

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

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

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)

2018 Stock Option and Incentive Plan

(Full Title of the Plan)

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)

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, or a smaller reporting company. See the definitions of “large accelerated filer,” “accelerated filer” and “smaller reporting company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

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)
2018 Stock Option and Incentive Plan				
Common Stock, par value \$0.01 per share	1,300,000	\$ 1.3095	\$ 1,702,350.00	\$ 211.94

- (1) This registration statement relates to 1,300,000 shares of common stock, \$0.01 par value per share, of the Registrant (the “Common Stock”) reserved for issuance under the 2018 Stock Option and Incentive Plan (the “2018 Plan”).
- (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 \$1.3095 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 August 3, 2018, 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

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, 2017, filed on March 12, 2018 (File No. 001-33133);
- (b) The Registrant’s Quarterly Reports on Form 10-Q for the quarter ended March 31, 2018, filed on May 10, 2018, and for the quarter ended June 30, 2018, filed on August 9, 2018 (File No. 001-33133);
- (c) The Registrant’s Current Reports on Form 8-K filed on May 22, 2018 and May 24, 2018 (File No. 001-33133);
- (d) the portions of the Registrant’s Definitive Proxy Statement on Schedule 14A filed on April 16, 2018 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.

The following exhibits are filed as part of this Registration Statement:

<u>Exhibit No.</u>	<u>Description of Exhibit</u>
4.1	Specimen Stock Certificate (filed as Exhibit 4.1 to the Registrant's Registration Statement on Form S-1 (No. 333-135760) on September 21, 2006 and incorporated herein by reference)
5.1	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)
23.2	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)
99.1	Yield10 Bioscience, Inc. 2018 Stock Option and Incentive Plan (filed as Exhibit 10.1 to the Registrant's Quarterly Report on 10-Q (File No. 001-33133) on August 9, 2018 and incorporated herein by reference)

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
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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.
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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, 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 August 9, 2018.

YIELD10 BIOSCIENCE, INC.

By: /s/ Oliver P. Peoples

Oliver P. Peoples

President and Chief Executive Officer

POWER OF ATTORNEY

We, the undersigned officers and directors 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, any and all amendments to this Registration Statement, and all other documents in connection therewith to be filed with the Securities and Exchange Commission, and generally to do all things in our names and on our behalf in such capacities to enable the Company to comply with the provisions of the Securities Act of 1933, as amended, and all requirements of the Securities and Exchange Commission.

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>/s/ Oliver P. Peoples</u> Oliver P. Peoples	President, Chief Executive Officer and Director (Principal Executive Officer)	August 9, 2018
<u>/s/ Charles B. Haaser</u> Charles B. Haaser	Vice President, Finance, and Chief Accounting Officer (Principal Financial and Accounting Officer)	August 9, 2018
<u>/s/ Joseph Shaulson</u> Joseph Shaulson	Director	August 9, 2018
<u>/s/ Richard Hamilton</u> Richard Hamilton	Director	August 9, 2018
<u>/s/ Peter N. Kellogg</u> Peter N. Kellogg	Director	August 9, 2018
<u>/s/ Anthony J. Sinskey</u> Anthony J. Sinskey	Director	August 9, 2018
<u>/s/ Robert L. Van Nostrand</u> Robert L. Van Nostrand	Chairman	August 9, 2018

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

Exhibit 5.1

August 9, 2018

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 an aggregate of 1,300,000 shares (the “Shares”) of the Company’s common stock, \$0.01 par value per share, that may be issued pursuant to the Company’s 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 category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission promulgated thereunder.

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

Very truly yours,

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

MINTZ, LEVIN, COHN, FERRIS, GLOVSKY AND POPEO, P.C.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

[To be provided by RSM]

/s/ RSM US LLP
Boston, Massachusetts
August [8], 2018

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 12, 2018, relating to the consolidated financial statements, of Yield10 Bioscience, Inc., appearing in the Annual Report on Form 10-K of Yield10 Bioscience, Inc. for the year ended December 31, 2017.

/s/ RSM US LLP

Boston, Massachusetts

August 9, 2018