

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
SCHEDULE 14A**

Proxy Statement Pursuant to Section 14(a) of
the Securities Exchange Act of 1934 (Amendment No.)

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material under §240.14a-12

Yield10 Bioscience, Inc.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement, if other than the Registrant)

Payment of Filing Fee (Check the appropriate box):

- No fee required.
- Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.
 - (1) Title of each class of securities to which transaction applies: _____
 - (2) Aggregate number of securities to which transaction applies: _____
 - (3) Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (set forth the amount on which the filing fee is calculated and state how it was determined): _____
 - (4) Proposed maximum aggregate value of transaction: _____
 - (5) Total fee paid: _____
- Fee paid previously with preliminary materials.
- Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.
 - (1) Amount Previously Paid: _____
 - (2) Form, Schedule or Registration Statement No.: _____
 - (3) Filing Party: _____
 - (4) Date Filed: _____



October 17, 2017

Dear Stockholder:

You are cordially invited to attend a Special Meeting of Stockholders of Yield10 Bioscience, Inc. (the "Company") to be held on Wednesday, November 29, 2017, at 10:00 a.m., Eastern time, at the Company's offices at 19 Presidential Way, Woburn, MA 01801. Directions to the location of the Special Meeting can be found at <http://ir.yield10bio.com/index.cfm>.

At this Special Meeting, you will be asked to approve an amendment to the Corporation's Amended and Restated Certificate of Incorporation, as amended, to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of our common stock that are authorized to be issued.

Details regarding the matter to be acted upon at this Special Meeting appear in the accompanying proxy statement. Please give this material your careful attention.

Whether or not you plan to attend the Special Meeting, we urge you to complete, sign, date and mail promptly the enclosed proxy which is being solicited on behalf of the Board of Directors so that your shares will be represented at the Special Meeting. A return envelope which requires no postage if mailed in the United States is enclosed for that purpose. You need to vote in accordance with the instructions listed on the proxy card. If shares are held in a bank or brokerage account, you may be eligible to vote electronically or by telephone. Please refer to the enclosed voting instruction form for instructions. If you attend the Special Meeting, you may vote in person even if you have previously returned your proxy card. Your prompt cooperation will be greatly appreciated.

Very truly yours,

/s/ Oliver P. Peoples

OLIVER P. PEOPLES

President and Chief Executive Officer

YIELD10 BIOSCIENCE, INC.
19 Presidential Way
Woburn, Massachusetts 01801
(617) 583-1700

NOTICE OF SPECIAL MEETING OF STOCKHOLDERS
TO BE HELD ON NOVEMBER 29, 2017

To the Stockholders of Yield10 Bioscience, Inc.:

A Special Meeting of Stockholders of Yield10 Bioscience, Inc., a Delaware corporation, will be held on Wednesday, November 29, 2017, at 10:00 a.m., Eastern time, at the Company's offices at 19 Presidential Way, Woburn, MA 01801, for the following purpose:

To amend our Amended and Restated Certificate of Incorporation, as amended, to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of our common stock that are authorized to be issued.

Only stockholders of record at the close of business on October 3, 2017, are entitled to notice of and to vote at the Special Meeting and at any adjournment or postponement thereof.

All stockholders are cordially invited to attend the Special Meeting in person. **However, to assure your representation at the Special Meeting, we urge you, whether or not you plan to attend the Special Meeting, to complete, sign, date and mail promptly the enclosed proxy which is being solicited on behalf of the Board of Directors so that your shares will be represented at the Special Meeting.** A return envelope which requires no postage if mailed in the United States is enclosed for that purpose. You need to vote in accordance with the instructions listed on the proxy card. If shares are held in a bank or brokerage account, you may be eligible to vote electronically or by telephone. Please refer to the enclosed voting instruction form for instructions. If you attend the Special Meeting, you may vote in person even if you have previously returned your proxy card.

By Order of the Board of Directors,

/s/ Lynne H. Brum

LYNNE H. BRUM

Secretary

Woburn, Massachusetts
October 17, 2017

WHETHER OR NOT YOU EXPECT TO ATTEND THE SPECIAL MEETING, PLEASE COMPLETE, SIGN, DATE AND MAIL PROMPTLY THE ENCLOSED PROXY WHICH IS BEING SOLICITED ON BEHALF OF THE BOARD OF DIRECTORS SO THAT YOUR SHARES WILL BE REPRESENTED AT THE SPECIAL MEETING. A RETURN ENVELOPE WHICH REQUIRES NO POSTAGE IF MAILED IN THE UNITED STATES IS ENCLOSED FOR THAT PURPOSE. YOU NEED TO VOTE IN ACCORDANCE WITH THE INSTRUCTIONS LISTED ON THE PROXY CARD. IF SHARES ARE HELD IN A BANK OR BROKERAGE ACCOUNT, YOU MAY BE ELIGIBLE TO VOTE ELECTRONICALLY OR BY TELEPHONE. PLEASE REFER TO THE ENCLOSED VOTING INSTRUCTION FORM FOR INSTRUCTIONS.

IN ACCORDANCE WITH OUR SECURITY PROCEDURES, ALL PERSONS ATTENDING THE SPECIAL MEETING MAY BE REQUIRED TO PRESENT PICTURE IDENTIFICATION.

**YIELD10 BIOSCIENCE, INC.
19 Presidential Way
Woburn, Massachusetts 01801**

PROXY STATEMENT

**For a Special Meeting of Stockholders
To Be Held on November 29, 2017**

October 17, 2017

Proxies in the form enclosed with this Proxy Statement are solicited by the Board of Directors of Yield10 Bioscience, Inc., a Delaware corporation (“Yield10” or the “Company”), for use at the Special Meeting of Stockholders of Yield10 to be held on Wednesday, November 29, 2017, at 10:00 a.m., Eastern time, or at any adjournments or postponements thereof (the “Special Meeting”) at the Company’s offices at 19 Presidential Way, Woburn, MA 01801. Directions to the location of the Special Meeting are available at <http://ir.yield10bio.com/index.cfm>. This Proxy Statement and the form of proxy were first sent or given to stockholders on or about October 19, 2017.

The purpose of the Special Meeting is to seek shareholder approval to amend the Company’s Amended and Restated Certificate of Incorporation, as amended (“Certificate of Incorporation”), to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of our common stock that are authorized to be issued.

Only stockholders of record at the close of business on October 3, 2017 (the “Record Date”) will be entitled to receive notice of and to vote at the Special Meeting. As of the Record Date, 3,461,714 shares of Common Stock were issued, outstanding and entitled to vote.

VOTING

The holders of Common Stock are entitled to one vote per share on the proposal to be presented at the Special Meeting. Stockholders may vote in person or by proxy. Stockholders may vote by proxy by completing, signing, dating and returning the accompanying proxy card in the postage-prepaid envelope enclosed for that purpose in accordance with the instructions listed on the proxy card. Execution of a proxy will not in any way affect a stockholder’s right to attend the Special Meeting and vote in person.

Any proxy given pursuant to this solicitation may be revoked by the person giving it any time before the taking of the vote at the Special Meeting. Proxies may be revoked by (1) filing with the Secretary of Yield10, before the taking of the vote at the Special Meeting, a written notice of revocation bearing a later date than the proxy, (2) duly executing a later-dated proxy relating to the same shares and delivering it to the Secretary of Yield10, in accordance with the instructions listed on the proxy card, before the taking of the vote at the Special Meeting, (3) if shares are held in a bank or brokerage account and if eligible, by transmitting a subsequent vote over the Internet or

by telephone, or (4) attending the Special Meeting and voting in person (although attendance at the Special Meeting will not in and of itself constitute a revocation of a proxy). Any written notice of revocation or subsequent proxy should be sent to Yield10 Bioscience, Inc., 19 Presidential Way, Woburn, MA 01801, Attention: Secretary, so as to be delivered before the taking of the vote at the Special Meeting.

If your shares are held by a broker on your behalf (that is, in "street name"), you may be required to present an account statement or letter from your bank or brokerage firm showing that you are the beneficial owner of the shares as of the Record Date in order to be admitted to the Special Meeting. To be able to vote your shares held in street name at the Special Meeting, you will need to obtain a proxy from the holder of record.

The persons named as attorneys-in-fact in the proxies, Oliver P. Peoples and Charles B. Haaser, were selected by the Board of Directors and are officers of the Company. All properly executed proxies returned in time to be counted at the Special Meeting will be voted by such persons at the Special Meeting as stated below. When a choice has been specified on the proxy with respect to a matter, the shares represented by the proxy will be voted in accordance with the specifications. If a proxy is submitted without giving voting instructions, such shares will be voted FOR the amendment of the Company's Certificate of Incorporation to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of our common stock that are authorized to be issued.

The representation in person or by proxy of at least a majority of the outstanding shares of Common Stock entitled to vote at the Special Meeting is necessary to constitute a quorum for the transaction of business. Abstentions are counted as present or represented for purposes of determining the presence or absence of a quorum for the Special Meeting, and will have the same effect as "against" votes. If your shares are held in street name, and you do not instruct the broker as to how to vote your shares on the amendment to the Certificate of Incorporation, the broker will not have discretion to vote for or against such proposal, your shares will not be counted as present or represented for purposes of determining the presence or absence of a quorum for the Special Meeting and it will have the same effect as "against" votes. This would be a broker "non-vote". **Please vote your proxy so your vote can be counted.**

Important Notice Regarding the Availability of Proxy Materials for the Special Meeting: The proxy statement is available for viewing, printing and downloading at <http://ir.yield10bio.com/index.cfm>.

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following table sets forth certain information regarding beneficial ownership of the Company's Common Stock as of September 15, 2017: (i) by each person known to us to be the beneficial owner of more than 5% of our outstanding shares of Common Stock; (ii) by each of our directors and nominees; (iii) by each of our named executive officers; and (iv) by all of our directors and executive officers as a group. Unless otherwise noted below, the address of each person listed on the table is c/o Yield10 Bioscience, Inc., 19 Presidential Way, Woburn, MA 01801.

Category	Beneficial Owner	Shares of Common Stock (1)	Options Exercisable Within 60 Days (2)	Warrants Exercisable Within 60 Days (2)	RSUs Vesting Within 60 Days (2)	Total Shares Beneficially Owned	Percentage of Outstanding Shares (3)
5% Stockholders	Jack W. Schuler (4) 100 N. Field Drive Suite 360 Lake Forest, IL 60045	1,383,421	-	299,670	-	1,683,091	44.8%
	William P. Scully (5) 771 Manatee Cove Vero Beach, FL 32963	293,333	-	-	-	293,333	8.5%
	Matthew Strobeck (6) C/O Birchview Capital 688 Pine Street, Suite D Burlington, VT 05401	228,493	-	13,110	-	241,603	7.0%
Directors and Named Executive Officers	Lynne H. Brum (7)	8,953	26,585	1,311	-	36,849	1.1%
	Oliver P. Peoples (8)	27,151	90,086	1,311	-	118,548	3.3%
	Kristi Snell (9)	6,510	53,589	-	-	60,099	1.7%
	Richard Hamilton	3,041	3,000	-	-	6,041	0.2%
	Peter Kellogg	5,302	2,002	-	-	7,304	0.2%
	Joseph Shaulson (10)	35,295	94,167	3,150	-	132,612	3.7%
	Anthony J. Sinskey (11)	12,372	2,002	-	-	14,374	0.4%
	Robert van Nostrand	11,293	2,252	-	-	13,545	0.4%
All directors and executive officers as a group (9 persons) (12)		114,511	301,337	5,772	-	421,620	11.2%

- (1) Beneficial ownership, as such term is used herein, is determined in accordance with Rule 13d-3(d)(1) promulgated under the Securities Exchange Act of 1934, as amended, and includes voting and/or investment power with respect to shares of our common stock. Unless otherwise indicated, the named person possesses sole voting and investment power with respect to the shares.
- (2) Consists of shares of common stock subject to stock options, warrants and restricted stock units ("RSUs") held by the person that are currently vested or will vest within 60 days after September 15, 2017.
- (3) Percentages of ownership are based upon 3,454,601 shares of Common Stock issued and outstanding as of September 15, 2017. Shares of common stock that may be acquired pursuant to options, warrants and RSUs that are vested and exercisable within 60 days after September 15, 2017, are deemed outstanding for computing the percentage ownership of the person holding such options, but are not deemed outstanding for the percentage ownership of any other person.

- (4) The reported securities consist of 218,565 shares of common stock and 149,835 shares of common stock underlying the warrants owned by Jack W. Schuler, 978,414 shares of common stock and 149,835 shares of common stock underlying the warrants owned by the Schuler Family Foundation, 160,392 shares of common stock owned by the Jack W. Schuler Living Trust, and 26,050 shares of common stock owned by Schuler Grandchildren LLC. Mr. Schuler has sole voting and investment power over the shares issued to Schuler Grandchildren LLC and the Jack W. Schuler Living Trust. He disclaims beneficial ownership over the shares held by Schuler Grandchildren LLC and has beneficial ownership over the shares held by the Jack W. Schuler Living Trust.
- (5) Information regarding Mr. Scully is based solely on a Schedule 13D/A filed with the SEC on January 7, 2016. According to such Schedule 13D/A, Mr. Scully reported sole voting power and sole dispositive power as to all of the shares.
- (6) Includes 71,036 shares held by Birchview Fund, LLC and 3,933 shares subject to warrants held by Birchview Fund, LLC. Dr. Strobeck is the sole member of Birchview Capital GP, LLC (the "GP"), the general partner of Birchview Capital, LP (the "Investment Manager"), which is the investment Manager of Birchview Fund, LLC (the "Fund") and the sole member of Birchview Partners, LLC (the "Manager"), which is a member of the Fund. Dr. Strobeck disclaims Section 16 beneficial ownership of the shares of Common Stock held by the Fund (collectively, the "Fund Shares"), except to the extent of his pecuniary interest, if any, in the Fund Shares by virtue of his membership interest in the GP. Also includes 6,666 shares held in accounts for minor children for which Dr. Strobeck serves as a custodian, 1,494 shares held by Dr. Strobeck's spouse as custodian for their children, and 681 shares held indirectly by a trust for the benefit of Dr. Strobeck's children. Dr. Strobeck is a trustee of the trust. Dr. Strobeck disclaims beneficial ownership of these shares except to the extent of his pecuniary interest in them, if any. Dr. Strobeck resigned from our Board on January 10, 2017.
- (7) Includes 3,922 shares held for Ms. Brum in the Company's 401(k) plan.
- (8) Includes 2,849 shares held for Dr. Peoples in the Company's 401(k) plan.
- (9) Includes 3,782 shares held for Dr. Snell in the Company's 401(k) plan.
- (10) Includes 1,470 shares held for Mr. Shaulson in the Company's 401(k) plan.
- (11) Includes 822 shares owned by Dr. Sinskey's spouse and 166 shares owned by a trust over which Dr. Sinskey may be deemed to share voting and investment power. Dr. Sinskey disclaims beneficial ownership of such shares.
- (12) Includes a total of 15,245 shares held for current executive officers and Mr. Shaulson, our former President and Chief Executive Officer, in the Company's 401(k) plan.

PROPOSAL

APPROVAL OF AN AMENDMENT TO OUR CERTIFICATE OF INCORPORATION TO DECREASE THE AUTHORIZED NUMBER OF SHARES OF OUR COMMON STOCK, \$0.01 PAR VALUE PER SHARE, FROM 250,000,000 TO 40,000,000

The Board of Directors has determined that it is advisable to decrease our authorized common stock, \$0.01 par value per share, from 250,000,000 shares to 40,000,000 shares, and has voted to recommend that the stockholders adopt an amendment to our Certificate of Incorporation effecting the proposed decrease. The full text of the proposed amendment to our Certificate of Incorporation is attached to this proxy statement as Appendix A.

As of September 15, 2017, 3,454,601 shares of our common stock were issued and outstanding, an additional 1,634,671 shares were reserved for issuance upon the conversion of existing securities, including vesting of outstanding restricted stock units and exercise of options or warrants granted under our various stock-based plans and certain agreements, and an additional 377,124 shares remain available for issuance under our 2014 Stock Option and Incentive Plans. Accordingly, of our 250,000,000 authorized common shares, approximately 244,533,604 shares of common stock are available for future issuance.

On May 24, 2017, our stockholders approved an amendment to our Certificate of Incorporation to effect a reverse stock split of our common stock at a ratio in the range of 1:2 to 1:10, such ratio to be determined by the Board of Directors. On May 25, 2017, we filed a Certificate of Amendment to our Certificate of Incorporation effecting a 1:10 reverse stock split effective as of May 30, 2017. As a result of this stock split, we currently have a very wide discrepancy between the number of shares of issued and outstanding common stock and the number of authorized shares of common stock.

The Board of Directors believes it continues to be in the best interest of Yield10 and its stockholders to have sufficient additional authorized but unissued shares of common stock available in order to provide flexibility for future corporate action in the future. Management believes that the availability of additional authorized shares for issuance from time to time in the Board of Directors' discretion in connection with future financings, possible acquisitions of other companies, investment opportunities or for other corporate purposes is desirable in order to avoid repeated separate amendments to our Certificate of Incorporation and the delay and expense incurred in holding special meetings of the stockholders to approve such amendment.

We currently have no specific understandings, arrangements, agreements or other plans to issue, in connection with future acquisitions, financings or otherwise, any of the authorized but unissued shares that would remain available following the proposed decrease in the number of authorized shares of our common stock. However, the Board of Directors believes that the unissued shares that remain available after the implementation of the reverse stock split results in a very high Delaware state franchise tax liability, while a lower number of unissued shares will still provide sufficient flexibility for corporate action in the future. Specifically, our current number of authorized shares results in a Delaware state franchise tax liability of approximately \$190,000 per year, while the proposed decrease in authorized shares to 40,000,000 would result in a Delaware state franchise tax liability of approximately \$39,000 per year, which would result in a meaningful cost savings for the Company in light of its current financial resources. Therefore, the Board of Directors recommends that our stockholders approve a decrease in the number of authorized shares of our common stock from 250,000,000 to 40,000,000. Even if the stockholders approve the proposed decrease in the number of Yield10's authorized shares, Yield10 reserves the right not to amend the Certificate of Incorporation if the Board does not continue to deem such amendment to be in the best interest of Yield10 and its stockholders following the Special Meeting.

We will not solicit further authorization by vote of the stockholders for the issuance of the unissued authorized shares of common stock, except as required by law, regulatory authorities or rules of the NASDAQ Capital Market or any other stock exchange on which our shares may then be listed. The issuance of additional shares of common stock could have the effect of diluting existing stockholder earnings per share, book value per share and voting power. Our stockholders do not generally have any preemptive right to purchase or subscribe for any part of any new or additional issuance of our securities.

Approval of the amendment to our Certificate of Incorporation to effect the proposed decrease in our authorized number of shares of common stock requires an affirmative vote of a majority of the common stock outstanding and entitled to vote at the Special Meeting. Abstentions will be counted towards the vote total for this proposal and will have the same effect as "against" votes. Broker non-votes will not be counted towards the vote total for this proposal and will have the same effect as "against" votes.

THE BOARD OF DIRECTORS RECOMMENDS A VOTE TO APPROVE THE AMENDMENT TO OUR CERTIFICATE OF INCORPORATION, AND PROXIES SOLICITED BY THE BOARD WILL BE VOTED IN FAVOR OF THE AMENDMENT UNLESS A STOCKHOLDER INDICATES OTHERWISE ON THE PROXY.

OTHER MATTERS

The Board of Directors knows of no other matters to be brought before the Special Meeting. If any other matters are properly brought before the Special Meeting, the persons appointed in the accompanying proxy intend to vote the shares represented thereby in accordance with their best judgment on such matters, under applicable laws.

EXPENSES AND SOLICITATION

The cost of solicitation of proxies will be borne by the Company and, in addition to soliciting stockholders by mail through its regular employees, the Company may request banks, brokers and other custodians, nominees and fiduciaries to solicit their customers who have stock of the Company registered in the names of a nominee and, if so, will reimburse such banks, brokers and other custodians, nominees and fiduciaries for their reasonable out-of-pocket costs. Solicitation by officers and employees of the Company may also be made of some stockholders in person or by mail, telephone or e-mail following the original solicitation. If Yield10 does retain a proxy solicitation firm, Yield10 would pay such firm's customary fees and expenses, which fees would be expected not to exceed \$10,000 plus expenses.

CERTIFICATE OF AMENDMENT
OF
AMENDED AND RESTATED CERTIFICATE OF INCORPORATION
OF
YIELD10 BIOSCIENCE, INC.

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

YIELD10 BIOSCIENCE, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

1. The name of the corporation (hereinafter called the “**Corporation**”) is Yield10 Bioscience, Inc.

2. The Certificate of Incorporation of the Corporation was filed with the Secretary of State of the State of Delaware on September 1, 1998. An Amended and Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on November 15, 2006 and thereafter Certificates of Designation were filed on July 8, 2009 and August 22, 2014 with the Secretary of State of the State of Delaware and Certificates of Amendment were filed on October 30, 2014 and May 26, 2015 with the Secretary of State of the State of Delaware and a Certificate of Designation was filed on September 11, 2015 with the Secretary of State of the State of Delaware. Certificates of Amendment were filed on January 6, 2017 and May 25, 2017 with the Secretary of State of the State of Delaware.

3. The first paragraph of Article IV of the Corporation’s Amended and Restated Certificate of Incorporation, as amended, is hereby deleted and replaced in its entirety with:

“The total number of shares of capital stock which the Corporation shall have authority to issue is forty-five million (45,000,000) shares, of which (i) forty million (40,000,000) shares shall be a class designated as common stock, par value \$.01 per share (the “Common Stock”), and (ii) five million (5,000,000) shares shall be a class designated as undesignated preferred stock, par value \$.01 per share (the “Undesignated Preferred Stock”).

4. The Board of Directors of the Corporation has duly adopted resolutions (i) authorizing the Corporation to execute and file with the Secretary of State of the State of Delaware this Certificate of Amendment, and (ii) declaring this Certificate of Amendment to be advisable and recommended for approval by the stockholders of the Corporation.

5. This Certificate of Amendment was duly adopted in accordance with the provisions of Section 242 of the DGCL by the Board of Directors and stockholders of the Corporation.

6. This Certificate of Amendment as filed under Section 242 of the General Corporation Law of the State of Delaware, has been duly authorized in accordance thereof.

7. This Certificate of Amendment shall take effect on [●], 2017.

[Remainder of this page intentionally left blank.]

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to Certificate of Incorporation to be signed by its duly authorized President and Chief Executive Officer this [●] day of [●], 2017.

YIELD10 BIOSCIENCE, INC.

By: /s/ Oliver P. Peoples
Dr. Oliver P. Peoples
President and Chief Executive Officer

Proxy Card:

YIELD10 BIOSCIENCE, INC.

19 Presidential Way, Woburn, Massachusetts 01801

PROXY FOR SPECIAL MEETING OF STOCKHOLDERS

November 29, 2017

YIELD10 BIOSCIENCE'S BOARD OF DIRECTORS SOLICITS THIS PROXY

The undersigned, revoking any previous proxies relating to these shares, hereby appoints Oliver P. Peoples and Charles B. Haaser, and each of them (with full power to act alone), the attorneys and proxies of the undersigned, with power of substitution to each, to vote all shares of the Common Stock of Yield10 Bioscience registered in the name provided in this Proxy which the undersigned is entitled to vote at the Special Meeting of Stockholders, to be held at 10:00 am on Wednesday, November 29, 2017 at the offices of Yield10 Bioscience, Inc. at 19 Presidential Way, Woburn, MA 01801, and at any adjournments of the meeting, with all the powers the undersigned would have if personally present at the meeting. Without limiting the general authorization given by this Proxy, the proxies are, and each of them is, instructed to vote or act as follows on the proposals set forth in the Proxy.

See reverse for voting instructions.

SPECIAL MEETING OF STOCKHOLDERS OF

YIELD10 BIOSCIENCE, INC.

NOVEMBER 29, 2017

Important Notice Regarding Internet Availability of Proxy Materials for the Special Meeting: The proxy statement is available at <http://ir.yield10bio.com/index.cfm>

Please sign, date and mail your proxy card in the envelope provided
as soon as possible.

Please detach along perforated line and mail in the envelope provided.

THE BOARD OF DIRECTORS RECOMMENDS A VOTE FOR PROPOSAL 1. PLEASE SIGN, DATE AND RETURN PROMPTLY IN THE ENCLOSED ENVELOPE. PLEASE MARK YOUR VOTE IN BLUE OR BLACK INK AS SHOWN HERE ☒

Proposal to amend the Company's Amended and Restated Certificate of Incorporation, as amended, to decrease from 250,000,000 shares to 40,000,000 shares the aggregate number of shares of the Company's common stock that are authorized to be issued.

This Proxy, when executed, will be voted in the manner directed herein. If you do not specify how you want your shares to be voted, this Proxy will be voted FOR Proposal 1. In their discretion the proxies are authorized to vote upon such other matters as may properly come before the meeting or any adjournments of the meeting.

FOR AGAINST ABSTAIN

VOTE BY MAIL

Mark, sign and date your proxy card. Return it in the postage-paid envelope we have provided, or return it to Yield10 Bioscience, Inc., c/o American Stock Transfer & Trust Company, 6201 15th Avenue, Brooklyn, NY 11219.

To change the address on your account, please check the box at right and indicate your new address in the address space above. Please note that changes to the registered name(s) on the account may not be submitted via this method.

Signature of Stockholder

Date:

Signature of Stockholder

Date:

Note: Please sign exactly as your name or names appear on this Proxy. When shares are held jointly, each holder should sign. When signing as executor, administrator, attorney, trustee or guardian, please give full title as such. If the signer is a corporation, please sign full corporate name by duly authorized officer, giving full title as such. If signer is a partnership, please sign in partnership name by authorized person.

e-Consent makes it easy to go paperless. With e-Consent, you can quickly access your proxy material, statements and other eligible documents online, while reducing costs, clutter and paper waste. Enroll today via www.astfinancial.com to enjoy online access.