increase photosynthesis in crops as part of those activities, which led to the creation in 2015 of the current Yield10 business focused on crop yield. In mid-2016 we sold our fermentation-based bioplastics assets to focus on our agricultural innovations and the company was rebranded as Yield10 Bioscience in January 2017.

**Liquidity and Capital Resources**

As of December 31, 2019, we held unrestricted cash, cash equivalents and short-term investments of $11.1 million. In March 2019, we closed on a registered direct offering of our common stock, raising $2.6 million, net of offering costs, and in November 2019, we closed on a public offering and a concurrent private placement of our securities, raising $10.2 million, net of offering costs. Through March 20, 2020, we received an additional $1.6 million from investor exercises of 204,796 outstanding warrants. We follow the guidance of Accounting Standards Codification ("ASC") Topic 205-40, *Presentation of Financial Statements — Going Concern*, in order to determine whether there is substantial doubt about the Company's ability to continue as a going concern for one year after the date its financial statements are issued. We have concluded, that the Company has sufficient cash and short-term investments to fund its operations into the second quarter of 2021.

We continue to face significant challenges and uncertainties and, as a result, our available capital resources may be consumed more rapidly than currently expected due to any or all of the following: (a) lower than expected revenues from grants and licenses related to our technologies; (b) changes we may make to the business that affect ongoing operating expenses; (c) further changes we may make to our business strategy; (d) changes in our research and development spending plans; and (e) other items affecting our forecasted level of expenditures and use of cash resources.

We will require additional capital resources to support the implementation of our business strategy and we may pursue one or more of a variety of financing options, including public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, as well as licensing or other collaborative arrangements. There can be no assurance that our financing efforts will be successful. If we are not able to secure such additional capital resources or otherwise fund our operations, we will be forced to explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

If we issue equity or debt securities to raise additional funds in the future, we may incur fees associated with such issuances, our existing stockholders may experience dilution from the issuance of new equity

securities, we may incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. In addition, utilization of our net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"), due to ownership changes resulting from equity financing transactions. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies or grant licenses on terms that are not favorable to us.

## CORPORATE INFORMATION

We were incorporated in Massachusetts in June 1992 under the name of Metabolix, Inc. In September 1998, we reincorporated in Delaware. We changed our name to Yield10 Bioscience, Inc. in January 2017 to reflect our change in mission around innovations in agricultural biotechnology focused on developing disruptive technologies for step-change improvements in crop yield and niche crop products. Our corporate headquarters are located at 19 Presidential Way, Woburn, MA 01801, and our telephone number is +1 (617) 583-1700. Our website address is www.yield10bio.com. The information on our website is not incorporated by reference into this prospectus or any prospectus supplement and should not be considered to be part of this prospectus or any prospectus supplement. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as well as reports relating to our securities filed by others pursuant to Section 16 of such act, are available through the investor relations page of our Internet website free of charge as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission (the "SEC"). The SEC maintains an Internet website that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. The address of that website is *http://www.sec.gov.*

## RISK FACTORS

Investing in our securities involves risk. The prospectus supplement applicable to each type or series of securities we offer will contain a discussion of the risks applicable to an investment in Yield10 and to the particular types of securities that we are offering under that prospectus supplement. Prior to making a decision about investing in our securities, you should carefully consider the specific factors discussed under the heading "Risk Factors" in the applicable prospectus supplement, together with all of the other information contained or incorporated by reference in the prospectus supplement or appearing or incorporated by reference in this prospectus. You should also consider the risks, uncertainties and assumptions discussed under the heading "Risk Factors" included in our most recent annual report on Form 10-K, as revised or supplemented by our most recent quarterly report on Form 10-Q, each of which are on file with the SEC and are incorporated herein by reference, and which may be amended, supplemented or superseded from time to time by other reports we file with the SEC in the future.

## USE OF PROCEEDS

We currently intend to use the estimated net proceeds from the sale of these securities for working capital and other general corporate purposes, and possibly acquisitions of other companies, products or technologies. Working capital and other general corporate purposes may include research and development expenditures, capital expenditures, operating and administrative expenditures, and any other purpose that we may specify in any prospectus supplement. While we have no current plans for any specific acquisitions at this time, we believe opportunities may exist from time to time to expand our current business through strategic alliances or acquisitions with other companies, products or technologies. We have not yet determined the amount of net proceeds to be used specifically for any of the foregoing purposes. Accordingly, our management will have significant discretion and flexibility in applying the net proceeds from the sale of these securities. Pending any use, as described above, we intend to invest the net proceeds in high-quality, short-term, interest-bearing securities. Our plans to use the estimated net proceeds from the sale of these securities may change, and if they do, we will update this information in a prospectus supplement.

## DESCRIPTION OF CAPITAL STOCK

The following description of our common stock and preferred stock, together with the additional information included in any applicable prospectus supplements, summarizes the material terms and provisions of these types of securities but is not complete. For the complete terms of our common stock and preferred stock, please refer to our Amended and Restated Certificate of Incorporation, as amended to date (our "certificate of incorporation"), and our Amended and Restated By-laws (our "by-laws"), each of which is incorporated by reference into the registration statement of which this prospectus is a part and, with respect to any new shares of preferred stock, the certificate of designation which will be filed with the SEC for each new series of preferred stock we may designate, if any.

### General

We will describe in a prospectus supplement the specific terms of any common stock or preferred stock we may offer pursuant to this prospectus. If indicated in a prospectus supplement, the terms of such common stock or preferred stock may differ from the terms described below.

We have 65,000,000 shares of capital stock authorized under our certificate of incorporation, consisting of 60,000,000 shares of common stock, par value $0.01 per share and 5,000,000 shares of preferred stock, par value $0.01 per share, of which 2,504 shares are designated as Series A Convertible Preferred Stock and 5,750 shares are designated as Series B Convertible Preferred Stock. The authorized shares of common stock and undesignated preferred stock are available for issuance without further action by our stockholders, unless such action is required by applicable law or the rules of any stock exchange or automated quotation system on which our securities may be listed or traded. If the approval of our stockholders is not so required, our board of directors may determine not to seek stockholder approval.

### Common Stock

As of March 30, 2020, there were 1,923,184 shares of our common stock outstanding held by 37 stockholders of record.

Holders of our common stock are entitled to one vote for each share of common stock held of record for the election of directors and on all matters submitted to a vote of stockholders. Holders of our common stock are entitled to receive dividends ratably, if any, as may be declared by our board of directors out of legally available funds, subject to any preferential dividend rights of any preferred stock then outstanding. Upon our dissolution, liquidation or winding up, holders of our common stock are entitled to share ratably in our net assets legally available after the payment of all our debts and other liabilities, subject to the preferential rights of any preferred stock then outstanding. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future. Except as described below in "Provisions of our Certificate of Incorporation and By-Laws and Delaware Anti-Takeover Law," a majority vote of common stockholders is generally required to take action under our certificate of incorporation and by-laws.

### Preferred Stock

Our board of directors is authorized, without action by the stockholders, to designate and issue up to an aggregate of 5,000,000 shares of preferred stock in one or more series. The board of directors can fix the rights, preferences and privileges of the shares of each series and any of its qualifications, limitations or restrictions. Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of common stock. The issuance of preferred stock, while providing flexibility in connection with possible future financings and acquisitions and other corporate purposes could, under certain circumstances, have the effect of delaying, deferring or preventing a change in control of our company and might harm the market price of our common stock. There are no restrictions on our ability to repurchase or reclaim our preferred shares while there is any arrearage in the payment of dividends on our preferred stock.

Our board of directors will make any determination to issue such shares based on its judgment as to our company's best interests and the best interests of our stockholders.

**Provisions of our Certificate of Incorporation and By-Laws and Delaware Anti-Takeover Law**

Our certificate of incorporation and by-laws includes a number of provisions that may have the effect of encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

*Board Composition and Filling Vacancies.* In accordance with our certificate of incorporation, our board is divided into three classes serving staggered three-year terms, with one class being elected each year. Our certificate of incorporation also provides that directors may be removed only for cause and then only by the affirmative vote of the holders of 75% or more of the shares then entitled to vote at an election of directors. Furthermore, any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of our board, may only be filled by the affirmative vote of a majority of our directors then in office even if less than a quorum.

*No Written Consent of Stockholders.* Our certificate of incorporation provides that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting.

*Meetings of Stockholders.* Our by-laws provide that only a majority of the members of our board of directors then in office may call special meetings of stockholders and only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders. Our by-laws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

*Advance Notice Requirements.* Our by-laws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. The notice must contain certain information specified in the by-laws.

*Amendment to By-Laws and Certificate of Incorporation.* As required by the Delaware General Corporation Law, any amendment of our certificate of incorporation must first be approved by a majority of our board of directors and, if required by law or our certificate of incorporation, thereafter be approved by a majority of the outstanding shares entitled to vote on the amendment, and a majority of the outstanding shares of each class entitled to vote thereon as a class, except that the amendment of the provisions relating to stockholder action, directors, limitation of liability and the amendment of our by-laws and certificate of incorporation must be approved by not less than 75% of the outstanding shares entitled to vote on the amendment, and not less than 75% of the outstanding shares of each class entitled to vote thereon as a class. Our by-laws may be amended by the affirmative vote of a majority of the directors then in office, subject to any limitations set forth in the by-laws; and may also be amended by the affirmative vote of at least 75% of the outstanding shares entitled to vote on the amendment, or, if the board of directors recommends that the stockholders approve the amendment, by the affirmative vote of the majority of the outstanding shares entitled to vote on the amendment, in each case voting together as a single class.

*Blank Check Preferred Stock.* Our certificate of incorporation provides for 5,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of us or our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our

certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

## DESCRIPTION OF WARRANTS

We may issue warrants for the purchase of preferred stock or common stock. Warrants may be issued independently or together with preferred stock or common stock and may be attached to or separate from any offered securities. Each series of warrants will be issued under a separate warrant agreement to be entered into between us and a warrant agent. The warrant agent will act solely as our agent in connection with the warrants and will not assume any obligation or relationship of agency or trust for or with any registered holders of warrants or beneficial owners of warrants. This summary of some provisions of the warrants is not complete. You should refer to the warrant agreement, including the forms of warrant certificate representing the warrants, relating to the specific warrants being offered for the complete terms of the warrant agreement and the warrants. That warrant agreement, together with the terms of the warrant certificate and warrants, will be filed with the SEC in connection with the offering of the specific warrants.

The particular terms of any issue of warrants will be described in the prospectus supplement relating to the issue. Those terms may include:

- the title of such warrants;
- the aggregate number of such warrants;
- the price or prices at which such warrants will be issued;
- the terms of the securities purchasable upon exercise of such warrants and the procedures and conditions relating to the exercise of such warrants;
- the price at which the securities purchasable upon exercise of such warrants may be purchased;
- the date on which the right to exercise such warrants will commence and the date on which such right shall expire;
- any provisions for adjustment of the number or amount of securities receivable upon exercise of the warrants or the exercise price of the warrants;
- if applicable, the minimum or maximum amount of such warrants that may be exercised at any one time;
- if applicable, the designation and terms of the securities with which such warrants are issued and the number of such warrants issued with each such security;
- if applicable, the date on and after which such warrants and the related securities will be separately transferable;
- information with respect to book-entry procedures, if any; and
- any other terms of such warrants, including terms, procedures and limitations relating to the exchange or exercise of such warrants.

The prospectus supplement relating to any warrants to purchase equity securities may also include, if applicable, a discussion of certain U.S. federal income tax considerations.

Warrants for the purchase of preferred stock and common stock will be offered and exercisable for U.S. dollars only. Securities warrants will be issued in registered form only.

Each warrant will entitle its holder to purchase the number of shares of preferred stock or common stock at the exercise price set forth in, or calculable as set forth in, the applicable prospectus supplement.

After the close of business on the expiration date, unexercised warrants will become void. We will specify the place or places where, and the manner in which, warrants may be exercised in the applicable prospectus supplement.

Upon receipt of payment and the warrant certificate properly completed and duly executed at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement, we will, as soon as practicable, forward the purchased securities. If less than all of the warrants represented by the warrant certificate are exercised, a new warrant certificate will be issued for the remaining warrants.

Prior to the exercise of any warrants to purchase preferred stock or common stock, holders of the warrants will not have any of the rights of holders of preferred stock or common stock purchasable upon exercise, including the right to vote or to receive any payments of dividends on the preferred stock or common stock purchasable upon exercise.

## DESCRIPTION OF SUBSCRIPTION RIGHTS

The following is a general description of the terms of the subscription rights we may issue from time to time. Particular terms of any subscription rights we offer will be described in the prospectus supplement or free writing prospectus relating to such subscription rights, and may differ from the terms described herein.

We may issue subscription rights to purchase our securities. These subscription rights may be issued independently or together with any other security offered hereby and may or may not be transferable by the stockholder receiving the subscription rights in such offering. In connection with any offering of subscription rights, we may enter into a standby arrangement with one or more underwriters or other purchasers pursuant to which the underwriters or other purchasers may be required to purchase any securities remaining unsubscribed for after such offering.

The applicable prospectus supplement will describe the specific terms of any offering of subscription rights for which this prospectus is being delivered, including the following:

- whether common stock, preferred stock, or warrants for those securities will be offered under the stockholder subscription rights;
- the price, if any, for the subscription rights;
- the exercise price payable for each security upon the exercise of the subscription rights;
- the number of subscription rights issued to each stockholder;
- the number and terms of the securities which may be purchased per each subscription right;
- the extent to which the subscription rights are transferable;
- any other terms of the subscription rights, including the terms, procedures and limitations relating to the exchange and exercise of the subscription rights;
- the date on which the right to exercise the subscription rights shall commence, and the date on which the subscription rights shall expire;
- the extent to which the subscription rights may include an over-subscription privilege with respect to unsubscribed securities;
- if appropriate, a discussion of material U.S. federal income tax considerations; and
- if applicable, the material terms of any standby underwriting or purchase arrangement entered into by us in connection with the offering of subscription rights.

The description in the applicable prospectus supplement of any subscription rights we offer will not necessarily be complete and will be qualified in its entirety by reference to the applicable subscription rights certificate or subscription rights agreement, which will be filed with the SEC if we offer subscription rights.

## DESCRIPTION OF UNITS

The following description, together with the additional information that we include in any applicable prospectus supplements, summarizes the material terms and provisions of the units that we may offer under this prospectus. While the terms we have summarized below will apply generally to any units that we may offer under this prospectus, we will describe the particular terms of any series of units in more detail in the applicable prospectus supplement. The terms of any units offered under a prospectus supplement may differ from the terms described below.

We will incorporate by reference from reports that we file with the SEC, the form of unit agreement that describes the terms of the series of units we are offering, and any supplemental agreements, before the issuance of the related series of units. The following summaries of material terms and provisions of the units are subject to, and qualified in their entirety by reference to, all the provisions of the unit agreement and any supplemental agreements applicable to a particular series of units. We urge you to read the applicable prospectus supplements related to the particular series of units that we may offer under this prospectus, as well as any related free writing prospectuses and the complete unit agreement and any supplemental agreements that contain the terms of the units.

### *General*

We may issue units consisting of common stock, preferred stock, warrants, rights or purchase contracts for the purchase of common stock or preferred stock in one or more series, in any combination. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each security included in the unit. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date.

We will describe in the applicable prospectus supplement the terms of the series of units being offered, including:

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions of the governing unit agreement that differ from those described below; and
- any provisions for the issuance, payment, settlement, transfer or exchange of the units or of the securities comprising the units.

The provisions described in this section, as well as those set forth in any prospectus supplement or as described under “Description of Common Stock,” “Description of Preferred Stock,” “Description of Warrants,” “Description of Rights” and “Description of Purchase Contracts” will apply to each unit, as applicable, and to any common stock, preferred stock, warrant, right or purchase contract included in each unit, as applicable.

### *Unit Agent*

The name and address of the unit agent for any units we offer will be set forth in the applicable prospectus supplement.

### *Issuance in Series*

We may issue units in such amounts and in such numerous distinct series as we determine.

### *Enforceability of Rights by Holders of Units*

Each unit agent will act solely as our agent under the applicable unit agreement and will not assume any obligation or relationship of agency or trust with any holder of any unit. A single bank or trust company may act as unit agent for more than one series of units. A unit agent will have no duty or responsibility in case of any default by us under the applicable unit agreement or unit, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a unit may,

without the consent of the related unit agent or the holder of any other unit, enforce by appropriate legal action its rights as holder under any security included in the unit.

## PLAN OF DISTRIBUTION

We may sell the securities being offered pursuant to this prospectus directly to purchasers, to or through underwriters, through dealers or agents, or through a combination of such methods. The prospectus supplement with respect to the securities being offered will set forth the terms of the offering of those securities, including the names of the underwriters, dealers or agents, if any, the purchase price, the net proceeds to us, any underwriting discounts and other items constituting underwriters' compensation, the public offering price, any discounts or concessions allowed or reallowed or paid to dealers and any securities exchanges on which such securities may be listed.

If underwriters are used in an offering, we will execute an underwriting agreement with such underwriters and will specify the name of each underwriter and the terms of the transaction (including any underwriting discounts and other terms constituting compensation of the underwriters and any dealers) in a prospectus supplement. The securities may be offered to the public either through underwriting syndicates represented by managing underwriters or directly by one or more investment banking firms or others, as designated. If an underwriting syndicate is used, the managing underwriter(s) will be specified on the cover of the prospectus supplement. If underwriters are used in the sale, the offered securities will be acquired by the underwriters for their own accounts and may be resold from time to time in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. Any public offering price and any discounts or concessions allowed or reallowed or paid to dealers may be changed from time to time. Unless otherwise set forth in the prospectus supplement, the obligations of the underwriters to purchase the offered securities will be subject to conditions precedent and the underwriters will be obligated to purchase all of the offered securities if any are purchased.

We may grant to the underwriters options to purchase additional securities to cover over-allotments, if any, at the public offering price, with additional underwriting commissions or discounts, as may be set forth in a related prospectus supplement. The terms of any over-allotment option will be set forth in the prospectus supplement for those securities.

If any underwriters are involved in the offer and sale, they will be permitted to engage in transactions that maintain or otherwise affect the price of the securities. These transactions may include over-allotment transactions, purchases to cover short positions created by the underwriter in connection with the offering and the imposition of penalty bids. If an underwriter creates a short position in the securities in connection with the offering by selling more securities than set forth on the cover page of the applicable prospectus supplement, the underwriter may reduce that short position by purchasing the securities in the open market. In general, purchases of a security to reduce a short position could cause the price of the security to be higher than it might be in the absence of such purchases. As noted above, underwriters may also choose to impose penalty bids on other underwriters and/or selling group members. This means that if underwriters purchase securities on the open market to reduce their short position or to stabilize the price of the securities, they may reclaim the amount of the selling concession from those underwriters and/or selling group members who sold such securities as part of the offering.

Neither we nor any underwriter make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of such securities. In addition, neither we nor any underwriter make any representation that such underwriter will engage in such transactions or that such transactions, once commenced, will not be discontinued without notice.

If dealers are used in an offering, we will sell the securities to the dealers as principals. The dealers then may resell the securities to the public at varying prices, which they determine at the time of resale. The names of the dealers and the terms of the transaction will be specified in a prospectus supplement.

The securities may be sold directly by us or through agents we designate from time to time at a fixed price or prices, which may be changed, or at varying prices determined at the time of sale, such as in an at-the-market offering or arrangement. If agents are used in an offering, the names of the agents and the

terms of the agency will be specified in a prospectus supplement. Unless otherwise indicated in a prospectus supplement, the agents will act on a best-efforts basis for the period of their appointment.

Dealers and agents named in a prospectus supplement may be deemed to be underwriters (within the meaning of the Securities Act of 1933, as amended, also referred to in this prospectus as the "Securities Act") of the securities described therein. In addition, we may sell the securities directly to institutional investors or others who may be deemed to be underwriters within the meaning of the Securities Act with respect to any resales thereof.

Underwriters, dealers and agents may be entitled to indemnification by us against specific civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments which the underwriters or agents may be required to make in respect thereof, under underwriting or other agreements. The terms of any indemnification provisions will be set forth in a prospectus supplement. Certain underwriters, dealers or agents and their associates may engage in transactions with and perform services for us in the ordinary course of business.

If so indicated in a prospectus supplement, we will authorize underwriters or other persons acting as our agents to solicit offers by institutional investors to purchase securities pursuant to contracts providing for payment and delivery on a future date. We may enter into contracts with commercial and savings banks, insurance companies, pension funds, investment companies, educational and charitable institutions and other institutional investors. The obligations of any institutional investor will be subject to the condition that its purchase of the offered securities will not be illegal at the time of delivery. The underwriters and other agents will not be responsible for the validity or performance of such contracts.

Direct sales to investors or our stockholders may be accomplished through subscription offerings or through subscription rights distributed to stockholders. In connection with subscription offerings or the distribution of subscription rights to stockholders, if all of the underlying securities are not subscribed for, we may sell any unsubscribed securities to third parties directly or through underwriters or agents. In addition, whether or not all of the underlying securities are subscribed for, we may concurrently offer additional securities to third parties directly or through underwriters or agents. If securities are to be sold through subscription rights, the subscription rights will be distributed as a dividend to the stockholders for which they will pay no separate consideration.

Any common stock sold pursuant to a prospectus supplement will be eligible for quotation and trading on Nasdaq, subject to official notice of issuance. Any underwriters to whom securities are sold by us for public offering and sale may make a market in the securities, but such underwriters will not be obligated to do so and may discontinue any market making at any time without notice.

In order to comply with the securities laws of some states, if applicable, the securities offered hereby will be sold in those jurisdictions only through registered or licensed brokers or dealers. In addition, in some states securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and complied with.

## LEGAL MATTERS

The validity of the securities offered hereby will be passed upon for us by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts. If the securities are being distributed in an underwritten offering, certain legal matters will be passed upon for the underwriters by counsel identified in the applicable prospectus supplement.

## EXPERTS

The consolidated financial statements of Yield10 Bioscience, Inc. as of December 31, 2019 and 2018, and for each of the years in the two-year period ended December 31, 2019 incorporated in this Prospectus by reference to the Yield10 Bioscience, Inc. annual report on Form 10-K filed on March 25, 2020 have been audited by RSM US LLP, an independent registered public accounting firm, as stated in their report incorporated herein by reference, and have been incorporated in this Prospectus in reliance upon such report and upon the authority of such firm as experts in accounting and auditing.

## WHERE YOU CAN FIND MORE INFORMATION

We are a public company and file annual, quarterly and current reports, proxy statements and other information with the Securities and Exchange Commission. The SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our SEC filings are also available to the public on the SEC's website at *http://www.sec.gov*, or on our website at *http://www.yield10bio.com/* under the "Investors" link. Information contained on our website is not part of this prospectus.

This prospectus is only part of a Registration Statement on Form S-3 that we have filed with the SEC under the Securities Act, and therefore omits certain information contained in the Registration Statement. We have also filed exhibits with the Registration Statement that are excluded from this prospectus, and you should refer to the applicable exhibit for a complete description of any statement referring to any contract or other document. You may:

- inspect a copy of this prospectus, including the exhibits and schedules, without charge at the public reference room;
- obtain a copy of this prospectus from the SEC upon payment of the fees prescribed by the SEC; or
- obtain a copy of this prospectus from the SEC website.

## INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" information from other documents that we file with them, which means that we can disclose important information in this prospectus by referring to those documents. The information incorporated by reference is considered to be part of this prospectus, and information that we file later with the SEC will automatically update and supersede the information in this prospectus. We incorporate by reference the documents listed below and any future filings made with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended. The documents we are incorporating by reference as of their respective dates of filing are:

- Our Annual Report on Form 10-K for the fiscal year ended December 31, 2019, filed with the SEC on March 25, 2020; and
- Definitive Proxy Statement on Schedule 14A for the annual meeting of our stockholders to be held on May 19, 2020, filed with the SEC on March 25, 2020;
- Current Reports on Form 8-K filed on January 9, 2020, January 15, 2020, January 31, 2020, February 13, 2020; and March 19, 2020; and
- The description of our common stock contained in Item 1 of our Registration Statement on Form 8-A filed with the SEC on November 6, 2006, including any amendments or reports filed for the purpose of updating the description.

All documents and reports filed by us with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act (other than Current Reports on Form 8-K containing only information furnished under Item 2.02 or Item 7.01 of Form 8-K, unless otherwise indicated therein) after the date of this prospectus and prior to the termination of the offering made hereby shall be deemed to be incorporated by reference into this prospectus and to be a part hereof from the date of filing of such documents. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained herein or in any other subsequently filed document which also is or is deemed to be incorporated by reference herein or in any prospectus supplement modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

We will provide, without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request of such person, a copy of any or all of the documents incorporated herein by reference other than exhibits, unless such exhibits are specifically incorporated by reference into such documents or this document. Requests for such documents should be addressed in writing or by telephone to:

Investor Relations
Yield10 Bioscience, Inc.
19 Presidential Way
Woburn, Massachusetts 01801
(617) 583-1700

You should rely only on the information contained in this prospectus, any prospectus supplement or any document to which we have referred you. We have not authorized anyone else to provide you with information that is different. This prospectus and any prospectus supplement may be used only where it is legal to sell these securities. The information in this prospectus or any prospectus supplement is current only as of the date on the front of these documents.