

PROSPECTUS



Up to 6,875,000 Shares of Common Stock

This prospectus relates to the proposed offer and resale or other disposition from time to time by the selling stockholders identified in this prospectus, or collectively the selling stockholders, of up to an aggregate of 6,875,000 shares of our common stock, par value \$0.0001 per share, or the common stock, consisting of (i) 6,725,000 shares of common stock and (ii) 150,000 shares of common stock issuable upon exercise of pre-funded warrants. The common stock and the pre-funded warrants were issued in a private placement, pursuant to a securities purchase agreement, dated May 26, 2026, by and among us and the selling stockholders.

We are registering the resale of the shares of common stock pursuant to the selling stockholders' registration rights under a registration rights agreement between us and the selling stockholders. Our registration of the resale of the shares of common stock covered by this prospectus does not mean that the selling stockholders will offer or sell all or any of the shares of common stock. The selling stockholders may offer, sell or distribute all or a portion of their shares of common stock from time to time directly or indirectly through one or more underwriters, broker-dealers or agents, and in one or more public or private transactions. The shares of common stock may be sold in one or more transactions at fixed prices, at prevailing market prices at the time of the sale, at varying prices determined at the time of sale or at negotiated prices. These sales may be effected in transactions, which may involve crosses or block transactions. See the section entitled "*Plan of Distribution*" for more information.

We will not receive any proceeds from any sale of common stock by the selling stockholders pursuant to this prospectus. However, we may receive nominal proceeds from the exercise of the pre-funded warrants if the holders exercise the pre-funded warrants for cash. We have agreed to bear the expenses in connection with the registration of the resale of the shares of common stock to be offered by this prospectus by the selling stockholders other than any underwriting discounts and commissions and all similar fees and commissions relating to the sale of common stock, which will be borne by the selling stockholders.

Our common stock is listed on the Nasdaq Capital Market, or Nasdaq, under the symbol "QTTB." On July 27, 2026, the closing price for our common stock, as reported on Nasdaq, was \$15.21 per share.

As of the date of this prospectus, we are a smaller reporting company as defined under Rule 405 of the Securities Act of 1933, as amended, or the Securities Act, and, as such, are subject to certain reduced public company reporting requirements. See "Prospectus Summary—Implications of Being a Smaller Reporting Company" on page 5 of this prospectus.

Investing in our securities involves certain risks. See the section entitled "[Risk Factors](#)" beginning on page 7 of this prospectus, in any applicable prospectus supplement and any related free writing prospectus, and in our SEC filings that are incorporated by reference herein. You should read the entire prospectus carefully before you make your investment decision.

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

The date of this prospectus is July 28, 2026.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the SEC, utilizing a “shelf” registration process. Under this shelf registration process, the selling stockholders identified in this prospectus under the caption “Selling Stockholders” may, from time to time, sell up to an aggregate of 6,875,000 shares of common stock described in this prospectus, consisting of (i) 6,725,000 shares of common stock and (ii) 150,000 shares of common stock issuable upon exercise of pre-funded warrants, in one or more offerings. We are not selling any shares of common stock under this prospectus, and we will not receive any proceeds from the sale of shares of common stock offered hereby by the selling stockholders. However, we may receive nominal proceeds from the exercise of the pre-funded warrants if the holders exercise the pre-funded warrants for cash.

You should rely only on the information provided in this prospectus as well as the information incorporated by reference herein and any applicable prospectus supplement or amendment. Neither we, nor the selling stockholders, have authorized anyone to give any information or to make any representation other than those contained or incorporated by reference in this prospectus. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus. The selling stockholders are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where it is lawful to do so. This prospectus does not constitute an offer to sell or the solicitation of an offer to buy any shares other than the registered shares to which it relates, nor does this prospectus constitute an offer to sell or the solicitation of an offer to buy shares in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. You should not assume that the information contained in this prospectus is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus is delivered or shares are sold on a later date. Our business, financial condition, results of operations and prospects may have changed since those dates.

This prospectus incorporates by reference market data and industry statistics and forecasts that are based on independent industry publications and other publicly available information. Although we believe these sources are reliable, we do not guarantee the accuracy or completeness of this information and we have not independently verified this information. In addition, the market and industry data and forecasts that may be included or incorporated by reference in this prospectus may involve estimates, assumptions and other risks and uncertainties and are subject to change based on various factors, including those discussed under the heading “Risk Factors” contained in this prospectus and under similar headings in other documents that are incorporated by reference into this prospectus. Accordingly, investors should not place undue reliance on this information.

A prospectus supplement may add to, update or change the information contained in this prospectus. You should read both this prospectus and any applicable prospectus supplement together with additional information described below under the heading “Where You Can Find Additional Information” or incorporated by reference herein as described under the heading “Incorporation of Certain Information by Reference.”

Unless the context otherwise indicates, references in this prospectus to “Company,” “we,” “our” and “us” refer, collectively to Q32 Bio Inc., a Delaware corporation, and its consolidated subsidiaries (including Legacy Q32 (as defined herein)).

We use various trademarks and trade names in our business, including without limitation our corporate name and logo. All other trademarks or trade names referred to in this prospectus are the property of their respective owners. Solely for convenience, the trademarks and trade names in this prospectus may be referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains and/or incorporates by reference statements that are not historical facts and are considered forward-looking within the meaning of Section 27A of the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. Our forward-looking statements include, but are not limited to, statements regarding our or our management team's expectations, hopes, beliefs, intentions or strategies regarding the future. In addition, any statements that refer to projections, forecasts or other characterizations of future events or circumstances, including any underlying assumptions, are forward-looking statements. The words "anticipate," "believe," "contemplate," "continue," "could," "estimate," "expect," "intends," "may," "might," "plan," "possible," "potential," "predict," "project," "should," "will," "would" and similar expressions may identify forward-looking statements, but the absence of these words does not mean that a statement is not forward-looking. Forward looking statements in this prospectus may include, for example, statements about:

- our ability to achieve and sustain profitability in the future;
- our strategies, prospects, plans, expectations or objectives of management for our future operations;
- estimates of our future expenses, revenues, capital requirements, cash runway, and our needs for additional financing;
- our estimates of and anticipated use of our existing cash and cash equivalents;
- the progress, scope or timing of the development of our product candidates;
- our expectations surrounding the potential safety, efficacy, and regulatory and clinical progress of our product candidates, including bempikibart, and our anticipated milestones, timing of anticipated registrational trials, and timing of data readouts;
- our ability to obtain and maintain regulatory approval of our product candidates;
- our ability to achieve and maintain market acceptance and adoption of our product candidates;
- the benefits that may be derived from any of our future products or the commercial or market opportunity with respect to any of our future products;
- our ability to maintain patent protection for our product candidates and protect our intellectual property rights;
- our ability to successfully compete against other companies developing similar products to ours;
- our anticipated operations, financial position, ability to raise capital to fund our operations, revenues, costs or expenses;
- our ability to retain our key executives and to attract and retain highly qualified personnel;
- our ability to successfully protect against cyber-attacks, security breaches and other disruptions to our information technology systems;
- our ability to establish and maintain an effective system of internal controls over financial reporting;
- the effect of unfavorable macroeconomic conditions or market volatility resulting from global economic conditions or geopolitical developments, including fluctuating interest rates and inflation and capital market disruptions, changes in governmental agencies, government shutdowns, international tariffs, trade protection measures, public health crises, economic sanctions and potential economic slowdowns or recessions, or similar events;
- our reliance on third parties in the supply and manufacture of our product candidates;
- the impact of applicable laws and regulations, whether in the U.S. or foreign jurisdictions, and any changes thereto;

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- the impacts of changes in the policies or regulations of the U.S. Food and Drug Administration or comparable foreign regulatory authorities regarding development, approval, and marketing of products;
- the statements regarding our future economic conditions or performance, statements of belief and any statement of assumptions underlying any of the foregoing; and
- other risks and uncertainties, including those listed under the caption “Risk Factors.”

These forward-looking statements are based on information available to us at the time of this prospectus or the documents incorporated by reference herein and current expectations, forecasts and assumptions, and involve a number of judgments, risks and uncertainties. Accordingly, forward-looking statements should not be relied upon as representing our views as of any subsequent date, and we do not undertake any obligation to update forward-looking statements to reflect events or circumstances after the date they were made, whether as a result of new information, future events or otherwise, except as may be required under applicable securities laws.

The outcome of the events described in these forward-looking statements is subject to known and unknown risks, uncertainties, and other factors. As a result of a number of known and unknown risks and uncertainties, our actual results or performance may be materially different from those expressed or implied by these forward-looking statements, including those set forth in this prospectus in the section entitled “Risk Factors” and in our periodic filings with the SEC. Our SEC filings are available publicly on the SEC’s website at www.sec.gov. Given these risks and uncertainties, you should not place undue reliance on these forward-looking statements. Additional cautionary statements or discussions of risks and uncertainties that could affect our results or the achievement of the expectations described in forward-looking statements may also be contained in any accompanying prospectus supplement. Should one or more of the risks or uncertainties described in this prospectus, or should underlying assumptions prove incorrect, actual results and plans could differ materially from those expressed in any forward-looking statements.

You should read this prospectus and any accompanying prospectus supplement completely and with the understanding that our actual future results, levels of activity and performance as well as other events and circumstances may be materially different from what we expect. Except as otherwise required by applicable law, we disclaim any duty to update any forward-looking statements, all of which are expressly qualified by the statements in this section, to reflect events or circumstances after the date of this prospectus. We qualify all of our forward-looking statements by these cautionary statements.

PROSPECTUS SUMMARY

Our Company

We are a clinical stage biotechnology company focused on developing innovative therapies for alopecia areata, or AA, and other autoimmune and inflammatory diseases.

Bempikibart (ADX-914), our most advanced product candidate, is a fully human anti–interleukin-7 receptor alpha antagonist monoclonal antibody designed to re-regulate adaptive immune function by potently blocking signaling mediated by interleukin-7 and thymic stromal lymphopoietin. We have completed two Phase 2a clinical trials evaluating bempikibart, SIGNAL-AA Part A, for the treatment of AA, and SIGNAL-AD, for the treatment of atopic dermatitis. In December 2024, we announced topline results from both of these trials, as well as our intention to advance bempikibart for the treatment of AA.

In April 2025, we announced dosing of the first patients in Part B of the SIGNAL-AA Phase 2a clinical trial. Patients will be treated with bempikibart for 36 weeks, with follow-up out to 52 weeks. Efficacy will be evaluated on the basis of mean percentage change from baseline in Severity of Alopecia Tool, or SALT, scores as well as the proportion of subjects achieving various relative and absolute SALT score improvements at week 36, with follow-up through week 52. The trial is intended to support advancement into pivotal trials upon completion, pending review of the results.

Following completion of the SIGNAL-AA Part B trial through 52 weeks, eligible patients can enter an open-label extension, or OLE, period to enable longer-term follow-up and continued dosing. In May 2026, we announced that the first patient has been dosed in the OLE portion of Part B.

In addition to bempikibart, our strategy has been focused on the advancement of our proprietary tissue-targeted complement inhibitor platform. However, in February 2025, we announced a corporate restructuring to focus on the advancement of bempikibart for the treatment of patients with AA. In November 2025, we entered into an Asset Purchase Agreement with Akebia Therapeutics, Inc. or Akebia, pursuant to which we sold to Akebia substantially all of our assets related to the research, development, manufacture and commercialization of ADX-097, a Phase 2 asset from this platform. Following the asset sale, Akebia is now responsible for the future development and commercialization of ADX-097. Other assets developed from our proprietary platform include ADX-096, and C3d mAb fusions and nanobodies designed for tissue-targeted complement inhibition. We retain the rights to our wholly owned tissue-targeted complement inhibitor platform, including ADX-096, and other remaining early-stage assets, and are continuing to evaluate strategic options for these programs.

Corporate Information

We were incorporated under the laws of the State of Delaware on April 10, 2017. On March 25, 2024, Kenobi Merger Sub, Inc., or Merger Sub, a wholly-owned subsidiary of Homology Medicines, Inc., or Homology, completed its merger with and into Q32 Bio Operations Inc. (previously named Q32 Bio Inc. and referred to herein as Legacy Q32), with Legacy Q32 continuing as the surviving entity as a wholly-owned subsidiary of Homology. This transaction is referred to herein as the Merger. Homology changed its name to Q32 Bio Inc., and Legacy Q32, which remains as a wholly-owned subsidiary of ours, changed its name to Q32 Bio Operations, Inc. The Merger was effected pursuant to an Agreement and Plan of Merger, or the Merger Agreement, dated as of November 16, 2023, by and among Homology, Legacy Q32, and Merger Sub. Effective March 26, 2024, our common stock began trading on the Nasdaq Global Market under the trading symbol “QTTB.” Our principal executive office is located at 830 Winter Street, Waltham, Massachusetts 02451, and our telephone number is (781) 999-0232. Our website address is <https://www.q32bio.com>. We do not incorporate the information on or accessible through our website into this prospectus, and you should not consider any information on, or that can be accessed through, our website as part of this prospectus.

Implications of Being a Smaller Reporting Company

We are a “smaller reporting company” as defined in the Exchange Act. We may take advantage of certain of the scaled disclosures available to smaller reporting companies and will be able to take advantage of these scaled disclosures for so long as the market value of the common stock held by non-affiliates is less than \$250.0 million measured on the last business day of our second fiscal quarter, or our annual revenue is less than \$100.0 million during the most recently completed fiscal year and the market value of the common stock held by non-affiliates is less than \$700.0 million measured on the last business day of our second fiscal quarter. As a result, the information in or incorporated by reference into this prospectus and that we provide to our investors in the future may be different than what you might receive from other public reporting companies.

THE OFFERING

Issuer	Q32 Bio Inc.
Common stock Offered by the Selling Stockholders	6,875,000 shares of common stock, consisting of (i) 6,725,000 shares of common stock and (ii) 150,000 shares of common stock issuable upon exercise of pre-funded warrants.
Use of Proceeds	We will not receive any proceeds from the sale of the shares of common stock covered by this prospectus. However, we may receive nominal proceeds from the exercise of the pre-funded warrants if the holders exercise the pre-funded warrants for cash. See the section titled “ <i>Use of Proceeds</i> ” appearing elsewhere in this prospectus for more information.
Nasdaq Symbol	QTTB
Offering Price	The selling stockholders will offer the shares of common stock offered by this prospectus at the prevailing market prices or at privately negotiated prices.
Risk Factors	You should read the “Risk Factors” section of this prospectus and other information included and incorporated by reference in this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
For additional information concerning the offering, see “ <i>Plan of Distribution</i> ” beginning on page 22.	

RISK FACTORS

Investing in our securities involves risks. Before you make a decision to buy our securities, in addition to the risks and uncertainties discussed above under “*Cautionary Note Regarding Forward-Looking Statements*,” you should carefully consider the risks factors incorporated herein by reference to our most recent Annual Report on Form 10-K and in any subsequent Quarterly Reports on Form 10-Q or Current Reports on Form 8-K we file after the date of this prospectus, all other information contained or incorporated by reference into this prospectus, as updated by our subsequent filings under the Exchange Act, and the risk factors and other information contained in any applicable prospectus supplement. We operate in a dynamic and rapidly changing industry that involves numerous risks and uncertainties. If any of these risks actually occur, it may materially harm our business, financial condition, liquidity and results of operations. As a result, the market price of our securities could decline, and you could lose all or part of your investment. Additionally, the risks and uncertainties described in this prospectus or any prospectus supplement are not the only risks and uncertainties that we face. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may become material and adversely affect our business.

USE OF PROCEEDS

This prospectus relates to the potential resale from time to time of some or all of 6,875,000 shares of our common stock, consisting of (i) 6,725,000 shares of common stock and (ii) 150,000 shares of common stock issuable upon exercise of pre-funded warrants. The selling stockholders will receive all of the proceeds from any sale of such shares. We will not receive any proceeds from any sales of shares of our common stock by the selling stockholders. However, we may receive nominal proceeds from the exercise of the pre-funded warrants if the holders exercise the pre-funded warrants for cash.

We have agreed to bear the expenses in connection with the registration of the shares of common stock to be offered by this prospectus by the selling stockholders other than any underwriting discounts and commissions and all similar fees and commissions relating to the sale of common stock, which will be borne by the selling stockholders.

SELLING STOCKHOLDERS

The selling stockholders acquired shares of common stock and pre-funded warrants to acquire shares of common stock from us in a private placement pursuant to an exemption from registration under Section 4(a)(2) of the Securities Act, and/or Rule 506 under Regulation D promulgated thereunder. Under the registration rights agreement by and among us and the selling stockholders, we agreed to file a registration statement with the SEC for the purposes of registering for resale from time to time the shares of common stock (including the shares of common stock underlying the pre-funded warrants).

The table below lists the selling stockholders and other information regarding their ownership of the shares of common stock offered hereby. The pre-funded warrants include provisions that prohibit their exercise if such exercise would result in the selling stockholder beneficially owning in excess of the stated percentage therein (9.99%) elected by such selling stockholder. For purposes of the table below, we have disregarded these provisions and treat all shares of common stock underlying the pre-funded warrants as owned, and are registering for resale hereunder all such shares underlying the pre-funded warrants purchased in the PIPE (as defined below). A selling stockholder may never acquire beneficial ownership of such underlying shares, and inclusion of such underlying shares in the table below should not imply that such selling stockholder beneficially owns such shares for purposes of applicable rules and regulations of the SEC. The second column lists the number of shares of common stock beneficially owned by the selling stockholders as of July 16, 2026 unless otherwise indicated in the footnotes to the table and disregarding the beneficial ownership blocker provisions in the pre-funded warrants. The selling stockholders may have sold or transferred some or all of the common stock indicated below and may in the future sell or transfer some or all of the common stock indicated below in transactions exempt from the registration requirements of the Securities Act rather than under this prospectus. The third column lists the shares of common stock being offered by this prospectus by the selling stockholders, including the shares of common stock underlying the pre-funded warrants purchased by the selling stockholders in the PIPE. The fourth column assumes the sale of all of the shares of common stock offered by the selling stockholders pursuant to this prospectus. The selling stockholders may sell all, some or none of their shares of common stock in this offering. See “*Plan of Distribution*.”

Except as indicated by the footnotes below, we believe, based on the information furnished to us, that the selling stockholders have sole voting and investment power with respect to all shares of common stock that they own, subject to applicable community property laws. Beneficial ownership for the purposes of the table below is determined in accordance with the rules and regulations of the SEC. These rules generally provide that a person is the beneficial owner of securities if such person has or shares the power to vote or direct the voting thereof, or to dispose or direct the disposition thereof or has the right to acquire such powers within 60 days. Percentage of beneficial ownership is based on 29,763,999 shares of common stock outstanding as of July 16, 2026.

Name and Address of Selling Stockholders	Number of Shares Beneficially Owned Before the Offering	Number of Shares that May Be Offered Hereby(9)	Shares Beneficially Owned After the Offering	
			Number	Percentage
Biotechnology Value Fund, L.P. ⁽¹⁾	2,462,757	1,310,052	1,152,705	3.72%
Biotechnology Value Fund II, L.P. ⁽²⁾	1,846,756	988,301	858,455	2.80%
Biotechnology Value Trading Fund OS LP ⁽³⁾	310,350	165,060	145,290	*
MSI BVF SPV, LLC ⁽⁴⁾	71,917	36,587	35,330	*
OrbiMed Private Investments VII, LP ⁽⁵⁾	3,502,987	1,250,000	2,252,987	7.57%
OrbiMed Genesis Master Fund, L.P. ⁽⁶⁾	625,000	625,000	—	*
Atlas Venture Opportunity Fund III, L.P. ⁽⁷⁾	625,000	625,000	—	*
RA Capital Healthcare Fund, L.P. ⁽⁸⁾	5,072,183	1,875,000	3,197,183	9.84%

* Less than 1%

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- (1) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of (i) 1,231,449 shares of common stock held of record, (ii) 78,603 shares of common stock issuable upon exercise of the pre-funded warrants purchased in the PIPE and (iii) 1,152,705 shares of common stock issuable upon exercise of pre-funded warrants otherwise acquired. BVF I GP LLC, as the general partner of Biotechnology Value Fund, L.P., or BVF, may be deemed to beneficially own the securities beneficially owned by BVF. BVF GP Holdings LLC, as the sole member of BVF I GP LLC, may be deemed to beneficially own the securities beneficially owned by BVF. BVF Partners, L.P., as the investment manager of BVF, may be deemed to beneficially own the securities beneficially owned by BVF. BVF Inc., as the general partner of BVF Partners, L.P., may be deemed to beneficially own the securities beneficially owned by BVF. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the securities beneficially owned by BVF. Each of BVF I GP LLC, BVF GP Holdings LLC, BVF Partners, L.P., BVF Inc. and Mr. Lampert disclaims beneficial ownership of such securities except to the extent of any pecuniary interest therein. The address of BVF and Mr. Lampert is 44 Montgomery Street, Suite 4000, San Francisco, California 94104.
- (2) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of (i) 929,003 shares of common stock held of record, (ii) 59,298 shares of common stock issuable upon exercise of the pre-funded warrants purchased in the PIPE and (iii) 858,455 shares of common stock issuable upon exercise of pre-funded warrants otherwise acquired. BVF II GP LLC, as the general partner of Biotechnology Value Fund II, L.P., or BVF2, may be deemed to beneficially own the securities beneficially owned by BVF2. BVF GP Holdings LLC, as the sole member of BVF II GP LLC, may be deemed to beneficially own the securities beneficially owned by BVF2. BVF Partners, L.P., as the investment manager of BVF2, may be deemed to beneficially own the securities beneficially owned by BVF2. BVF Inc., as the general partner of BVF Partners, L.P., may be deemed to beneficially own the securities beneficially owned by BVF2. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the securities beneficially owned by BVF2. Each of BVF II GP LLC, BVF GP Holdings LLC, BVF Partners, L.P., BVF Inc. and Mr. Lampert disclaims beneficial ownership of such securities except to the extent of any pecuniary interest therein. The address of BVF2 and Mr. Lampert is 44 Montgomery Street, Suite 4000, San Francisco, California 94104.
- (3) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of (i) 155,156 shares of common stock held of record, (ii) 9,904 shares of common stock issuable upon exercise of the pre-funded warrants purchased in the PIPE and (iii) 145,290 shares of common stock issuable upon exercise of pre-funded warrants otherwise acquired. BVF Partners OS Ltd., as the general partner of Biotechnology Value Trading Fund OS LP, or Trading Fund OS, may be deemed to beneficially own the securities beneficially owned by Trading Fund OS. BVF Partners, L.P., as the investment manager of Trading Fund OS, may be deemed to beneficially own the securities beneficially owned by Trading Fund OS. BVF Inc., as the general partner of BVF Partners, L.P., may be deemed to beneficially own the securities beneficially owned by Trading Fund OS. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the securities beneficially owned by Trading Fund OS. Each of BVF Partners OS Ltd., BVF Partners, L.P., BVF Inc. and Mr. Lampert disclaims beneficial ownership of such securities except to the extent of any pecuniary interest therein. The address of Trading Fund OS and Mr. Lampert is 44 Montgomery Street, Suite 4000, San Francisco, California 94104.
- (4) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of (i) 34,392 shares of common stock held of record, (ii) 2,195 shares of common stock issuable upon exercise of the pre-funded warrants purchased in the PIPE and (iii) 35,330 shares of common stock issuable upon exercise of pre-funded warrants otherwise acquired. BVF Partners, L.P., as the investment manager of MSI BVF SPV, LLC, or MSI, may be deemed to beneficially own the securities beneficially owned by MSI. BVF Inc., as the general partner of BVF Partners, L.P., may be deemed to beneficially own the securities beneficially owned by MSI. Mark N. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the securities beneficially owned by MSI. Each of BVF Partners, L.P., BVF Inc. and Mr. Lampert disclaims beneficial ownership of such securities except to the extent of any pecuniary interest therein. The address of MSI and Mr. Lampert is 44 Montgomery Street, Suite 4000, San Francisco, California 94104.

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- (5) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of 3,502,987 shares of common stock held of record. OrbiMed Capital GP VII LLC, or GP VII, is the general partner of OrbiMed Private Investments VII, LP, or OPI VII, and OrbiMed Advisors LLC, or OrbiMed Advisors, is the managing member of GP VII. By virtue of such relationships, GP VII and OrbiMed Advisors may be deemed to have beneficial ownership over the shares held by OPI VII and as a result, may be deemed to have beneficial ownership over such securities. OrbiMed Advisors exercises investment and voting power through a management committee comprised of Carl L. Gordon, Sven H. Borho, and W. Carter Neild, each of whom disclaims beneficial ownership of the shares held by OPI VII. Diyong Xu, a member of our Board of Directors, is an employee of OrbiMed Advisors. The address for the OrbiMed entities is c/o OrbiMed Advisors LLC, 601 Lexington Avenue, 54th Floor, New York, NY 10022.
- (6) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of 625,000 shares of common stock held of record. OrbiMed Genesis GP LLC, or Genesis GP, is the general partner of OrbiMed Genesis Master Fund, L.P., or Genesis and OrbiMed Advisors is the managing member of Genesis GP. By virtue of such relationships, Genesis GP and OrbiMed Advisors may be deemed to have beneficial ownership over the shares held by Genesis and as a result, may be deemed to have beneficial ownership over such securities. OrbiMed Advisors exercises investment and voting power through a management committee comprised of Carl L. Gordon, Sven H. Borho, and W. Carter Neild, each of whom disclaims beneficial ownership of the shares held by Genesis. Diyong Xu, a member of our Board of Directors, is an employee of OrbiMed Advisors. The address for the OrbiMed entities is c/o OrbiMed Advisors LLC, 601 Lexington Avenue, 54th Floor, New York, New York 10022.
- (7) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of 625,000 shares of common stock held of record. Atlas Venture Associates Opportunity III, L.P., or AVAO III, as the general partner of Atlas Venture Opportunity Fund III, L.P., or Atlas Opportunity III, may be deemed to beneficially own the securities beneficially owned by Atlas Opportunity III. Atlas Venture Associates Opportunity III, LLC, or AVAO III LLC, as the general partner of AVAO III, may be deemed to beneficially own the securities beneficially owned by Atlas Opportunity III. AVAO III and AVAO III LLC disclaim beneficial ownership of such securities except to the extent of any pecuniary interest therein. The address of Atlas Opportunity III, AVAO III and AVAO III LLC is 300 Technology Square, 8th Floor, Cambridge, Massachusetts 02139.
- (8) Shares listed under “Number of Shares Beneficially Owned Before the Offering” consists of (i) 2,332,457 shares of common stock held of record and (ii) 2,739,726 shares of common stock issuable upon exercise of pre-funded warrants otherwise acquired. RA Capital Management, L.P., or RA Capital, as the investment manager of RA Capital Healthcare Fund, L.P., or RA Fund, may be deemed to beneficially own the securities beneficially owned by the RA Fund. RA Capital Management GP, LLC, or RA Capital GP, as the general partner of RA Capital, may be deemed to beneficially own the securities beneficially owned by the RA Fund. Peter Kolchinsky and Rajeev Shah, as the managing members of RA Capital GP, may be deemed to beneficially own the securities beneficially owned by the RA Fund. Each of RA Capital, RA Capital GP, Mr. Kolchinsky and Mr. Shah disclaims beneficial ownership of such securities except to the extent of any pecuniary interest therein. The principal business address of RA Capital and RA Capital GP is 200 Berkeley Street, 18th Floor, Boston, Massachusetts 02116.
- (9) No other shares of common stock, including, without limitation, shares of common stock acquired in the open market are being offered under this prospectus.

DESCRIPTION OF CAPITAL STOCK

The following description summarizes some of the terms of our restated certificate of incorporation and amended and restated bylaws and of the Delaware General Corporation Law. This description is summarized from, and qualified in its entirety by reference to, our restated certificate of incorporation and amended and restated bylaws, each of which has been publicly filed with the SEC.

Our authorized capital stock consists of:

- 400,000,000 shares of common stock, par value \$0.0001 per share; and
- 10,000,000 shares of preferred stock, par value \$0.0001 per share.

Common Stock

Our common stock is listed on Nasdaq under the symbol “QTTB.”

Voting Rights. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. An election of directors by our stockholders shall be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Subject to the supermajority votes for some matters, other matters shall be decided by the affirmative vote of our stockholders having a majority in voting power of the votes cast by the stockholders present or represented and voting on such matter. Our restated certificate of incorporation, as amended, and amended and restated bylaws also provide that our directors may be removed only for cause and only by the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock entitled to vote thereon. In addition, the affirmative vote of the holders of at least two-thirds in voting power of the outstanding shares of capital stock entitled to vote thereon is required to amend or repeal, or to adopt any provision inconsistent with, several of the provisions of our restated certificate of incorporation, as amended. See below under “—*Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws—Amendment of Charter Provisions.*”

Rights Upon Liquidation. In the event of our liquidation or dissolution, the holders of common stock are entitled to receive proportionately our net assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any outstanding preferred stock.

Other Rights. Holders of common stock have no preemptive, subscription, redemption or conversion rights. Our outstanding shares of common stock are, when issued and paid for, validly issued, fully paid and nonassessable. 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.

Transfer Agent

The transfer agent and registrar for our common stock is Equiniti Trust Company, LLC.

Dividend

Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock. We have never declared or paid any cash dividends on our common stock. We do not intend to declare or pay cash dividends for the foreseeable future. We currently expect to retain all future earnings, if any, for use in the development, operation and expansion of our business. Any determination to pay cash dividends in the future will depend upon, among other things, our results of operations, plans for expansion, tax considerations, available net profits and reserves, limitations under law, financial condition, capital requirements and other factors that our board of directors considers to be relevant.

Preferred Stock

Under the terms of our restated certificate of incorporation, as amended, our board of directors is authorized to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors have the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The purpose of authorizing the board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock.

Registration Rights

2024 Registration Rights Agreement

In connection with the Merger Agreement, Legacy Q32 entered into a subscription agreement in November 2023, or the Subscription Agreement, with certain investors to consummate their purchase of shares of Legacy Q32's common stock for an aggregate purchase price of \$42.0 million, or the Pre-Closing Financing. Pursuant to the Subscription Agreement, on March 25, 2024, we entered into a registration rights agreement, or the 2024 Registration Rights Agreement, with the investors in the Pre-Closing Financing. Under the 2024 Registration Rights Agreement, among other things, we agreed to register for resale certain shares of our common stock held by such investors from time to time, including shares of our common stock issued in the Merger in exchange for the shares of Legacy Q32 common stock issued in the Pre-Closing Financing.

Pursuant to the 2024 Registration Rights Agreement, we are obligated to prepare and file a shelf registration statement covering the resale of covered shares of our common stock within forty-five (45) calendar days following the closing of the Merger, subject to certain exceptions, pursuant to Rule 415 of the Securities Act. We also agreed to use our reasonable best efforts to keep such registration statement continuously effective under the Securities Act until the earlier of the date that all registrable securities covered by such registration statement (a) have been sold, thereunder or pursuant to Rule 144 of the Securities Act, or Rule 144, or (b) may be sold without volume or manner-of-sale restrictions pursuant to Rule 144 and without the requirement for us to be in compliance with the current public information requirement under Rule 144. The 2024 Registration Rights Agreement also provides that we will pay certain expenses of the securityholders and indemnify the applicable securityholders against certain liabilities.

2026 Registration Rights Agreement

On May 26, 2026, we entered into a securities purchase agreement with selected investors to sell shares of common stock and pre-funded warrants to purchase shares of common stock for an aggregate purchase price of approximately \$55 million, or the PIPE. In connection with the PIPE, we entered into a registration rights agreement with each of such selected investors, or the 2026 Registration Rights Agreement, pursuant to which we are required to prepare and file a registration statement with the SEC under the Securities Act, covering the resale of the shares such investors purchased in the PIPE and the shares underlying the pre-funded warrants such investors purchased in the PIPE. We are required to file such registration statement with the SEC within fifty (50) days of the closing date of the PIPE and is required to have such registration statement declared effective by the SEC in accordance with the terms of the Registration Rights Agreement. We also agreed to use our reasonable best efforts to keep such registration statement continuously effective under the Securities Act until the earlier of the date that all registrable securities covered by such registration statement (a) have been sold, thereunder, or (b) may be sold without registration and without volume or manner-of-sale restrictions pursuant to Rule 144 and without the requirement for us to be in compliance with the current public information requirement under Rule 144. The 2026 Registration Rights Agreement also provides that we will pay certain expenses of the securityholders and indemnify the applicable securityholders against certain liabilities.

Pre-Funded Warrants

As of March 1, 2026, we had 1,025,654 shares of common stock issuable upon the exercise of pre-funded warrants and each of such pre-funded warrants has an initial exercise price per share equal to \$0.0001. The pre-funded warrants are immediately exercisable upon issuance and may be exercised at any time until they are exercised in full. The exercise price and number of shares of common stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends and distributions, stock splits, stock combinations, reclassification, reorganizations or similar events affecting our common stock and the exercise price.

A holder of the pre-funded warrants does not have the right to exercise any portion of the pre-funded warrants if the holder (together with its affiliates) would beneficially own in excess of 9.99% of the number of our shares of common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrants. However, any holder may increase or decrease such percentage, but in no event may such percentage be increased to more than 19.99%, provided that any increase will not be effective until the 61st day after such election.

The pre-funded warrants are exercisable, at the option of the holder, in whole or in part by delivering to us a duly executed exercise notice and, at any time a registration statement registering the issuance of shares of common stock underlying the pre-funded warrants under the Securities Act is effective and available for the issuance of such shares, or an exemption from registration under the Securities Act is available for the issuance of such shares, by payment in full in immediately available funds for the number of shares of common stock purchased upon such exercise. The pre-funded warrants may also be exercised, in whole or in part, at such time by means of a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the pre-funded warrant.

Except as otherwise provided in the pre-funded warrants or by virtue of such holder's ownership of our common stock, the holder of a pre-funded warrant does not have the rights or privileges of a holder of our common stock, including any voting rights or rights to receive dividends, until the holder exercises the pre-funded warrant.

There is no established trading market for the pre-funded warrants and we do not expect a market to develop. In addition, we do not intend to apply for the listing of the pre-funded warrants on any national securities exchange or other trading market.

Anti-Takeover Effects of Delaware Law and Our Certificate of Incorporation and Bylaws

Some provisions of the Delaware law, our restated certificate of incorporation, as amended, and amended and restated bylaws could make the following transactions more difficult: an acquisition by means of a tender offer; an acquisition by means of a proxy contest or otherwise; or the removal incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions which provide for payment of a premium over the market price for our shares.

These provisions, summarized below, are intended to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of our company to first negotiate with our board of directors. We believe that the benefits of the increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

Undesignated Preferred Stock

The ability of our board of directors, without action by the stockholders, to issue up to 10,000,000 shares of undesignated preferred stock with voting or other rights or preferences as designated by our board of directors could impede the success of any attempt to change control of it. These and other provisions may have the effect of deferring hostile takeovers or delaying changes in control or management.

Stockholder Meetings

Our amended and restated bylaws provide that a special meeting of stockholders may be called only by our chairman of the board, chief executive officer or president (in the absence of a chief executive officer), or by a resolution adopted by a majority of our board of directors.

Requirements for Advance Notification of Stockholder Nominations and Proposals

Our amended and restated bylaws establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors, other than nominations made by or at the direction of the board of directors or a committee of the board of directors.

Elimination of Stockholder Action by Written Consent

Our restated certificate of incorporation, as amended, eliminates the right of stockholders to act by written consent without a meeting.

Staggered Board

Our board of directors is divided into three classes. The directors in each class will serve for a three-year term, one class being elected each year by our stockholders. This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of our company, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Removal of Directors

Our restated certificate of incorporation, as amended, and amended and restated bylaws provide that, subject to the rights of holders of any series of preferred stock, no member of our board of directors may be removed from office by our stockholders except for cause and, in addition to any other vote required by law, upon the approval of the holders of at least two-thirds in voting power of the outstanding shares of capital stock entitled to vote in the election of directors. Subject to the rights of holders of any series of preferred stock, any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of directors then in office, unless our board of directors determines by resolution that any such vacancy or newly created directorship shall be filled by our stockholders.

Stockholders Not Entitled to Cumulative Voting

Our restated certificate of incorporation, as amended, does not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the outstanding shares of our common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they choose, other than any directors that holders of our preferred stock may be entitled to elect.

Delaware Anti-Takeover Statute

We are subject to Section 203 of the General Corporation Law of the State of Delaware, which prohibits persons deemed to be “interested stockholders” from engaging in a “business combination” with a publicly held

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Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by the board of directors.

Choice of Forum

Our restated certificate of incorporation, as amended, provides that, unless we consent in writing to an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for: (1) any derivative action or proceeding brought on our behalf; (2) any action asserting a claim of breach of a fiduciary duty or other wrongdoing by any of our directors, officers, employees or agents to us or our stockholders; (3) any action asserting a claim against it arising pursuant to any provision of the General Corporation Law of the State of Delaware or our restated certificate of incorporation, as amended, or amended and restated bylaws; or (4) any action asserting a claim governed by the internal affairs doctrine. Our restated certificate of incorporation, as amended, also provides that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to this choice of forum provision. It is possible that a court of law could rule that the choice of forum provision contained in our restated certificate of incorporation, as amended, is inapplicable or unenforceable if it is challenged in a proceeding or otherwise.

In addition, our amended and restated bylaws provide that unless we consent in writing to the selection of an alternative forum, to the fullest extent permitted by law, the federal district courts of the United States of America shall be the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act, and any person or entity purchasing or otherwise acquiring or holding any interest in our shares of capital stock shall be deemed to have notice of and consented to this choice of forum provision.

Amendment of Charter Provisions

The amendment of any of the above provisions, except for the provision making it possible for our board of directors to issue preferred stock and the provision prohibiting cumulative voting, would require approval by holders of at least two-thirds in voting power of the outstanding shares of capital stock entitled to vote thereon.

The provisions of Delaware law, our restated certificate of incorporation, as amended, and amended and restated bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in the composition of our board and management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

MATERIAL UNITED STATES FEDERAL INCOME TAX CONSIDERATIONS

Material U.S. Federal Income Tax Consequences for Holders of Common Stock

The following is a discussion of certain material U.S. federal income tax consequences of the acquisition, ownership and disposition of our shares of common stock, which we refer to as our securities. This discussion applies only to securities that are held as capital assets for U.S. federal income tax purposes and is applicable only to holders who are receiving our securities in this offering.

This discussion is a summary only and does not describe all of the tax consequences that may be relevant to you in light of your particular circumstances, including but not limited to the alternative minimum tax, the Medicare tax on certain investment income and the different consequences that may apply if you are subject to special rules that apply to certain types of investors (such as the effects of Section 451 of the Code), including but not limited to:

- financial institutions or financial services entities;
- broker-dealers;
- governments or agencies or instrumentalities thereof;
- regulated investment companies;
- real estate investment trusts;
- expatriates or former long-term residents of the United States;
- persons that actually or constructively own 5% or more of our voting shares;
- insurance companies;
- dealers or traders subject to a mark-to-market method of accounting with respect to the securities;
- persons holding the securities as part of a “straddle,” hedge, integrated transaction or similar transaction;
- U.S. holders (as defined below) whose functional currency is not the U.S. dollar;
- partnerships or other pass-through entities for U.S. federal income tax purposes and any beneficial owners of such entities; and
- tax-exempt entities.

This discussion is based on the Code, and administrative pronouncements, judicial decisions and final, temporary and proposed Treasury regulations as of the date hereof, which are subject to change, possibly on a retroactive basis, and changes to any of which subsequent to the date of this prospectus may affect the tax consequences described herein. This discussion does not address any aspect of state, local or non-U.S. taxation, or any U.S. federal taxes other than income taxes (such as gift and estate taxes).

We have not sought, and will not seek, a ruling from the Internal Revenue Service, or the IRS, as to any U.S. federal income tax consequence described herein. The IRS may disagree with the discussion herein, and its determination may be upheld by a court. Moreover, there can be no assurance that future legislation, regulations, administrative rulings or court decisions will not adversely affect the accuracy of the statements in this discussion. You are urged to consult your tax advisor with respect to the application of U.S. federal tax laws to your particular situation, as well as any tax consequences arising under the laws of any state, local or foreign jurisdiction.

This discussion does not consider the tax treatment of partnerships or other pass-through entities or persons who hold our securities through such entities. If a partnership (or other entity or arrangement classified as a

partnership or other pass-through entity for U.S. federal income tax purposes) is the beneficial owner of our securities, the U.S. federal income tax treatment of a partner or member in the partnership or other pass-through entity generally will depend on the status of the partner or member and the activities of the partnership or other pass-through entity. If you are a partner or member of a partnership or other pass-through entity holding our securities, we urge you to consult your tax advisor.

THIS DISCUSSION IS ONLY A SUMMARY OF CERTAIN UNITED STATES FEDERAL INCOME TAX CONSIDERATIONS ASSOCIATED WITH THE ACQUISITION, OWNERSHIP AND DISPOSITION OF OUR SECURITIES. EACH PROSPECTIVE INVESTOR IN OUR SECURITIES IS URGED TO CONSULT ITS TAX ADVISOR WITH RESPECT TO THE PARTICULAR TAX CONSEQUENCES TO SUCH INVESTOR OF THE ACQUISITION, OWNERSHIP AND DISPOSITION OF OUR SECURITIES, INCLUDING THE APPLICABILITY AND EFFECT OF ANY UNITED STATES FEDERAL NON-INCOME, STATE AND LOCAL, AND NON-U.S. TAX LAWS.

Material U.S. Federal Income Tax Consequences for U.S. Holders

For purposes of this discussion, a “U.S. Holder” is any beneficial owner of our common stock that, for U.S. federal income tax purposes, is or is treated as:

- an individual who is a citizen or resident of the United States;
- a corporation 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 tax regardless of its source; or
- a trust that (1) is subject to the primary supervision of a U.S. court and all substantial decisions of which are subject to the control of one or more “United States persons” (within the meaning of Section 7701(a)(30) of the Code), or (2) has a valid election in effect to be treated as a United States person for U.S. federal income tax purposes.

Taxation of Distributions. If we pay distributions in cash or other property (other than certain distributions of our stock or rights to acquire our stock) to U.S. holders of shares of common stock, such distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. Distributions in excess of current and accumulated earnings and profits will constitute a return of capital that will be applied against and reduce (but not below zero) the U.S. holder’s adjusted tax basis in common stock. Any remaining excess will be treated as gain realized on the sale or other disposition of the common stock and will be treated as described under “*U.S. Holders-Gain or Loss on Sale, Taxable Exchange or Other Taxable Disposition of common stock*” below.

Dividends we pay to a U.S. holder that is a taxable corporation generally will qualify for the dividends received deduction if the requisite holding period is satisfied. With certain exceptions (including, but not limited to, dividends treated as investment income for purposes of investment interest deduction limitations), and provided certain holding period requirements are met, dividends we pay to a non-corporate U.S. holder may constitute “qualified dividends” that will be subject to tax at the maximum tax rate accorded to long-term capital gains. If the holding period requirements are not satisfied, then a corporation may not be able to qualify for the dividends received deduction and would have taxable income equal to the entire dividend amount, and non-corporate holders may be subject to tax on such dividend at regular ordinary income tax rates instead of the preferential rate that applies to qualified dividend income.

Gain or Loss on Sale, Taxable Exchange or Other Taxable Disposition of common stock. Upon a sale or other taxable disposition of common stock, a U.S. holder generally will recognize capital gain or loss in an amount equal to the difference between the amount realized and the U.S. holder’s adjusted tax basis in the common

stock. Any such capital gain or loss generally will be long-term capital gain or loss if the U.S. holder's holding period for the common stock so disposed of exceeds one year. If the holding period requirements are not satisfied, any gain on a sale or taxable disposition of the shares would be subject to short-term capital gain treatment and would be taxed at regular ordinary income tax rates. Long-term capital gains recognized by non-corporate U.S. holders will be eligible to be taxed at reduced rates. The deductibility of capital losses is subject to limitations.

Generally, the amount of gain or loss recognized by a U.S. holder is an amount equal to the difference between (i) the sum of the amount of cash and the fair market value of any property received in such disposition and (ii) the U.S. holder's adjusted tax basis in its common stock so disposed of. A U.S. holder's adjusted tax basis in its common stock generally will equal the U.S. holder's acquisition cost for the common stock or less, in the case of a share of common stock, any prior distributions treated as a return of capital. In the case of any shares of common stock originally acquired as part of an investment unit, the acquisition cost for the share of common stock that were part of such unit would equal an allocable portion of the acquisition cost of the unit based on the relative fair market values of the components of the unit at the time of acquisition.

Information Reporting and Backup Withholding. In general, information reporting requirements may apply to dividends paid to a U.S. holder and to the proceeds of the sale or other disposition of our shares of common stock, unless the U.S. holder is an exempt recipient. Backup withholding may apply to such payments if the U.S. holder fails to provide a taxpayer identification number, a certification of exempt status or has been notified by the IRS that it is subject to backup withholding (and such notification has not been withdrawn).

Any amounts withheld under the backup withholding rules generally should be allowed as a refund or a credit against a U.S. holder's U.S. federal income tax liability provided the required information is timely furnished to the IRS.

Material U.S. Federal Income Tax Consequences for Non-U.S. Holders

This section applies to you if you are a "Non-U.S. holder." As used herein, the term "Non-U.S. holder" means a beneficial owner of common stock who or that is for U.S. federal income tax purposes:

- a non-resident alien individual (other than certain former citizens and residents of the U.S. subject to U.S. tax as expatriates);
- a foreign corporation or
- an estate or trust that is not a U.S. holder;

but generally does not include an individual who is present in the United States for 183 days or more in the taxable year of disposition. If you are such an individual, you should consult your tax advisor regarding the U.S. federal income tax consequences of the acquisition, ownership or sale or other disposition of our securities.

Taxation of Distributions. In general, any distributions we make to a Non-U.S. holder of shares of common stock, to the extent paid out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles), will constitute dividends for U.S. federal income tax purposes and, provided such dividends are not effectively connected with the Non-U.S. holder's conduct of a trade or business within the United States, we will be required to withhold tax from the gross amount of the dividend at a rate of 30%, unless such Non-U.S. holder is eligible for a reduced rate of withholding tax under an applicable income tax treaty and provides proper certification of its eligibility for such reduced rate (usually on an IRS Form W-8BEN or W-8BEN-E). Any distribution not constituting a dividend will be treated first as reducing (but not below zero) the Non-U.S. holder's adjusted tax basis in its shares of common stock and, to the extent such distribution exceeds the Non-U.S. holder's adjusted tax basis, as gain realized from the sale or other disposition of the common stock, which will be treated as described under "*Non-U.S. Holders-Gain on Sale, Taxable Exchange or Other Taxable Disposition of common stock*" below.

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The withholding tax does not apply to dividends paid to a Non-U.S. holder who provides a Form W-8ECI, certifying that the dividends are effectively connected with the Non-U.S. holder's conduct of a trade or business within the United States. Instead, the effectively connected dividends will be subject to regular U.S. income tax as if the Non-U.S. holder were a U.S. resident, subject to an applicable income tax treaty providing otherwise. A Non-U.S. corporation receiving effectively connected dividends may also be subject to an additional "branch profits tax" imposed at a rate of 30% (or a lower treaty rate).

Gain on Sale, Taxable Exchange or Other Taxable Disposition of common stock. A Non-U.S. holder generally will not be subject to U.S. federal income or withholding tax in respect of gain recognized on a sale, taxable exchange or other taxable disposition of common stock, unless:

- the gain is effectively connected with the conduct of a trade or business by the Non-U.S. holder within the United States (and, under certain income tax treaties, is attributable to a United States permanent establishment or fixed base maintained by the Non-U.S. holder); or
- we are or have been a "U.S. real property holding corporation" for U.S. federal income tax purposes at any time during the shorter of the five-year period ending on the date of disposition or the period that the Non-U.S. holder held common stock, and, in the case where shares of common stock are regularly traded on an established securities market, the Non-U.S. holder has owned, directly or constructively, more than 5% of common stock at any time within the shorter of the five-year period preceding the disposition or such Non-U.S. holder's holding period for the shares of common stock. There can be no assurance that common stock will be treated as regularly traded on an established securities market for this purpose.

Unless an applicable treaty provides otherwise, gain described in the first bullet point above will be subject to tax at generally applicable U.S. federal income tax rates as if the Non-U.S. holder were a U.S. resident. Any gains described in the first bullet point above of a Non-U.S. holder that is a foreign corporation may also be subject to an additional "branch profits tax" at a 30% rate (or lower treaty rate).

If the second bullet point above applies to a Non-U.S. holder, gain recognized by such holder on the sale, exchange or other disposition of common stock will be subject to tax at generally applicable U.S. federal income tax rates.

Information Reporting and Backup Withholding. Information returns will be filed with the IRS in connection with payments of dividends and the proceeds from a sale or other disposition of our shares of common stock. A Non-U.S. holder may have to comply with certification procedures to establish that it is not a United States person in order to avoid information reporting and backup withholding requirements. The certification procedures required to claim a reduced rate of withholding under a treaty will satisfy the certification requirements necessary to avoid the backup withholding as well. The amount of any backup withholding from a payment to a Non-U.S. holder will be allowed as a credit against such holder's U.S. federal income tax liability and may entitle such holder to a refund, provided that the required information is timely furnished to the IRS.

FATCA Withholding Taxes. Provisions commonly referred to as "FATCA" impose withholding of 30% on payments of dividends (including constructive dividends) on common stock to "foreign financial institutions" (which is broadly defined for this purpose and in general includes 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 interests in or accounts with those entities) have been satisfied by, or an exemption applies to, the payee (typically certified as to by the delivery of a properly completed IRS Form W-8BEN-E). Pursuant to proposed Treasury Regulations, the U.S. Treasury Department has indicated its intent to eliminate the requirement under FATCA of withholding on gross proceeds from the sale or other disposition of property of a type which can produce U.S. source dividends or interest. The U.S. Treasury Department has indicated that taxpayers may rely on these proposed Treasury Regulations pending their finalization. Foreign financial

institutions located in jurisdictions that have an intergovernmental agreement with the United States governing FATCA may be subject to different rules. Under certain circumstances, a Non-U.S. holder might be eligible for refunds or credits of such withholding taxes, and a Non-U.S. holder might be required to file a U.S. federal income tax return to claim such refunds or credits. Prospective investors should consult their tax advisers regarding the effects of FATCA on their investment in our securities.

PLAN OF DISTRIBUTION

The selling stockholders, which as used herein includes donees, pledgees, transferees or other successors-in-interest selling shares of common stock or interests in shares of common stock received after the date of this prospectus from a selling stockholder as a gift, pledge, partnership distribution or other transfer, may, from time to time, sell, transfer or otherwise dispose of any or all of their shares of common stock or interests in shares of common stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. These dispositions may be at fixed prices, at prevailing market prices at the time of sale, at prices related to the prevailing market price, at varying prices determined at the time of sale, or at negotiated prices.

The selling stockholders may use any one or more of the following methods when disposing of shares or interests therein:

- distributions to members, partners, stockholders or other equityholders of the selling stockholders;
- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares as agent, but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;
- privately negotiated transactions;
- short sales and settlement of short sales entered into after the effective date of the registration statement of which this prospectus is a part;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- broker-dealers may agree with the selling stockholders to sell a specified number of such shares at a stipulated price per share;
- a combination of any such methods of sale; and
- any other method permitted pursuant to applicable law.

The selling stockholders may, from time to time, pledge or grant a security interest in some or all of the shares of common stock owned by them and, if they default in the performance of their secured obligations, the pledgees or secured parties may offer and sell the shares of common stock, from time to time, under this prospectus, or under an amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act, amending the list of selling stockholders to include the pledgee, transferee or other successors in interest as selling stockholders under this prospectus. The selling stockholders also may transfer the shares of common stock in other circumstances, in which case the transferees, pledgees or other successors in interest will be the selling stockholders for purposes of this prospectus.

In connection with the sale of our common stock or interests therein, the selling stockholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the common stock in the course of hedging the positions they assume. The selling stockholders may also sell shares of our common stock short and deliver these securities to close out their short positions, or loan or pledge the common stock to broker-dealers that in turn may sell these securities. The selling stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or the creation of one or more derivative securities which require the delivery to such broker-dealer or other financial institution of shares offered by this prospectus, which shares such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

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The aggregate proceeds to the selling stockholders from the sale of the common stock offered by them will be the purchase price of the common stock less discounts or commissions, if any. Each of the selling stockholders reserves the right to accept and, together with their agents from time to time, to reject, in whole or in part, any proposed purchase of common stock to be made directly or through agents. We will not receive any of the proceeds from this offering. Upon any exercise of the pre-funded warrants by payment of cash, however, we will receive the exercise price of the pre-funded warrants.

The selling stockholders also may resell all or a portion of the shares in open market transactions in reliance upon Rule 144 under the Securities Act, provided that they meet the criteria and conform to the requirements of that rule, or another available exemption from the registration requirements under the Securities Act.

The selling stockholders and any underwriters, broker-dealers or agents that participate in the sale of the common stock or interests therein may be “underwriters” within the meaning of Section 2(a)(11) of the Securities Act (it being understood that the selling stockholders shall not be deemed to be underwriters solely as a result of their participation in this offering). Any discounts, commissions, concessions or profit they earn on any resale of the shares may be underwriting discounts and commissions under the Securities Act. Selling stockholders who are “underwriters” within the meaning of Section 2(a)(11) of the Securities Act will be subject to the prospectus delivery requirements of the Securities Act.

To the extent required, the shares of our common stock to be sold, the names of the selling stockholders, the respective purchase prices and public offering prices, the names of any agent, dealer or underwriter, and any applicable commissions or discounts with respect to a particular offer will be set forth in an accompanying prospectus supplement or, if appropriate, a post-effective amendment to the registration statement that includes this prospectus.

In order to comply with the securities laws of some states, if applicable, the common stock may be sold in these jurisdictions only through registered or licensed brokers or dealers. In addition, in some states the common stock may not be sold unless it has been registered or qualified for sale or an exemption from registration or qualification requirements is available and is complied with.

We have advised the selling stockholders that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholders and their affiliates. In addition, to the extent applicable, we will make copies of this prospectus (as it may be supplemented or amended from time to time) available to the selling stockholders for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The selling stockholders may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

We have agreed to indemnify the selling stockholders against liabilities, including liabilities under the Securities Act and state securities laws, relating to the registration of the shares offered by this prospectus.

We have agreed with the selling stockholders to use commercially reasonable efforts to cause the registration statement of which this prospectus constitutes a part to become effective and to remain continuously effective until the earlier of: (i) the date on which the selling stockholders shall have resold or otherwise disposed of all the shares covered by this prospectus and (ii) the date on which the shares covered by this prospectus no longer constitute “Registrable Securities” as such term is defined in the 2026 Registration Rights Agreement, such that they may be resold by the selling stockholders without registration and without regard to any volume or manner-of-sale limitations and without current public information pursuant to Rule 144 under the Securities Act or any other rule of similar effect.

LEGAL MATTERS

The validity of the common stock being offered by this prospectus has been passed upon for us by Goodwin Procter LLP, Boston, Massachusetts.

EXPERTS

The consolidated financial statements of Q32 Bio Inc. appearing in Q32 Bio Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2025, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon, included therein, and incorporated herein by reference. Such financial statements are, and audited financial statements to be included in subsequently filed documents will be, incorporated herein by reference in reliance upon the report of Ernst & Young LLP pertaining to such financial statements (to the extent covered by consents filed with the SEC) given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We are subject to the informational requirements of the Exchange Act and in accordance therewith, file annual, quarterly and current reports, proxy statements and other information with the SEC electronically, and the SEC maintains a website that contains our filings as well as reports, proxy and information statements, and other information issuers file electronically with the SEC at www.sec.gov.

We also make available free of charge on or through our website at www.q32bio.com, our Annual Reports 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 we electronically file such material with or otherwise furnishes it to the SEC. The website addresses are inactive textual references and except as specifically incorporated by reference into this prospectus, information on those websites is not part of this prospectus.

This prospectus and any prospectus supplement are part of a registration statement that we filed with the SEC and do not contain all of the information in the registration statement. The full registration statement may be obtained from the SEC or us, as provided below. Other documents establishing the terms of the offered securities are or may be filed as exhibits to the registration statement or documents incorporated by reference in the registration statement. Statements in this prospectus or any prospectus supplement about these documents are summaries and each statement is qualified in all respects by reference to the document to which it refers. You should refer to the actual documents for a more complete description of the relevant matters. You may inspect a copy of the registration statement through the SEC's website, as provided above.

INCORPORATION BY REFERENCE

The SEC allows us to incorporate by reference into this prospectus the information contained in other documents we file with the SEC, which means that we can disclose important information to you by referring you to those documents. Any statement contained in any 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 in or omitted from this prospectus, or in any other subsequently filed document that also is or is deemed to be incorporated by reference herein, modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus. We incorporate by reference the documents listed below which have been filed by us:

- Annual Report on [Form 10-K](#) for the fiscal year ended December 31, 2025, filed with the SEC on March 10, 2026;
- The information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2025 from our [Definitive Proxy Statement on Schedule 14A](#), filed with the SEC on April 30, 2026;
- Quarterly Report on [Form 10-Q](#) for the fiscal quarter ended March 31, 2026, filed with the SEC on May 5, 2026;
- Current Reports on Form 8-K filed with the SEC on [February 17, 2026](#), [March 27, 2026](#), [April 24, 2026](#), [May 27, 2026](#), [June 16, 2026](#), [July 13, 2026](#), [July 13, 2026](#), and [July 15, 2026](#); and
- The description of the Registrant's Common Stock contained in (i) the Registration Statement on [Form 8-A](#) (File No. 001-38433), filed by the Registrant with the Securities and Exchange Commission under Section 12(b) of the Exchange Act on March 19, 2018, including any amendments or reports filed for the purpose of updating such description and (ii) [Exhibit 4.1](#)—Description of Securities to our Annual Report on Form 10-K, as filed with the Securities and Exchange Commission on March 10, 2026.

All documents we file with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, except as to any portion of any report or documents that is not deemed filed under such provisions, (i) on or after the date of filing of the registration statement containing this prospectus and prior to the effectiveness of the registration statement and (ii) on or after the date of this prospectus until the earlier of the date on which all of the securities registered hereunder have been sold or the registration statement of which this prospectus is a part has been withdrawn, shall be deemed incorporated by reference in this prospectus and to be a part of this prospectus from the date of filing of those documents and will be automatically updated and, to the extent described above, supersede information contained or incorporated by reference in this prospectus and previously filed documents that are incorporated by reference in this prospectus.

Nothing in this prospectus shall be deemed to incorporate information furnished but not filed with the SEC pursuant to Item 2.02, 7.01 or 9.01 of Form 8-K. Upon written or oral request, we will provide without charge to each person, including any beneficial owner, to whom a copy of the prospectus is delivered a copy of any or all of the reports or documents incorporated by reference herein (other than exhibits to such documents, unless such exhibits are specifically incorporated by reference herein). You may request a copy of these filings, at no cost, by writing or telephoning us at the following address or phone number:

Q32 Bio Inc.
830 Winter Street
Waltham, MA 02451
Attn: Investor Relations
(781) 999-0232
Email: IR@q32bio.com



Up to 6,875,000 Shares of Common Stock

PROSPECTUS

July 28, 2026
