PROSPECTUS

Up to \$100,000,000



Common Stock

We previously entered into an Equity Distribution Agreement with Piper Sandler & Co., or Piper Sandler, dated September 11, 2019, as amended on March 26, 2021, or the Amended Equity Distribution Agreement, relating to shares of our common stock offered by this prospectus. In accordance with the terms of the Amended Equity Distribution Agreement, which does not have a limit on the amount that can be sold pursuant thereto, we may offer and sell shares of our common stock having an aggregate offering price of up to \$100.0 million from time to time through Piper Sandler, acting as sales agent, pursuant to this prospectus.

Our common stock is listed on the Nasdaq Global Market under the symbol "AQST." The last reported sale price of our common stock on the Nasdaq Global Market on April 2, 2024 was \$4.14 per share.

Sales of our common stock, if any, under this prospectus may be made in sales deemed to be an "at the market offering" as defined in Rule 415(a)(4) promulgated under the Securities Act of 1933, as amended, or the Securities Act. Piper Sandler is not required to sell any specific number or dollar amount of securities, but will act as a sales agent using commercially reasonable efforts consistent with its normal trading and sales practices on mutually agreed terms between Piper Sandler and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

The compensation to Piper Sandler for sales of common stock sold pursuant to the Amended Equity Distribution Agreement will be an amount up to 3.0% of the gross sales price per share of common stock sold under the Amended Equity Distribution Agreement. In connection with the sale of the common stock on our behalf, Piper Sandler will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of Piper Sandler will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to Piper Sandler with respect to certain liabilities, including liabilities under the Securities Act or the Securities Exchange Act of 1934, as amended, or the Exchange Act.

Investing in our common stock involves a high degree of risk. You should read this prospectus and the documents incorporated by reference herein before you make your investment decision. See "Risk Factors" beginning on page S-6 of this prospectus and in the documents incorporated by reference herein, including our annual report on Form 10-K, to read about risks that you should consider before purchasing shares of our common stock.

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

Piper Sandler

The date of this prospectus is April 23, 2024.

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Prospectus

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we have filed with the Securities and Exchange Commission, or the SEC, utilizing a "shelf" registration process, and relates to the offering of our common stock. Before buying any of the shares of common stock that we are offering, we urge you to carefully read this prospectus all of the information incorporated by reference herein, as well as the additional information described under the headings "Where You Can Find More Information" and "Incorporation of Certain Information by Reference" in this prospectus. These documents contain important information that you should consider when making your investment decision.

This prospectus describes the terms of this offering of common stock and also adds to and updates information contained in the documents incorporated by reference into this prospectus. To the extent there is a conflict between the information contained in this prospectus, on the one hand, and the information contained in any document incorporated by reference into this prospectus that was filed with the Securities and Exchange Commission, or the SEC, before the date of this prospectus, on the other hand, you should rely on the information in this prospectus. If any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference into this prospectus—the statement in the document having the later date modifies or supersedes the earlier statement.

You should rely only on the information contained in or incorporated by reference in this prospectus, any applicable prospectus supplement and any free writing prospectus that we may authorize for use in connection with this offering. Neither we nor Piper Sandler have authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. Neither we nor Piper Sandler are making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted or in which the person making that offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make an offer or solicitation. You should assume that the information appearing in this prospectus, any applicable prospectus supplement, the documents incorporated by reference herein and therein and any free writing prospectus that we have authorized for use in connection with this offering is accurate only as of the date of those respective documents. Our business, financial condition, results of operations and prospects may have changed since those dates. You should read this prospectus, any applicable prospectus supplement, the documents incorporated by reference herein and therein and any free writing prospectus that we have authorized for use in connection with this offering in their entirety before making an investment decision.

SUMMARY

This summary highlights information contained in other parts of this prospectus or incorporated by reference herein from our filings with the SEC. As it is only a summary, it does not contain all of the information that you should consider before purchasing our securities and it is qualified in its entirety by, and should be read in conjunction with, the more detailed information appearing elsewhere or incorporated by reference into this prospectus. You should read the entire prospectus, any applicable prospectus supplement, the registration statement of which this prospectus is a part, and the information incorporated by reference in its entirety, including the sections titled "Risk Factors" and our financial statements and the related notes contained in and incorporated by reference into this prospectus, before purchasing our securities.

Unless the context indicates otherwise, references in this prospectus to "Aquestive," "Company," "we," "us" and "our" refer to Aquestive Therapeutics, Inc. and its consolidated subsidiaries.

Company Overview

Aquestive is a pharmaceutical company advancing medicines to bring meaningful improvement to patients' lives through innovative science and delivery technologies. We are developing pharmaceutical products to deliver complex molecules through administrations that are alternatives to invasive and inconvenient standard of care therapies. We have five licensed commercialized products which are marketed by our licensees in the U.S. and around the world. We are the exclusive manufacturer of these licensed products. Aquestive also collaborates with pharmaceutical companies to bring new molecules to market using proprietary, best-in-class technologies, like PharmFilm®, and has proven drug development and commercialization capabilities. We are advancing a product pipeline for the treatment of severe allergic reactions, including anaphylaxis. We have also developed a product pipeline focused on treating diseases of the central nervous system. Our production facilities are located in Portage, Indiana, and our corporate headquarters and primary research laboratory facilities are based in Warren, New Jersey.

We manufacture licensed products at our facilities and anticipate that our current manufacturing capacity is sufficient for commercial quantities of our licensed products and product candidates currently in development. Our facilities have been inspected by the U.S. Food and Drug Administration (the "FDA"), the Australian Government Department of Health's Therapeutics Goods Administration, and the Drug Enforcement Agency and are subject to inspection by all applicable health agencies, including the Brazilian Health Regulatory Agency and the European Medicines Agency. Not all collaborative or licensed products of Aquestive that may be commercially launched in the future will necessarily be manufactured by us, such as the case with KYNMOBI®.

Corporate Information

Our principal executive offices are located at 30 Technology Drive, Warren, New Jersey 07059. Our website is www.aquestive.com. Except as otherwise specifically incorporated by reference in this prospectus, information contained in, or accessible through, our website is not a part of this prospectus, and you should not rely on any such information in deciding whether to purchase our securities.

Implications of Being a Smaller Reporting Company

As of December 31, 2023, we are no longer an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012 but are still a "smaller reporting company," meaning that the market value of our stock held by non-affiliates plus the proposed aggregate amount of gross proceeds to us as a result of this offering is less than \$700.0 million and our annual revenue is less than \$100.0 million during the most recently completed fiscal year. We may continue to be a smaller reporting company after this offering if either (i) the market value of our stock held by non-affiliates is less than \$250.0 million or (ii) our annual revenue is less than \$100.0 million during the most recently completed fiscal year and the market value of our stock held by non-affiliates is less than \$700.0 million. We may rely on exemptions from certain disclosure requirements that are available to smaller reporting companies. Specifically, as a smaller reporting company, (a) we may choose to present only the two most recent fiscal years of audited financial statements and only two years of related "Management's discussion and analysis of financial condition and results of operations" in our Annual Report on Form 10-K, (b) we are not required to comply with the

auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002, as amended, on the effectiveness of our internal controls over financial reporting and (c) similar to emerging growth companies, we are subject to reduced disclosure obligations regarding executive compensation arrangements in our periodic reports, proxy statements and registration statements.

THE OFFERING

Common stock offered by us

Shares of common stock having an aggregate offering price of up to \$100.0 million sold from time to time pursuant to this prospectus.

Common stock to be outstanding after this offering

Up to 92,687,674 shares (as more fully described in the notes following this table), assuming sales of 24,154,589 shares of our common stock in this offering at an offering price of \$4.14 per share, which was the last reported sale price of our common stock on the Nasdaq Global Market on April 2, 2024. The actual number of shares issued will vary depending on the sales price under this offering.

Plan of Distribution

"At the market offering" that may be made from time to time, if at all, through our sales agent, Piper Sandler. See "Plan of Distribution" on page S-18.

Use of Proceeds

We currently intend to use the net proceeds from this offering, if any, primarily for working capital, capital expenditures and general corporate purposes. See "Use of Proceeds" within this prospectus on page S-11.

Risk Factors

Investing in our common stock involves significant risks. See "Risk Factors" beginning on page S-6 of this prospectus, and under similar headings in other documents incorporated by reference into this prospectus, for a discussion of factors that you should read and consider before investing in our common stock.

Nasdaq listing symbol

"AQST"

The number of shares of our common stock that will be outstanding immediately after this offering as shown above is based on 68,533,085 shares of common stock outstanding as of December 31, 2023. The number of shares of common stock outstanding as of December 31, 2023, as used throughout this prospectus, unless otherwise indicated, does not take into account (i) 4,557,220 shares of common stock issued subsequent to December 31, 2023 and prior to this offering pursuant to our ATM Facility (defined below), (ii) 16,666,667 shares of common stock issued in an underwritten public offering on March 22, 2024, pursuant to an underwriting agreement (the "Underwriting Agreement"), by and among us and Leerink Partners LLC and Piper Sandler & Co., as representatives of the several underwriters named therein (the "Underwriters"), dated March 19, 2024 and up to 2,500,000 shares of common stock issuable to the Underwriters pursuant to the Underwriters' 30-day option to purchase additional shares of common stock pursuant to the Underwriting Agreement, (iii) exercise of our outstanding options and the proceeds from such issuances, and (iv) issuances of shares upon the vesting of our restricted stock units, and also excludes:

- 5,733,064 shares of common stock issuable upon exercise of outstanding options pursuant to our stock incentive plans at a weighted average option exercise price of \$5.58 per share as of December 31, 2023;
- 1,948,313 shares of common stock issuable upon vesting of restricted stock units outstanding under our stock incentive plans as of December 31, 2023;
- Up to 1,998,000 shares of common stock issuable under performance stock units outstanding under our 2018 Equity Incentive Plan as of December 31, 2023 upon the satisfaction of performance criteria;

- 4,624,977 shares of common stock issuable upon exercise of outstanding warrants as
 December 31, 2023: 1,571,429 of which are exercisable at an exercise price of \$4.25 per share,
 143,000 of which are exercisable at an exercise price of \$5.38 per share, 160,548 of which are
 exercisable at an exercise price of \$0.96 per share, and 2,750,000 shares of which are
 exercisable at an exercise price of \$2.60 per share;
- 947,950 shares of common stock reserved for future issuance under the 2018 Equity Incentive Plan as of December 31, 2023;
- 1,000,000 shares of common stock reserved for future issuance under the 2022 Inducement Equity Incentive Plan as of December 31, 2023;
- 39,018 shares of common stock available for future purchases under our Employee Stock Purchase Plan as of December 31, 2023; and
- Up to 214,129 commitment shares issuable to Lincoln Park Capital Fund LLC pursuant to the Purchase Agreement, dated April 22, 2022 (the "Lincoln Park Purchase Agreement"), in connection with future purchases under the Lincoln Park Purchase Agreement.

RISK FACTORS

Investing in our Common Stock involves a high degree of risk. You should carefully consider the risks and uncertainties described in the documents incorporated by reference in this prospectus and any applicable prospectus supplement, as well as other information we include or incorporate by reference into this prospectus and any applicable prospectus supplement, before making an investment decision. Our business, financial condition or results of operations could be materially adversely affected by the materialization of any of these risks. The trading price of our securities could decline due to the materialization of any of these risks, and you may lose all or part of your investment. This prospectus and the documents incorporated herein by reference also contain forward-looking statements that involve risks and uncertainties. Actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks described in the documents incorporated herein by reference, including our most recent Annual Report on Form 10-K for the year ended December 31, 2023, which is on file with the SEC and are incorporated by reference into this prospectus, and other documents we file with the SEC that are deemed incorporated by reference into this prospectus.

Risks Related to this Offering

Resales of our common stock in the public market during this offering by our stockholders may cause the market price of our common stock to fall.

We may issue common stock from time to time in connection with this offering. This issuance from time to time of these new shares of our common stock, or our ability to issue these shares of common stock in this offering, could result in resales of our common stock by our current stockholders concerned about the potential dilution of their holdings. In turn, these resales could have the effect of depressing the market price for our common stock.

There may be future sales or other dilution of our equity, which may adversely affect the market price of our common stock.

We are generally not restricted from issuing additional common stock, including any securities that are convertible into or exchangeable for, or that represent the right to receive, common stock. The market price of our common stock could decline as a result of sales of common stock or securities that are convertible into or exchangeable for, or that represent the right to receive, common stock after this offering or the perception that such sales could occur.

We have broad discretion in how we use the net proceeds of this offering, and we may not use these proceeds effectively or in ways with which you agree.

Our management will have broad discretion as to the application of the net proceeds, if any, of this offering and could use them for purposes other than those contemplated at the time of this offering. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not increase the market price of our common stock.

Purchasers will experience immediate dilution in the book value per share of the common stock purchased in the offering.

The expected offering price of our common stock will be substantially higher than the net tangible book value (deficit) per share of our outstanding common stock. As a result, based on our capitalization as of December 31, 2023, investors purchasing shares in this offering would incur immediate dilution of \$4.258 per share of common stock purchased, based on an assumed public offering price of our common stock of \$4.140 per share, the last reported sale price of the common stock on April 2, 2024. In addition to this offering, subject to market conditions and other factors, it is likely that we will pursue additional financings in the future, as we continue to build our business. In future years, we will likely need to raise significant additional capital to finance our operations and to fund clinical trials, regulatory submissions and the development, manufacture and marketing of other products under development and new product opportunities. Accordingly, we may conduct substantial future offerings of equity or debt securities. The exercise of outstanding options and warrants and future equity issuances, including future public offerings

or future private placements of equity securities and any additional shares issued in connection with acquisitions, will result in dilution to investors. In addition, the market price of our common stock could fall as a result of resales of any of these shares of common stock due to an increased number of shares available for sale in the market.

The actual number of shares we will issue under the Amended Equity Distribution Agreement with Piper Sandler, at any one time or in total, is uncertain.

Subject to certain limitations in the Amended Equity Distribution Agreement with Piper Sandler and compliance with applicable law, we have the discretion to deliver placement notices to Piper Sandler at any time throughout the term of the Amended Equity Distribution Agreement. The number of shares that are sold by Piper Sandler after delivering a placement notice will fluctuate based on the market price of the common stock during the sales period and limits we set with Piper Sandler.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents that we incorporate by reference in each contain "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995 (set forth in Section 27A of the Securities Act and Section 2 1E of the Exchange Act). These are based on our management's current beliefs, expectations and assumptions about future events, conditions and results and on information currently available to us. Discussions containing these forward-looking statements may be found, among other places, in the Sections entitled "Business," "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" incorporated by reference from our most recent Annual Report on Form 10-K and Quarterly Reports on Form 10-Q, as well as any amendments thereto, filed with the SEC. Also, documents we subsequently file with the SEC and incorporate by reference may contain forward-looking statements. Such risks and uncertainties include, but are not limited to:

- risks associated with our development work, including any delays or changes to the timing, cost
 and success of our product development activities and clinical trials and plans, including those
 relating to Anaphylm™ (epinephrine) Sublingual Film and Libervant™ (diazepam) Buccal Film;
- risk of delays in regulatory advancement through the FDA of Anaphylm, Libervant and our other drug candidates or failure to receive FDA approval at all;
- the risk that we may not overcome the seven-year orphan drug exclusivity granted by the FDA for the approved nasal spray product of another company in the U.S. in order for Libervant to be granted U.S. market access for any age group of patients;
- risk of litigation brought by third parties relating to overcoming their orphan drug exclusivity of an FDA approved product should the FDA approve Libervant for U.S. market access for any age group of this epilepsy patient population;
- risk that a competing pediatric epilepsy product of Libervant will receive FDA approval prior to the Company's receipt of FDA approval of the Libervant NDA for these epilepsy patients between two and five years of age;
- risk in obtaining market access for Libervant for other reasons;
- risk in obtaining market access from the FDA for our other product candidates;
- risk inherent in commercializing a new product (including technology risks, financial risks, market risks and implementation risks and regulatory limitations);
- risks and uncertainties concerning the revenue stream from the monetization of our royalty rights
 for the product KYNMOBI®, as well as the achievement of royalty targets worldwide or in any
 jurisdiction and certain other commercial targets required for contingent payments under the
 KYNMOBI® monetization transaction, and the Company may not receive any of the additional
 aggregate contingent payments under the monetization agreement;
- risk of development of a sales and marketing capability for future commercialization of our product candidates;
- risk of sufficient capital and cash resources, including access to available debt and equity
 financing, including under our ATM Facility and the Common Stock Purchase Agreement entered
 into with Lincoln Park Capital Fund, LLC on April 12, 2022, and from revenues from operations,
 to satisfy all of our short-term and longer-term cash requirements and other cash needs, at the
 times and in the amounts needed, including near-term debt amortization schedules;
- risk of failure to satisfy all financial and other debt covenants and of any default under our debt facility;
- short-term and long-term liquidity and cash requirements, cash funding and cash burn;

- risk related to government and other claims against Indivior Inc. for which we license, manufacture and sell Suboxone[®] and which accounts for the substantial part of our current operating revenues, including the risk related to the recent product liability multi-district litigation related to Suboxone[®];
- risks related to the outsourcing of certain operational and staff functions to third parties;
- risk of the rate and degree of market acceptance of our product and product candidates;
- risk of the success of any competing products including generics;
- risk of the size and growth of our product markets;
- risk of compliance with all FDA and other governmental and customer requirements for our manufacturing facilities;
- risks associated with intellectual property rights and infringement claims relating to our products;
- · risk of unexpected patent developments;
- risk of legislation and regulatory actions and changes in laws or regulations affecting our business including relating to our products and product candidates and product pricing, reimbursement or access therefor:
- · risk of loss of significant customers;
- risks related to claims and legal proceedings including patent infringement, securities, business torts, investigative, product safety or efficacy and antitrust litigation matters;
- risk of product recalls and withdrawals;
- risks related to any disruptions in our information technology networks and systems, including the impact of cyberattacks;
- risk of increased cybersecurity attacks and data accessibility disruptions due to remote working arrangements;
- adverse developments affecting the financial services industry;
- · risks related to inflation and rising interest rates;
- risks related to the impact of a health pandemic on our business, including with respect to our clinical trials and the site initiation, patient enrollment and timing and adequacy of those clinical trials, regulatory submissions and regulatory reviews and approvals of our product candidates, availability of pharmaceutical ingredients and other raw materials used in our products and product candidates, supply chain, manufacture and distribution of our products and product candidates;
- risks and uncertainties related to general economic, political (including the wars in Ukraine and Israel and other acts of war and terrorism), business, industry, regulatory and market conditions and other unusual items;
- other uncertainties affecting us including those described in the "Risk Factors" section of this
 prospectus, and in our most recent Annual Report on Form 10-K filed with the SEC; and
- use of our existing cash and cash equivalents and the anticipated use of net proceeds from this
 offering.

In some cases, forward-looking statements are identified by terminology such as "may," "will," "could," "should," "expects," "plans," "anticipates," "believes," "intends," "estimates," "predicts," "potential," or "continue" or the negative of these terms or other comparable terminology. Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results or performance to differ materially from those projected. These statements are only current predictions and are subject to known and unknown risks, uncertainties, and other factors that may cause our or our industry's actual results, levels of activity, performance or achievements to be materially different from those

anticipated by the forward-looking statements. In addition, historic results of scientific research and clinical and preclinical trials do not guarantee that the conclusions of future research or trials would not be different, and historic results referred to in our most recent Annual Report on Form 10-K, may be interpreted differently in light of additional research and clinical and preclinical trials results. Readers are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date hereof. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance, or achievements. Except as required by law, we are under no duty to (and expressly disclaim any such obligation to) update or revise any of the forward-looking statements, whether as a result of new information, future events or otherwise, after the date of this prospectus.

USE OF PROCEEDS

We may offer and sell shares of our common stock having an aggregate offering price of up to \$100.0 million from time to time through Piper Sandler pursuant to this prospectus. We intend to use the net proceeds, if any, from the sale of the common stock under this prospectus for working capital, capital expenditures and general corporate purposes. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time. We may also use a portion of the net proceeds to invest in or acquire businesses or technologies that we believe are complementary to our own, although we have no current plans, commitments or agreements with respect to any acquisitions as of the date of this prospectus.

As of the date of this prospectus, we cannot specify with certainty all of the particular uses of the proceeds from this offering. Accordingly, our management will retain broad discretion over the use of such proceeds. Pending the use of the net proceeds from this offering, we intend to invest the net proceeds in investment-grade, interest-bearing instruments.

DILUTION

If you invest in our common stock in this offering, your interest will be diluted to the extent of the difference between the public offering price per share of our common stock and the net tangible book value per share of our common stock upon consummation of this offering. Dilution results from the fact that the public offering price is substantially in excess of the book value per share attributable to the existing stockholders for the presently outstanding stock.

The net tangible book value (deficit) of our common stock as of December 31, 2023, was approximately \$(107.8) million, or approximately \$(1.572) per share. Net tangible book value (deficit) per share represents the amount of our total tangible assets, excluding goodwill and intangible assets, less total liabilities divided by the total number of shares of our common stock outstanding.

After giving effect to the sale of shares of our common stock in an assumed maximum offering of \$100.0 million at an assumed offering price of \$4.140 per share, the last reported sale price of our common stock on April 2, 2024 on the Nasdaq Global Market, and after deducting estimated commissions and estimated offering expenses of approximately \$3.1 million, our as adjusted net tangible book value as of December 31, 2023 would have been approximately \$(10.9) million, or approximately \$(0.118) per share. This represents an immediate increase in net tangible book value of approximately \$1.455 per share to our existing stockholders and an immediate dilution in as adjusted net tangible book value of approximately \$4.258 per share to purchasers of our common stock in this offering, as illustrated by the following table:

Assumed offering price per share	\$ 4.140
Net tangible book value (deficit) per share as of December 31, 2023	\$(1.572)
Increase in net tangible book value per share attributable to new investors	\$ 1.455
As adjusted net tangible book value per share after this offering	\$(0.118)
Net dilution per share to new investors participating in this offering	\$ 4.258

The table above assumes for illustrative purposes only an aggregate of 24,154,589 shares of our common stock are sold at a price of \$4.140 per share, the last reported sale price of our common stock on the Nasdaq Global Market on April 2, 2024, for aggregate gross proceeds of \$100.0 million. The shares, if any, sold in this offering will be sold from time to time at various prices. An increase of \$1.000 per share in the price at which the shares are sold from the assumed offering price of \$4.140 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$100.0 million is sold at that price, would decrease our adjusted net tangible book value per share after the offering to \$(0.124) per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$5.264 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of \$1.000 per share in the price at which the shares are sold from the assumed offering price of \$4.140 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$100.0 million is sold at that price, would increase our adjusted net tangible book value per share after the offering to \$(0.109) per share and would decrease the dilution in net tangible book value per share to new investors in this offering to \$3.249 per share, after deducting commissions and estimated aggregate offering expenses payable by us. This information is supplied for illustrative purposes only.

The calculations above are based upon 68,533,085 shares of common stock outstanding as of December 31, 2023 and do not take into account (i) 4,557,220 shares of common stock issued subsequent to December 31, 2023 and prior to this offering pursuant to our ATM Facility, (ii) 16,666,667 shares of common stock issued in an underwritten public offering on March 22, 2024, pursuant to the Underwriting Agreement and up to 2,500,000 shares of common stock issuable to the Underwriters pursuant to the Underwriters' 30-day option to purchase additional shares of common stock pursuant to the Underwriting Agreement, (iii) exercise of our outstanding options and the proceeds from such issuances, and (vi) issuances of shares upon the vesting of our restricted stock units, and exclude:

 5,733,064 shares of common stock issuable upon exercise of outstanding options pursuant to our stock incentive plans at a weighted average option exercise price of \$5.58 per share as of December 31, 2023;

- 1,948,313 shares of common stock issuable upon vesting of restricted stock units outstanding under our stock incentive plans as of December 31, 2023;
- Up to 1,998,000 shares of common stock issuable under performance stock units outstanding under our 2018 Equity Incentive Plan as of December 31, 2023 upon the satisfaction of performance criteria;
- 4,624,977 shares of common stock issuable upon exercise of outstanding warrants as
 December 31, 2023: 1,571,429 of which are exercisable at an exercise price of \$4.25 per share,
 143,000 of which are exercisable at an exercise price of \$5.38 per share, 160,548 of which are
 exercisable at an exercise price of \$0.96 per share, and 2,750,000 shares of which are
 exercisable at an exercise price of \$2.60 per share;
- 947,950 shares of common stock reserved for future issuance under the 2018 Equity Incentive Plan as of December 31, 2023;
- 1,000,000 shares of common stock reserved for future issuance under the 2022 Inducement Equity Incentive Plan as of December 31, 2023;
- 39,018 shares of common stock available for future purchases under our Employee Stock Purchase Plan as of December 31, 2023; and
- Up to 214,129 commitment shares issuable to Lincoln Park Capital Fund LLC pursuant to the Lincoln Park Purchase Agreement, in connection with future purchases under the Lincoln Park Purchase Agreement.

To the extent that outstanding options or warrants outstanding as of December 31, 2022 have been or may be exercised or other shares are issued, investors purchasing our common stock in this offering may experience further dilution. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

DESCRIPTION OF COMMON STOCK

The following description of our common stock and provisions of our amended and restated certificate of incorporation and amended and restated bylaws are summaries. You should also refer to the amended and restated certificate of incorporation and the amended and restated bylaws, which are incorporated by reference as exhibits to the registration statement of which this prospectus is part.

General

Our amended and restated certificate of incorporation authorizes us to issue up to 250,000,000 shares of common stock, \$0.001 par value per share. The following summary is qualified in its entirety by reference to our amended and restate certificate of incorporation, a copy of which is filed as an exhibit to our previous filings with the SEC and incorporated herein by reference.

Common Stock

Outstanding Shares

The holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. The holders of our common stock do not have any cumulative voting rights. Holders of our common stock are entitled to receive ratably any dividends declared by the board of directors out of funds legally available for that purpose, subject to any preferential dividend rights of any outstanding preferred stock. Our common stock has no preemptive rights, conversion rights or other subscription rights or redemption or sinking fund provisions.

Voting Rights

Each holder of common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders. The affirmative vote of holders of at least 66 2/3% of the voting power of all of the thenoutstanding shares of capital stock, voting as a single class, is required to amend certain provisions of our amended and restated certificate of incorporation, including provisions relating to amending our amended and restated bylaws, the classified board, the size of our board, removal of directors, director liability, vacancies on our board, special meetings, stockholder notices, actions by written consent and exclusive jurisdiction, provided, however, that this restriction shall not apply to, and such 66 2/3% vote shall not be required for, any such amendment, change or repeal approved by the affirmative vote of at least a majority of the then current duly elected board of directors, in which case such action shall require only the vote of shareholders as required under Delaware law.

Dividends

Subject to preferences that may apply to any outstanding preferred stock, holders of our common stock are entitled to receive ratably any dividends that our board of directors may declare out of funds legally available for that purpose on a non-cumulative basis. We currently anticipate that we will retain future earnings for the development, operation and expansion of our business and do not anticipate we will declare or pay any cash dividends for the foreseeable future. Further, any future debt agreements may also prohibit us from paying, or place restrictions on our ability to pay, dividends. Any return to stockholders will therefore be limited to the appreciation of their stock.

Liquidation

In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities, subject to the satisfaction of any liquidation preference granted to the holders of any outstanding shares of preferred stock.

Rights and Preferences

Holders of our common stock have no preemptive, conversion or subscription rights, and there are no redemption or sinking fund provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of our preferred stock that we may designate and issue in the future.

Anti-Takeover Effects of Provisions of Our Certificate of Incorporation and Our Bylaws

Our amended and restated certificate of incorporation and amended and restated bylaws contain certain provisions that are intended to enhance the likelihood of continuity and stability in the composition of the board of directors and which may have the effect of delaying, deferring or preventing a future takeover or change in control of the company unless such takeover or change in control is approved by the board of directors.

These provisions include:

Classified Board. Our amended and restated certificate of incorporation provides that our board of directors is divided into three classes of directors, with the classes as nearly equal in number as possible. As a result, approximately one-third of our board of directors are elected each year. The classification of directors has the effect of making it more difficult for stockholders to change the composition of our board. Our amended and restated certificate of incorporation also provides that, subject to any rights of holders of preferred stock to elect additional directors under specified circumstances, the number of directors will be fixed exclusively pursuant to a resolution adopted by our board of directors.

Action by Written Consent; Special Meetings of Stockholders. Our amended and restated certificate of incorporation provides that stockholder action can be taken only at an annual or special meeting of stockholders and cannot be taken by written consent in lieu of a meeting. Our amended and restated certificate of incorporation and our amended and restated bylaws also provide that, except as otherwise required by law, special meetings of the stockholders can be called only by or at the direction of the board of directors pursuant to a resolution adopted by a majority of the total number of directors. Stockholders are not permitted to call a special meeting or to require the board of directors to call a special meeting.

Removal of Directors. Our amended and restated certificate of incorporation provides that our directors may be removed only for cause by the affirmative vote of at least 66 2/3% of the votes that all our stockholders would be entitled to cast in an annual election of directors, voting together as a single class, at a meeting of the stockholders called for that purpose. This requirement of a supermajority vote to remove directors could enable a minority of our stockholders to prevent a change in the composition of our board.

Advance Notice Procedures. Our amended and restated bylaws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to the board of directors. Stockholders at an annual meeting are only able to consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of the board of directors or by a stockholder who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given our secretary timely written notice, in proper form, of the stockholder's intention to bring that business before the meeting. Although the amended and restated bylaws do not give the board of directors the power to approve or disapprove stockholder nominations of candidates or proposals regarding other business to be conducted at a special or annual meeting, the amended and restated bylaws may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempting to obtain control of the company.

Super Majority Approval Requirements. The Delaware General Corporation Law generally provides that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws, unless either a corporation's certificate of incorporation or bylaws requires a greater percentage. A majority vote of our board of directors or the affirmative vote of holders of at least 66 2/3% of the total votes of the outstanding shares of our capital stock entitled to vote with respect thereto, voting together as a single class, are required to amend, alter, change or repeal the amended and restated bylaws. In addition, the affirmative vote of the holders of at least 66 2/3% of the total votes of the outstanding shares of our capital stock entitled to vote with respect thereto, voting together as a single class, are required to amend, alter, change or repeal, or to adopt any provisions inconsistent with, any of the provisions in our amended and restated certificate of incorporation relating to amendments to our amended and restated certificate of incorporation and amended and restated bylaws and as described under "Action by Written Consent; Special Meetings of Stockholders", "Classified Board" and

"Removal of Directors" above. This requirement of a supermajority vote to approve amendments to our amended and restated bylaws and amended and restated certificate of incorporation could enable a minority of our stockholders to exercise veto power over any such amendments.

Authorized but Unissued Shares. Our authorized but unissued shares of common stock and preferred stock are available for future issuance without stockholder approval. These additional shares may be utilized for a variety of corporate purposes, including future public offerings to raise additional capital and corporate acquisitions. The existence of authorized but unissued shares of common stock and preferred stock could render more difficult or discourage an attempt to obtain control of a majority of our common stock by means of a proxy contest, tender offer, merger or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a takeover proposal is not in the best interests of us or our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our amended and restated certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Exclusive Forum. Our amended and restated certificate of incorporation provides that, subject to limited exceptions, the state or federal courts located in the State of Delaware are the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws, or (iv) any other action asserting a claim against us that is governed by the internal affairs doctrine. This exclusive forum provision would not apply to suits brought to enforce any liability or duty created by the Securities Act or the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. To the extent that any such claims may be based upon federal law claims, Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all suits brought to enforce any duty or liability created by the Securities Act or the rules and regulations thereunder. Our amended and restated certificate of incorporation 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 amended and restated certificate of incorporation is inapplicable or unenforceable if it is challenged in a proceeding or otherwise. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above. Although we believe these provisions benefit us by providing increased consistency in the application of Delaware law for the specified types of actions and proceedings, the provisions may have the effect of discouraging lawsuits against our directors and officers. The enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with one or more actions or proceedings described above, a court could find the choice of forum provisions contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable.

Section 203 of the Delaware General Corporation Law

We are subject to the provisions of Section 203 of the Delaware General Corporation Law, or Section 203. In general, Section 203 prohibits a publicly-held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless the business combination is approved in a prescribed manner. A "business combination" includes, among other things, a merger, asset or stock sale or other transaction resulting in a financial benefit to the interested stockholder. An "interested stockholder" is a

person who, together with affiliates and associates, owns, or did own within three years prior to the determination of interested stockholder status, 15% or more of the corporation's voting stock.

Under Section 203, a business combination between a corporation and an interested stockholder is prohibited unless it satisfies one of the following conditions: before the stockholder became interested, the board of directors approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder; upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 75% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the voting stock outstanding, shares owned by persons who are directors and also officers, and employee stock plans, in some instances; or at or after the time the stockholder became interested, the business combination was approved by the board of directors of the corporation and authorized at an annual or special meeting of the stockholders by the affirmative vote of at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.

A Delaware corporation may "opt out" of these provisions with an express provision in its original certificate of incorporation or an express provision in its certificate of incorporation or bylaws resulting from a stockholders' amendment approved by at least a majority of the outstanding voting shares. We have not opted out of these provisions. As a result, mergers or other takeover or change in control attempts of us may be discouraged or prevented.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare. The transfer agent's address is 1290 Avenue of the Americas, 9th Floor, New York, NY 10104, and its telephone number is (212) 805-7100. The transfer agent for any series of stock that we may offer under this prospectus will be named and described in the prospectus supplement for that series.

Listing on the Nasdaq Global Market

Our common stock is listed on the Nasdaq Global Market under the symbol "AQST."

PLAN OF DISTRIBUTION

We previously entered into the Amended Equity Distribution Agreement with Piper Sandler, pursuant to which we may offer and sell shares of our common stock from time to time through Piper Sandler, acting as sales agent. This prospectus registers shares of common stock having an aggregate offering price of up to \$100.0 million that we may offer and sell from time to time.

Piper Sandler will use commercially reasonable efforts to sell on our behalf all of the shares of our common stock requested to be sold by us, consistent with its normal trading and sales practices, under the terms and subject to the conditions set forth in the Amended Equity Distribution Agreement. We may instruct the sales agent not to sell our common stock if the sales cannot be effected at or above the price designated by us in any instruction. We or the sales agent may suspend the offering of our common stock upon proper notice and subject to other conditions, as further described in the Amended Equity Distribution Agreement. A copy of the Amended Equity Distribution Agreement is incorporated by reference into the registration statement of which this prospectus forms a part. Additionally, we have agreed to not make any sales of our common stock under the Amended Equity Distribution Agreement until the expiration or waiver of a 60-day lock-up period ending May 18, 2024, pursuant to the underwriting agreement, dated March 19, 2024, by and among us and Leerink Partners LLC and Piper Sandler

Piper Sandler may sell our common stock by any method permitted by law deemed to be an "at the market offering" as defined in Rule 415(a)(4) promulgated under the Securities Act, including sales made directly on or through the Nasdaq Capital Market or on any other existing trading market for our common stock. Piper Sandler will provide written confirmation to us following the close of trading on the Nasdaq Capital Market each day in which our common stock is sold under the Amended Equity Distribution Agreement. Each such confirmation will include the number of shares of our common stock sold on such day, the net proceeds to us and the compensation payable by us to Piper Sandler in connection with such sales

We will pay Piper Sandler commissions for its services in acting as sales agent in the sale of our common stock. Piper Sandler will be entitled to compensation in an amount up to 3.0% of the gross sales price of all common stock sold through it as sales agent under the Amended Equity Distribution Agreement. We have also agreed to reimburse Piper Sandler for the out-of-pocket reasonable fees and disbursements of its legal counsel, in an amount not to exceed \$50,000 in connection with the execution of the Amended Equity Distribution Agreement. We estimate that the total expenses for this offering, excluding compensation payable to Piper Sandler under the terms of the Amended Equity Distribution Agreement, will be approximately \$140,000.

Settlement for sales of our common stock will occur on the second business day following the date on which any such sales are made, or on some other date that is agreed upon by us and Piper Sandler in connection with a particular transaction, in return for payment of the net proceeds to us. Pursuant to Rule 15c6-1 of the Exchange Act, settlement for any securities offered under this prospectus supplement on or after May 28, 2024, may occur on the first business day that is also a trading day following the date on which any sales were made in return for payment of the net proceeds to us. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

We will report at least quarterly the number of shares of our common stock sold through Piper Sandler, as sales agent, under the Amended Equity Distribution Agreement, the net proceeds to us and the compensation paid by us to Piper Sandler in connection with such sales.

Piper Sandler and its affiliates have from time to time provided, and may in the future provide, various investment banking, commercial banking, fiduciary and advisory services for us for which they have received, and may in the future receive, customary fees and expenses. Piper Sandler and its affiliates may from time to time engage in other transactions with and perform services for us in the ordinary course of their business.

In connection with the sale of our common stock on our behalf, Piper Sandler will be deemed to be an underwriter within the meaning of the Securities Act, and the compensation paid by us to Piper Sandler will be deemed to be underwriting commissions or discounts. We have agreed to indemnify Piper Sandler against specified liabilities, including liabilities under the Securities Act, or to contribute to payments that Piper Sandler may be required to make because of such liabilities.

The offering of our common stock pursuant to the Amended Equity Distribution Agreement will terminate upon the termination of the Amended Equity Distribution Agreement. The Amended Equity Distribution

Agreement may be terminated by Piper Sandler or us at any time on the close of business on the date of receipt of written notice, and by Piper Sandler at any time in certain circumstances, including any suspension or limitation on the trading of our common stock on the Nasdaq Capital Market, as further described therein.

LEGAL MATTERS

Certain legal matters in connection with this offering will be passed upon for us by Dechert LLP. Piper Sandler & Co. is being represented in connection with this offering by Cooley LLP, New York, New York.

EXPERTS

The consolidated financial statements of Aquestive Therapeutics, Inc. as of December 31, 2023 and 2022, and for each of the years in the two-year period ended December 31, 2023, have been incorporated by reference herein and in the registration statement in reliance upon the report of KPMG LLP, independent registered public accounting firm, incorporated by reference herein, and upon the authority of said firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of the registration statement on Form S-3 we filed with the Commission under the Securities Act and does not contain all the information set forth or incorporated by reference in the registration statement. For further information with respect to us and the securities offered by this prospectus, we refer you to the registration statement and its exhibits. Whenever a reference is made in this prospectus as to the contents of any contract or any other document referred to herein, such references are not necessarily complete, and in each instance, we refer you to the copy of the contract or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference.

We file electronically with the SEC annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements and other information and amendments to those reports filed or furnished pursuant to Section 13 or 15(d) of the Exchange Act. The SEC maintains an Internet site (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Copies of these reports, proxy and information statements and other information may be obtained by electronic request at the following e-mail address: publicinfo@sec.gov.

We make available, free of charge and through our Internet web site at www.aquestive.com, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and any amendments to any such 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 furnish it to, the SEC. Copies of our Code of Business Conduct and Ethics and our Corporate Governance Guidelines may be accessed free of charge by visiting our website at www.aquestive.com under "Investors" at "Corporate Governance: Governance Documents" or by requesting a copy via an e-mail addressed to investorrelations@aquestive.com or by written request addressed to our Corporate Secretary at our principal executive offices. To the extent required by applicable law and regulation, we intend to post on our website any amendment to, or waiver under, a provision of the Code of Business Conduct and Ethics that applies to our executive officers and directors within the time period required. The information set forth on, or connected to, our website is expressly not incorporated by reference into, and does not constitute a part of, this prospectus.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to "incorporate by reference" information into this prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The SEC file number for the documents incorporated by reference in this prospectus is 001-38599. The documents incorporated by reference into this prospectus contain important information that you should read about us.

The following documents are incorporated by reference into this document:

- our Annual Report on Form 10-K for the year ended December 31, 2023, filed with the SEC on March 5, 2024;
- our Definitive Proxy Statement on Schedule 14A, filed with the SEC on <u>April 28, 2023</u> (to the
 extent incorporated by reference into Part III of our Annual Report on Form 10-K for the fiscal
 year ended December 31, 2022);
- our Current Reports on Form 8-K filed with the SEC on March 15, 2024, March 21, 2024, April 1, 2024 and April 22, 2024 (to the extent the information in such reports is filed and not furnished);
- the description of our common stock contained in our Registration Statement on Form 8-A, filed with the SEC on July 20, 2018, as the description therein has been updated and superseded by the description of our securities contained in Exhibit 4.7 to our Annual Report on Form 10-K for the fiscal year ended December 31, 2019, as filed with the SEC on March 11, 2020.

We also incorporate by reference into this prospectus all documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) that are hereafter filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act until all of the securities offered by this prospectus have been sold or we otherwise terminate the offering of these securities. These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as proxy statements.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, without charge upon written or oral request, a copy of any or all of the documents that are incorporated by reference into this prospectus but not delivered with the prospectus, including exhibits that are specifically incorporated by reference into such documents. You should direct any requests for documents to Aquestive Therapeutics, Inc., Attn: Corporate Secretary, 30 Technology Dr. South, Warren, NJ 07059; telephone: (908) 941-1900.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference into this document will be deemed to be modified or superseded for purposes of the document to the extent that a statement contained in this document or any other subsequently filed document that is deemed to be incorporated by reference into this document modifies or supersedes the statement.

Up to \$100,000,000



Common	Stock
PROSPEC	CTUS

Piper Sandler

April 23, 2024