

November 22, 2017

**VIA EDGAR**

Securities and Exchange Commission  
Division of Corporation Finance  
100 F Street, N.E. Washington, D.C. 20549  
Attention: Office of Manufacturing and Construction

**Re: Yield1O Bioscience, Inc. Registration Statement on Form S-1**  
**Filed November 2, 2017**  
**File No. 333-221283**

Ladies and Gentlemen:

We are submitting this letter on behalf of Yield10 Bioscience, Inc. (the "Company") in response to comments from the staff (the "Staff") of the Securities and Exchange Commission (the "Commission") received by letter dated November 16, 2017 (the "Comment Letter") from the Division of Corporation Finance, Office of Manufacturing and Construction, to Dr. Oliver P. Peoples, President & Chief Executive Officer of the Company, relating to the above-referenced Registration Statement on Form S-1. In conjunction with this letter, the Company is filing the amended Registration Statement on Form S-1 (the "Amended Form S-1").

For convenient reference, we have set forth below in italics the Staff's comments set forth in the Comment Letter with the Company's corresponding response.

*Comment:*

*Underwriting, page 54*

*Over-allotment Option, page 56*

*We note your disclosure in this section and on the prospectus cover page that the underwriters have the option to purchase additional shares of common stock and/or warrants to purchase shares of common stock, as opposed to simply purchasing additional Units. Please revise your disclosure to explain under what circumstances the underwriters would decide to make such purchases and how such purchases of common stock and/or warrants would be priced. In addition, please tell us how the over-allotment option comports with the offering of Class A Units and Class B Units being registered on the registration statement.*

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

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Response: As described in the Underwriting section on pages 56-57 of the prospectus, the underwriters may elect to exercise the over-allotment option in two circumstances - either to cover oversubscriptions, in a situation where they have sold more units than the Company has agreed to sell in the underwriting agreement, or in order to engage in stabilization of the price of the Company's common stock following the offering. In the latter case, the underwriters have the opportunity to purchase either the common stock or the warrants (which are exercisable for common stock) to be sold in the offering.

The Company's common stock is listed on the Nasdaq Capital Market under the symbol "YTEN". None of the Company's other securities, including the Class A Units, Class B Units, warrants and Series A preferred stock to be issued in the offering are, or will be, listed or traded on any public market. As set forth in the "Underwriting - Stabilization, Short Positions and Penalty Bids" section on page 57, the underwriters may engage in stabilization transactions. In the event they do engage in such transactions, as the common stock is the only publicly traded security of the Company that can be stabilized, the over-allotment needs to be exercisable for shares of common stock **and/or** warrants so that both of these components of the Units may be delivered to cover the over-allotment sales. Without the ability to separate the over-allotment into the component securities, the underwriters would be inhibited from engaging in stabilizing transactions, which the Company believes could be detrimental to the offering and its shareholders. The prices for the warrants and common stock in any overallotment option exercises would be the public offering price for such securities set forth in the public offering price table footnotes on the second page of the prospectus. With a view towards disclosure, we have further revised the public offering price table to break out the public offering prices of the components of the units being offered by the Company.

The Class A Units and Class B Units are used merely to describe the fixed combination of (i) common stock and warrants and (ii) Series A preferred stock and warrants being offered by the Company. As set forth on the first page of the prospectus and on page 48, the Class A Units and Class B Units are not being issued as stand-alone securities and have no rights as stand-alone securities. The shares of common stock, preferred stock and warrants comprising the units are immediately separable and will be issued separately in the offering, as disclosed on the first page of the prospectus and on page 48.

We hope that the above response and the related revisions reflected in the Amended Form S-1 will be acceptable to the Staff. Please do not hesitate to call me at (617) 542-6000 with any comments or questions regarding the Amended Form S-1 and this letter. We thank you for your time and attention.

Sincerely,

Megan N. Gates

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cc:

Securities and Exchange Commission

Pamela Long

YieldIO Bioscience, Inc.

Dr. Oliver P. Peoples