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

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**FORM S-8**  
**REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

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**YIELD10 BIOSCIENCE, INC.**

(Exact Name of Registrant as Specified in Its Charter)

**Delaware**

(State or Other Jurisdiction of Incorporation or Organization)

**04-3158289**

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

**Yield10 Bioscience, Inc.**

**19 Presidential Way**

**Woburn, Massachusetts 01801**

(Address of Principal Executive Offices) (Zip Code)

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**Amended and Restated 2018 Stock Option and Incentive Plan**

(Full Title of the Plan)

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**Dr. Oliver P. Peoples**

**President & Chief Executive Officer**

**Yield10 Bioscience, Inc.**

**19 Presidential Way**

**Woburn, Massachusetts 01801**

(Name and Address of Agent for Service)

**(617) 583-1700**

(Telephone Number, Including Area Code, of Agent For Service)

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**Copies to:**

**Megan N. Gates, Esq.**

Mintz, Levin, Cohn, Ferris, Glovsky, and Popeo, P.C.

One Financial Center

Boston, Massachusetts 02111

(617) 542-6000

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

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

#### CALCULATION OF REGISTRATION FEE

Title of Securities To Be Registered	Amount To Be Registered(1)(2)	Proposed Maximum Offering Price Per Share(3)	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee(4)
<b>2018 Stock Option and Incentive Plan</b>				
Common Stock, par value \$0.01 per share	250,000	\$ 5.93	\$ 1,482,500	\$ 192.43

- (1) This registration statement relates to an additional 250,000 shares of common stock, \$0.01 par value per share, of the Registrant (the "Common Stock") reserved for issuance under the Amended and Restated 2018 Stock Option and Incentive Plan (the "2018 Plan"), added pursuant to an amendment to the 2018 Plan adopted by the Registrant's stockholders on May 19, 2020.
- (2) Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement shall also cover any additional shares of Common Stock which become issuable under the 2018 Plan by reason of any stock dividend, stock split, recapitalization or any other similar transaction effected without the receipt of consideration which results in an increase in the number of outstanding shares of Common Stock.
- (3) The price of \$5.93 per share, which is the average of the high and low sales price for a share of Common Stock as reported on the Nasdaq Capital Market on May 27, 2020, is set forth solely for purposes of calculating the registration fee pursuant to Rule 457(c) and (h) of the Securities Act.
- (4) Calculated pursuant to Section 6(b) of the Securities Act.

## PART I

### INFORMATION REQUIRED IN THE SECTION 10(A) PROSPECTUS

This Registration Statement on Form S-8 is filed to register an additional 250,000 shares of the Registrant's Common Stock reserved for issuance under the 2018 Plan, which were added to the shares authorized for issuance under the 2018 Plan pursuant to an amendment to the 2018 Plan adopted by the Registrant's stockholders on May 19, 2020. As of May 29, 2020, there were an aggregate of 76,937 shares of the Registrant's Common Stock reserved for issuance pursuant to outstanding options and restricted stock units under the 2018 Plan.

The document(s) containing the information required in this Part I will be sent or given to employees as specified by Rule 428(b)(1) under the Securities Act. In accordance with the rules and regulations of the Securities and Exchange Commission (the "SEC") and the instructions to Form S-8, such documents are not being filed with the SEC either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act. These documents and the documents incorporated by reference in the registration statement pursuant to Item 3 of Part II of this Form, taken together, constitute a prospectus that meets the requirements of Section 10(a) of the Securities Act.

## PART II

### INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

#### Item 3. Incorporation of Documents by Reference.

The following documents filed with the Commission are incorporated by reference in this Registration Statement:

- (a) The Registrant's [Annual Report on Form 10-K](#) for the year ended December 31, 2019, filed on March 25, 2020 (File No. 001-33133);
- (b) The Registrant's [Quarterly Report on Form 10-Q](#) for the quarter ended March 31, 2020, filed on May 15, 2020 (File No. 001-33133);
- (c) The Registrant's [Current Report on Form 8-K](#), filed on May 20, 2020 (File No. 001-33133);
- (d) The portions of the Registrant's [Definitive Proxy Statement on Schedule 14A](#) filed on March 25, 2020 that are deemed "filed" with the Commission under the Securities Exchange Act of 1934, as amended (the "Exchange Act") (File No. 001-33133); and
- (e) The section entitled "Description of Registrant's Securities to be Registered" contained in the Registrant's [Registration Statement on Form 8-A](#), filed pursuant to Section 12(b) of the Exchange Act on November 6, 2006 (File No. 001-33133), including any amendment or report filed for the purpose of updating such description.

All documents subsequently filed with the Commission by the Registrant pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act, on or after the date of this Registration Statement and prior to the filing of a post-effective amendment to this Registration Statement which indicates that all securities offered herein have been sold or which deregisters all securities then remaining unsold, shall be deemed to be incorporated by reference in this Registration Statement and to be a part thereof from the date of filing of such documents.

#### Item 4. Description of Securities.

Not applicable.

#### Item 5. Interests of Named Experts and Counsel.

Not applicable.

Item 6. Indemnification of Directors and Officers.

The Delaware General Corporation Law and our By-laws provide for indemnification of our directors and officers for liabilities and expenses that they may incur in those capacities. In general, directors and officers are indemnified with respect to actions taken in good faith in a manner reasonably believed to be in, or not opposed to, the best interests of the Registrant, and with respect to any criminal action or proceeding, actions that the indemnitee had no reasonable cause to believe were unlawful. We refer you to our [Amended and Restated By-laws](#) filed as Exhibit 3.2 to our Current Report on Form 8-K filed with the SEC on January 6, 2017 (File No. 001-33133).

The Registrant has entered into agreements with certain of its officers and directors that also provide for such indemnification and expenses and liability reimbursement. These agreements require the Registrant to indemnify such persons against liabilities that may arise by reason of their status or service as officers and directors and to advance their expenses incurred as a result of any proceeding against them as to which they could be indemnified. In addition, the Registrant has an existing directors and officers liability insurance policy to insure such persons against certain liabilities.

Item 7. Exemption from Registration.

Not applicable.

Item 8. Exhibits.

<u>Exhibit No.</u>	<u>Description of Exhibit</u>
<a href="#">4.1</a>	Amended and Restated Certificate of Incorporation, as amended, of the Registrant (filed as Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q (File No. 001-33133) on August 9, 2018 and incorporated herein by reference)
<a href="#">4.2</a>	Certificate of Designation of Preferences, Rights and Limitations with respect to the Series A Preferred Stock (filed as Exhibit 3.1 to the Registrant's Current Report on 8-K (File No. 001-33133) on November 20, 2019 and incorporated herein by reference)
<a href="#">4.3</a>	Amended and Restated By-laws of the Registrant (filed as Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-33133) on January 6, 2017 and incorporated herein by reference)
<a href="#">5.1</a> *	Opinion of Mintz, Levin, Cohn, Ferris, Glovsky, and Popeo, P.C.
23.1	Consent of Mintz, Levin, Cohn, Ferris, Glovsky, and Popeo, P.C. (included in Exhibit 5.1)
<a href="#">23.2</a> *	Consent of RSM US LLP, an independent registered public accounting firm
24.1	Power of Attorney (included as part of the signature page of this Registration Statement)
<a href="#">99.1</a>	Yield10 Bioscience, Inc. Amended and Restated 2018 Stock Option and Incentive Plan (filed as Appendix A to the Registrant's Proxy Statement for its 2020 Annual Meeting of Stockholders, filed on March 25, 2020 (File No. 001-33133) and incorporated herein by reference)
<a href="#">99.2</a>	Amended and Restated 2018 Stock Option and Incentive Plan, Form of Stock Option Agreement (filed as Exhibit 10.2.5 to the Registrant's Annual Report on Form 10-K, filed on March 28, 2019 (File No. 001-33133) and incorporated herein by reference)
<a href="#">99.3</a>	Amended and Restated 2018 Stock Option and Incentive Plan, Form of Restricted Stock Unit Agreement (filed as Exhibit 10.2.6 to the Registrant's Annual Report on Form 10-K, filed on March 25, 2020 (File No. 001-33133) and incorporated herein by reference)

\* Filed herewith.

Item 9. Undertakings.

(a) The Registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:
  - (i) To include any prospectus required by Section 10(a)(3) of the Securities Act;
  - (ii) To reflect in the prospectus any facts or events arising after the effective date of this Registration Statement which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and

price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective Registration Statement.

- (iii) To include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the Registration Statement.

*provided, however*, that paragraphs (a)(1)(i) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the SEC by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in the Registration Statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (b) The Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to section 13(a) or section 15(d) of the Exchange Act that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (c) 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 provisions described in Item 6, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

#### SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Woburn, Commonwealth of Massachusetts, on May 29, 2020.

YIELD10 BIOSCIENCE, INC.

By: /s/ Oliver P. Peoples

Oliver P. Peoples

President and Chief Executive Officer

#### POWER OF ATTORNEY

We, the undersigned directors and officers of Yield10 Bioscience, Inc., hereby severally constitute and appoint Oliver P. Peoples, Charles B. Haaser, and Lynne H. Brum, and each of them singly, our true and lawful attorneys, with full power to them, and to each of them singly, to sign for us and in our names in the capacities indicated below, the

registration statement on Form S-8 filed herewith, and any and all pre-effective and post-effective amendments to said registration statement, and any registration statement filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended, in connection with the registration under the Securities Act of 1933, as amended, of equity securities of the Company, and to file or cause to be filed the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as each of us might or could do in person, and hereby ratifying and confirming all that said attorneys, and each of them, or their substitute or substitutes, shall do or cause to be done by virtue of this Power of Attorney.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated:

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Oliver P. Peoples</u> Oliver P. Peoples	Director, President and Chief Executive Officer (Principal Executive Officer)	May 29, 2020
<u>/s/ Charles B. Haaser</u> Charles B. Haaser	Chief Accounting Officer (Principal Financial Officer and Principal Accounting Officer)	May 29, 2020
<u>/s/ Sherri M. Brown</u> Sherri M. Brown	Director	May 29, 2020
<u>/s/ Richard W. Hamilton</u> Richard W. Hamilton	Director	May 29, 2020
<u>/s/ Anthony J. Sinskey</u> Anthony J. Sinskey	Director	May 29, 2020
<u>/s/ Robert L. Van Nostrand</u> Robert L. Van Nostrand	Chairman	May 29, 2020



May 29, 2020

Yield10 Bioscience, Inc.  
19 Presidential Way  
Woburn, Massachusetts 01801

Re: Securities Being Registered under Registration Statement on Form S-8

Ladies and Gentlemen:

We have acted as legal counsel to Yield10 Bioscience, Inc., a Delaware corporation (the "Company"), in connection with the preparation and filing with the Securities and Exchange Commission (the "Commission") of a Registration Statement on Form S-8 (the "Registration Statement"), pursuant to which the Company is registering the issuance under the Securities Act of 1933, as amended (the "Securities Act"), of 250,000 shares (the "Shares") of the Company's common stock, \$0.01 par value per share, that may be issued pursuant to the Company's Amended and Restated 2018 Stock Option and Incentive Plan (the "Plan"). This opinion is being rendered in connection with the filing of the Registration Statement with the Commission. All capitalized terms used herein and not otherwise defined shall have the respective meanings given to them in the Registration Statement.

In connection with this opinion, we have examined the Company's Amended and Restated Certificate of Incorporation, as amended, and the Company's Amended and Restated By-Laws, each as currently in effect; such other records of the corporate proceedings of the Company as we have deemed relevant; and the Registration Statement and the exhibits thereto.

In our examination, we have assumed the genuineness of all signatures, the legal capacity of natural persons, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as certified or photostatic copies and the authenticity of the originals of such copies. In addition, we have assumed that the Company will receive any required consideration in accordance with the terms of the Plan.

Our opinion is limited to the General Corporation Law of the State of Delaware, and we express no opinion with respect to the laws of any other jurisdiction. No opinion is expressed herein with respect to the qualification of the Shares under the securities or blue sky laws of any state or any foreign jurisdiction.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

Based upon the foregoing, we are of the opinion that the Shares, when issued and delivered in accordance with the terms of the Plan will be validly issued, fully paid and non-assessable.

We understand that you wish to file this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K promulgated under the Securities Act, and we hereby consent thereto. In giving this consent, we do not admit that we are within the

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BOSTON   LONDON   LOS ANGELES   NEW YORK   SAN DIEGO   SAN FRANCISCO   WASHINGTON

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category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission promulgated thereunder.

Very truly yours,

/s/ Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P.C.

Mintz, Levin, Cohn, Ferris, Glovsky & Popeo, P.C.

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We consent to the incorporation by reference in this Registration Statement on Form S-8 of Yield10 Bioscience, Inc. of our report dated March 24, 2020, relating to the consolidated financial statements of Yield10 Bioscience, Inc. and Subsidiaries, appearing in the Annual Report on Form 10-K of Yield10 Bioscience, Inc. for the year ended December 31, 2019.

/s/ RSM US LLP  
Boston, Massachusetts  
May 29, 2020