

PROSPECTUS SUPPLEMENT
(to Prospectus dated March 5, 2024)

Benitec Biopharma Inc.

Up to \$75,000,000

Common Stock

We have entered into a sales agreement (“Sales Agreement”) with Leerink Partners LLC (“Leerink Partners”) relating to shares of our common stock, par value \$0.0001 per share (“common stock”), offered by this prospectus supplement and accompanying prospectus. In accordance with the terms of such Sales Agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to \$75,000,000 from time to time through Leerink Partners acting as our sales agent.

Our common stock is currently listed on the Nasdaq Capital Market under the symbol “BNTC.” On October 8, 2024, the last reported sale price of our common stock on the Nasdaq Capital Market was \$9.46 per share.

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

The compensation to Leerink Partners for sales of common stock sold pursuant to the Sales Agreement will be 3.0% of the aggregate gross proceeds of any shares of common stock sold under the Sales Agreement. In connection with the sale of the common stock on our behalf, Leerink Partners may be deemed to be an “underwriter” within the meaning of the Securities Act and the compensation of Leerink Partners may be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to Leerink Partners with respect to certain liabilities, including liabilities under the Securities Act or the Securities Exchange Act of 1934, as amended, (the “Exchange Act”). See “Plan of Distribution” beginning on page S-16 for additional information regarding the compensation to be paid to Leerink Partners.

Investing in our common stock involves a high degree of risk. Please read “[Risk Factors](#)” beginning on page S-8 of this prospectus supplement and those found in the accompanying prospectus and under similar headings in the documents incorporated by reference herein and therein before investing in our securities.

Neither the Securities and Exchange Commission (the “SEC”) nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus supplement or the accompanying prospectus. Any representation to the contrary is a criminal offense.

Leerink Partners

The date of this prospectus supplement is October 14, 2024.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus form part of a registration statement on Form S-3 that we have filed with the SEC, utilizing a “shelf” registration process. By using a shelf registration statement, we may offer shares of our common stock having an aggregate offering price of up to \$75,000,000 from time to time under this prospectus supplement at prices and on terms to be determined by market conditions at the time of offering.

This document contains two parts. The first part consists of this prospectus supplement, which provides you with specific information about this offering. The second part, the accompanying prospectus, provides more general information, some of which may not apply to this offering. Generally, when we refer only to the “prospectus,” we are referring to both parts combined. This prospectus supplement may add, update or change information contained in the accompanying prospectus. To the extent that any statement we make in this prospectus supplement is inconsistent with statements made in the accompanying prospectus or any documents incorporated by reference herein or therein as of the date of this prospectus supplement, the statements made in this prospectus supplement will be deemed to modify or supersede those made in the accompanying prospectus and such documents incorporated by reference herein and therein. You should carefully read this prospectus supplement and the accompanying prospectus, including the information incorporated by reference herein and therein, and any related free writing prospectus that we have authorized for use in connection with this offering.

We have not, and Leerink Partners has not, authorized anyone to provide any information other than that contained in or incorporated by reference in this prospectus supplement, any applicable prospectus supplement, and any applicable free writing prospectus prepared by or on behalf of us or to which we have referred you. We and Leerink Partners take no responsibility for, and can provide no assurance as to, the reliability of, any other information that others may give you. We are not, and Leerink Partners is not, making an offer to sell or soliciting an offer to buy our securities in any jurisdiction where an offer or solicitation is not authorized 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 supplement, any applicable prospectus supplement, the documents incorporated by reference into this prospectus supplement, and in any applicable free writing prospectus that we may authorize 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 supplement, the documents incorporated by reference into this prospectus supplement, and any applicable free writing prospectus that we may authorize for use in connection with this offering, in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus supplement entitled “Where You Can Find More Information” and “Incorporation of Certain Information by Reference.”

We are offering to sell, and seeking offers to buy, shares of common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement outside the United States. This prospectus supplement, the accompanying prospectus and any related free writing prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities in any jurisdiction or to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

When we refer to “Benitec,” “we,” “our,” “us” and the “Company” in this prospectus supplement, we mean Benitec Biopharma Inc., unless otherwise specified. When we refer to “you,” we mean the holders of common stock of the Company.

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This prospectus supplement includes trademarks, service marks and trade names owned by us or other companies. These trademarks include:

- BENITEC BIOPHARMA®
- BENITEC®
- GIVING DISEASE THE SILENT TREATMENT®
- SILENCING GENES FOR LIFE®

All trademarks, service marks and trade names included or incorporated by reference into this prospectus supplement are the property of their respective owners. Solely for convenience, trademarks and trade names referred to in this prospectus supplement, including logos, artwork and other visual displays, may appear without the ® or ™ symbols, but such references are not intended to indicate, in any way, that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. We do not intend our use or display of other companies' trade names or trademarks to imply a relationship with, or endorsement or sponsorship of us by, any other companies.

PROSPECTUS SUMMARY

This summary provides a general overview of selected information and does not contain all of the information you should consider before buying our common stock. Therefore, you should read the entire prospectus, any applicable prospectus supplement, and any applicable free writing prospectus that we have authorized for use in connection with this offering carefully, including the information incorporated by reference herein and therein, before deciding to invest in our common stock. Investors should carefully consider the information set forth under “Risk Factors” beginning on page S-8 of this prospectus supplement and in the documents incorporated by reference into this prospectus supplement.

Company Overview

We endeavor to become the leader in discovery, development, and commercialization of therapeutic agents capable of addressing significant unmet medical need via the application of the silence and replace approach to the treatment of genetic disorders.

Benitec Biopharma Inc. (“Benitec” or the “Company” or in the first person, “we” or “our”) is a clinical-stage biotechnology company focused on the advancement of novel genetic medicines with headquarters in Hayward, California. The proprietary platform, called DNA-directed RNA interference, or ddRNAi, combines RNA interference, or RNAi, with gene therapy to create medicines that facilitate sustained silencing of disease-causing genes following a single administration. The unique therapeutic constructs also enable the simultaneous delivery of wildtype replacement genes, facilitating the proprietary “silence and replace” approach to the treatment of genetically defined diseases. The Company is developing a silence and replace-based therapeutic (BB-301) for the treatment of Oculopharyngeal Muscular Dystrophy (OPMD), a chronic, life-threatening genetic disorder.

BB-301 is a silence and replace-based genetic medicine currently under development by Benitec. BB-301 is an AAV-based gene therapy designed to permanently silence the expression of the disease-causing gene (to slow, or halt, the biological mechanisms underlying disease progression in OPMD) and to simultaneously replace the mutant gene with a wildtype gene (to drive restoration of function in diseased cells). This fundamental therapeutic approach to disease management is called “silence and replace.” The silence and replace mechanism offers the potential to restore the normative physiology of diseased cells and tissues and to improve treatment outcomes for patients suffering from the chronic, and potentially fatal, effects of OPMD. BB-301 has been granted Orphan Drug Designation in the United States and the European Union.

The targeted gene silencing effects of RNAi, in conjunction with the durable transgene expression achievable via the use of modified viral vectors, imbues the silence and replace approach with the potential to produce permanent silencing of disease-causing genes along with simultaneous replacement of the wild type gene function following a single administration of the proprietary genetic medicine. We believe that this novel mechanistic profile of the current and future investigational agents developed by Benitec could facilitate the achievement of robust and durable clinical activity while greatly reducing the frequency of drug administration traditionally expected for medicines employed for the management of chronic diseases. Additionally, the achievement of permanent gene silencing and gene replacement may significantly reduce the risk of patient non-compliance during the course of medical management of potentially fatal clinical disorders.

We will require additional financing to progress our product candidates through to key inflection points.

Recent Developments

On October 12, 2024, the Company announced continued durable improvements in swallowing following administration of the low-dose of BB-301 in the study’s first two subjects treated in the BB-301 Phase 1b/2a

single-arm, open-label, sequential, dose-escalation cohort study (NCT06185673) in Oculopharyngeal Muscular Dystrophy (OPMD). Interim clinical study data were presented on October 12, 2024 in an oral late-breaking podium presentation at the 29th Annual Congress of the World Muscle Society, taking place in Prague, Czech Republic.

The interim clinical study update presented at the Annual Congress of the World Muscle Society detailed the 9-month (270-day) post-dose results for the first subject and the 6-month (180-day) post-dose results for the second subject, both of whom have been safely treated with BB-301. Key efficacy endpoints presented included videofluoroscopic swallowing study (“VFSS”) assessments of Total Pharyngeal Residue (“TPR”, i.e., the amount of solid food or liquid material remaining in the pharynx after the first swallow) and the Subject-Reported Outcome Instrument (i.e., the Sydney Swallow Questionnaire or “SSQ”). The post-dose results were compared to the average pre-dose results for each subject as evaluated during the five clinical assessment visits conducted during their enrollment in the Benitec-sponsored OPMD Natural History (NH) Study. The post-dose results for each subject were also compared to the pre-dose result derived from the final pre-dose clinical visit prior to the administration of BB-301.

Summary of Results:

- Two subjects have received the lowest-dose of gene therapy BB-301 (1.2e13 vg/subject), and there were no Significant Adverse Events.
- Dysphagic symptoms at baseline for Subject 1 (7-years post diagnosis) were more severe than those of Subject 2 (6-years post diagnosis) as assessed by pre-dose SSQ and TPR results, but both Subjects experienced significant levels of clinical benefit per the post-dose SSQ scores and TPR results.
- The SSQ Total Scores and SSQ Sub-Scores correlate strongly with the VFSS TPR results.
- Subject 1 experienced clinically meaningful improvements in post-dose SSQ Total Score and SSQ Sub-Scores at Day 270 driven by corresponding reductions in VFSS TPR values.
- Subject 2 experienced clinically meaningful improvements in post-dose SSQ Total Score and SSQ Sub-Scores at Day 180, with an SSQ Total Score representative of a normal swallowing profile, driven by a corresponding reduction in the frequency of pathologic low-volume sequential swallows.
- These data represent the first reported successful improvements in swallow function using a novel gene therapy for OPMD.

Subjects enrolled in the NH Study and the BB-301 Phase 1b/2a Clinical Study have been shown to be impacted by:

- Excessive accumulation of pharyngeal residue post-swallow
- Pathologic low-volume sequential swallows (i.e., rapid contractions of the pharyngeal muscles during the consumption of low volumes of thin liquids)

Subject 1 (270 Days post-BB-301 dose):

Global inefficiency of swallowing for solid food, thin liquid, and thick liquids drives dysphagia for Subject 1.

Subject 1 displayed continued clinically meaningful reductions (i.e., improvements) in SSQ Total Score (35% reduction) and SSQ Sub-Scores (42% reduction for Thin Liquid, 16% reduction for Solid Food, and 22% reduction for Thick Liquids). Subject 1 displayed correspondingly significant reductions (i.e., improvements) in VFSS TPR (33% reduction for Thin Liquid, 18% reduction for Solid Food, and 30% reduction for Thick Liquids) following the administration of the low-dose of BB-301 as compared to the average values recorded for Subject 1 during the pre-dose period.

Subject 2 (180 Days post-BB-301-dose):

Pathologic low-volume sequential swallowing for thin liquid drives dysphagia for Subject 2. Pathologic low-volume sequential swallows are experienced by the subject as multiple swallows and are detected during VFSS as a series of rapid contractions of the pharyngeal muscles interrupting the discrete peristaltic contraction pattern typically observed during swallows of low volumes of thin liquids.

Subject 2 displayed clinically meaningful reductions (i.e., improvements) in SSQ Total Score (89% reduction) and the SSQ Sub-Score for the necessity of repeat swallows during consumption (84% reduction) as compared to the average values recorded for Subject 2 during the pre-dose period. The average post-dose SSQ Total Score of 82 is representative of a clinically normal swallowing profile for Subject 2. Subject 2 displayed correspondingly significant reductions (i.e., improvements) in the post-dose frequency of low-volume sequential swallows as evaluated by VFSS (92% reduction) following the administration of the low-dose of BB-301 as compared to the pre-dose values recorded for Subject 2 during the pre-dose period.

All study Subjects are blinded to their SSQ Total Scores and VFSS TPR assessment results, and the Central Reader for the VFSS assessments is blinded to the SSQ Total Scores and SSQ Sub- Scores for all Study Subjects.

Corporate Information

We were incorporated as a Delaware corporation on November 22, 2019 and completed a re-domiciliation on April 15, 2020. Our predecessor, Benitec Limited, Inc., was incorporated under the laws of Australia in 1995. Our common stock is traded on the Nasdaq Capital Market under the symbol “BNTC.” Our principal executive offices are located at 3940 Trust Way, Hayward, California 94545. Our telephone number is (510) 780-0819, and our Internet website is www.benitec.com. The information on, or that can be accessed through, our website is not part of this prospectus and is not incorporated by reference herein.

Implications of Being a Smaller Reporting Company

We are a “smaller reporting company” and will remain a smaller reporting company while either (i) the market value of our stock held by non-affiliates was less than \$250 million as of the last business day of our most recently completed second fiscal quarter or (ii) our annual revenue was less than \$100 million during our most recently completed fiscal year and the market value of our stock held by non-affiliates was less than \$700 million as of the last business day of our most recently completed second fiscal quarter. We may rely on exemptions from certain disclosure requirements that are available to smaller reporting companies, including many of the same exemptions from disclosure requirements as those that are available to emerging growth companies, such as reduced disclosure obligations regarding executive compensation in our registration statements, prospectus and our periodic reports and proxy statements. For so long as we remain a smaller reporting company, we are permitted and intend to rely on exemptions from certain disclosure and other requirements that are applicable to other public companies that are not smaller reporting companies.

THE OFFERING	
Issuer	Benitec Biopharma Inc.
Common stock offered by us	Shares of our common stock having an aggregate offering price of up to \$75,000,000.
Shares of common stock to be outstanding immediately after this offering	Up to 25,821,883 shares, assuming sales of 7,928,118 shares of common stock are made in this offering at an assumed offering price of \$9.46 per share, which was the last reported sale price of shares of our common stock on the Nasdaq Capital Market on October 8, 2024. The actual number of shares that may be 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 through or to our sales agent, Leerink Partners. See “Plan of Distribution” on page S-16.
Use of Proceeds	We intend to use the net proceeds from this offering, if any, to fund the continued development of our product candidate programs, working capital and other general corporate purposes. See “Use of Proceeds” on page S-12.
Risk Factors	Investing in our common stock involves significant risks. See “Risk Factors” beginning on page S-8 of this prospectus supplement and the other information included in, or incorporated by reference into, this prospectus supplement for a discussion of certain factors you should carefully consider before deciding to invest in shares of our common stock.
Nasdaq symbol	BNTC
<p>The number of shares of common stock to be outstanding after this offering is based on 17,893,765 shares of common stock outstanding at October 8, 2024 and excludes the following as of October 8, 2024:</p> <ul style="list-style-type: none"> • 1,182,140 shares of common stock issuable upon exercise of stock options outstanding at a weighted-average exercise price of \$6.58 per share; • 8,204,537 shares of common stock reserved for future issuance under our 2020 Equity and Incentive Compensation Plan; • 6,300 shares of common stock issuable upon the exercise of common warrants exercisable for shares of common stock outstanding at an exercise price of \$178.50 per share; • 797,620 shares of common stock issuable upon the exercise of common warrants issued on September 15, 2022 exercisable for shares of common stock at an exercise price of \$1.9299 per share; • 10,082,641 shares of common stock issuable upon the exercise of common warrants issued on August 11, 2023 exercisable for shares of common stock at an exercise price of \$3.86; 	

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- 588,236 shares of common stock issuable upon the exercise of pre-funded warrants issued on September 15, 2022 exercisable for shares of common stock outstanding at an exercise price of \$0.0017 per share;
- 12,604,739 shares of common stock issuable upon the exercise of pre-funded warrants issued on August 11, 2023 exercisable for shares of common stock outstanding at an exercise price of \$0.0001 per share; and
- 2,383,963 shares of common stock issuable upon the exercise of pre-funded warrants issued on April 22, 2024 exercisable for shares of common stock outstanding at an exercise price of \$0.0001 per share.

RISK FACTORS

Investing in our common stock involves a high degree of risk. You should carefully review the risks and uncertainties described below and under the section titled “Risk Factors” in our most recent annual report on Form 10-K that is incorporated by reference into this prospectus supplement, together with other information in this prospectus supplement and the information and documents incorporated by reference in this prospectus supplement, the accompanying prospectus, and any applicable free writing prospectus that we have authorized for use in connection with this offering before you make a decision to invest in our common stock. Each of the risk factors could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our common stock, and the occurrence of any of these risks might cause you to lose all or part of your investment. Additional risks not presently known to us or that we currently believe are immaterial may also significantly impair our business operations. Please also read carefully the section below titled “Note Regarding Forward-Looking Statements.”

Risks Related to this Offering

Issuances or sales of our common stock may be dilutive or cause the market price of our shares to fall.

The issuance or sale of substantial amounts of our common stock, the perception that such issuances or sales of our common stock could occur or the availability for future issuance or sale of our common stock could have a dilutive effect on our actual and expected earnings per share or could have the effect of depressing the market price of our common stock. The actual amount of dilution or decline in market price cannot be determined at this time and would be dependent upon numerous factors which are not currently known to us. Because the sales of the shares offered hereby will be made directly into the market or in negotiated transactions, the prices at which we sell these shares will vary and these variations may be significant. Purchasers of the shares we sell, as well as our existing stockholders, will experience significant dilution if we sell shares at prices significantly below the price at which they invested. In addition, to the extent we need to raise additional capital in the future and we issue additional shares of common stock or securities convertible or exchangeable for our common stock, our then existing stockholders may experience dilution and the new securities may have rights senior to those of our common stock offered in this offering. See “Dilution” on page S-14 of this prospectus for a more detailed discussion of the dilution you will incur in connection with this offering.

We will have broad discretion in the use of proceeds from this offering and may invest or spend the proceeds in ways with which you do not agree and in ways that may not increase the value of your investment.

We will have broad discretion over the use of proceeds from this offering, including for any of the purposes described in the section entitled “Use of Proceeds,” and you will not have the opportunity as part of your investment decision to assess whether the net proceeds are being used appropriately. You may not agree with our decisions, and our use of the proceeds may not yield any return on your investment. Our failure to apply the proceeds from this offering effectively could compromise our ability to pursue our growth strategy and we might not be able to yield a significant return, if any, on our investment of these net proceeds. You will not have the opportunity to influence our decisions on how to use these net proceeds. Any of the foregoing could adversely affect the market price of our common stock.

Future sales or issuances of our common stock in the public markets, or the perception of such sales, could depress the trading price of our common stock.

The sale of a substantial number of shares of our common stock or other equity-related securities in the public markets, or the perception that such sales could occur, could depress the market price of our common stock and impair our ability to raise capital through the sale of additional equity securities. We may sell large quantities of our common stock at any time pursuant to this prospectus the accompanying prospectus, or in one or more separate offerings. We cannot predict the effect that future sales of common stock or other equity-related securities would have on the market price of our common stock.

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The actual number of shares we will issue under the Sales Agreement, at any one time or in total, is uncertain.

Subject to certain limitations in the Sales Agreement and compliance with applicable law, we have the discretion to deliver a placement notice to Leerink Partners at any time throughout the term of the Sales Agreement. The number of shares that are sold by or to Leerink Partners under the Sales Agreement will fluctuate based on the market price of the shares of common stock during the sales period and limits we set with Leerink Partners. Because the price per share of each share sold will fluctuate based on the market price of our common stock during the sales period, it is not possible at this stage to predict the number of shares that will be ultimately issued.

The common stock offered hereby will be sold in “at-the-market” offerings, and investors who buy shares at different times will likely pay different prices.

Investors who purchase shares in this offering at different times will likely pay different prices, and so may experience different outcomes in their investment results. We will have discretion, subject to market demand, to vary the timing, prices, and numbers of shares sold, and there is no minimum or maximum sales price. Investors may experience a decline in the value of their shares as a result of share sales made at prices lower than the prices they paid.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, includes forward-looking statements within the meaning of the federal securities laws that involve risks and uncertainties concerning our business, products and financial results. All statements other than statements of historical facts contained in this prospectus supplement, including statements concerning possible or assumed future actions, business strategies, events or results of operations, and any statements that refer to projections, forecasts or other characterizations of future events or circumstances, including any underlying assumptions, are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as “may,” “should,” “expect,” “plan,” “anticipate,” “could,” “intend,” “target,” “project,” “contemplate,” “believe,” “estimate,” “predict,” “potential,” or “continue” or the negative of these terms or other similar expressions. The forward-looking statements in this prospectus supplement are only predictions. We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our business, financial condition and results of operations. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as predictions of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Some of the key factors that could cause actual results to differ from our expectations include, but are not limited to, the following:

- the success of our plans to develop and potentially commercialize our product candidates;
- the timing of the completion of preclinical studies and clinical trials;
- the timing and sufficiency of patient enrollment and dosing in any future clinical trials;
- the timing of the availability of data from our clinical trials;
- the timing and outcome of regulatory filings and approvals;
- the development of novel AAV vectors;
- our potential future out-licenses and collaborations;
- the plans of licensees of our technology;
- the clinical utility and potential attributes and benefits of ddRNAi and our product candidates, including the potential duration of treatment effects and the potential for a “one shot” cure;
- our intellectual property position and the duration of our patent portfolio;
- expenses, ongoing losses, future revenue, capital needs and needs for additional financing, and our ability to access additional financing given market conditions and other factors, including our capital structure;
- the length of time over which we expect our cash and cash equivalents to be sufficient to execute on our business plan;
- unanticipated delays;
- further research and development and the results of clinical trials possibly being unsuccessful or insufficient to meet applicable regulatory standards or warrant continued development;

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- the ability to enroll sufficient numbers of subjects in clinical trials;
- determinations made by the U.S. Food and Drug Administration and other governmental authorities;
- regulatory developments in the United States of America;
- our ability to protect and enforce our patents and other intellectual property rights;
- our dependence on our relationships with our collaboration partners and other third parties;
- the efficacy or safety of our products and the products of our collaboration partners;
- the acceptance of our products and the products of our collaboration partners in the marketplace and market competition;
- sales, marketing, manufacturing and distribution requirements;
- greater than expected expenses, expenses relating to litigation or strategic activities;
- the impact of, and our ability to remediate, the identified material weakness in our internal controls over financial reporting;
- our ability to satisfy our capital needs through increasing revenue and obtaining additional financing; and
- the impact of local, regional and national and international economic conditions and events.

These factors should not be considered exhaustive and should be read in conjunction with the other risks discussed in Part I, Item 1A, Risk Factors, included in our most recent Annual Report on Form 10-K and in any subsequent Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q or Current Reports on Form 8-K, and those discussed in other documents we file from time to time with the SEC.

Given these risks and uncertainties, we urge you to read this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein or therein completely and with the understanding that actual future results may be materially different from what we plan or expect. All of the forward-looking statements made in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein or therein are qualified by these cautionary statements and we cannot assure you that the actual results or developments anticipated by us will be realized or, even if substantially realized, that they will have the expected consequences to or effects on our business or operations. In addition, these forward-looking statements present our estimates and assumptions only as of the date of this prospectus supplement, the accompanying prospectus or the documents incorporated by reference herein or therein, as applicable.

All forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the cautionary statements set forth above. Forward-looking statements speak only as of the date of this prospectus supplement. You should not put undue reliance on any forward-looking statements. We assume no obligation to publicly update or revise any forward-looking statements because of new information, future events, changes in assumptions or otherwise, except to the extent required by applicable laws. If we update one or more forward-looking statements, no inference should be drawn that we will make additional updates with respect to those or other forward-looking statements.

USE OF PROCEEDS

We may issue and sell shares of our common stock having aggregate gross sales proceeds of up to \$75,000,000 from time to time. The amount of proceeds from this offering will depend upon the number of shares of our common stock sold and the market price at which they are sold. There can be no assurance that we will be able to sell any shares under or fully utilize the Sales Agreement with Leerink Partners as a source of financing.

We intend to use the net proceeds from this offering, if any, to fund the continued development of our product candidate programs, working capital and other general corporate purposes.

The amounts and timing of our actual expenditures will depend on numerous factors, including our development and commercialization efforts with respect to our product candidates, as well as the amount of cash used in our operations. We therefore cannot estimate with certainty the amount of net proceeds to be used for the purposes described above. We may find it necessary or advisable to use the net proceeds for other purposes, and we will have broad discretion in the application of the net proceeds.

DIVIDEND POLICY

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings use in the operation of our business and do not anticipate paying any cash dividends on our common stock in the foreseeable future. Any future determination to declare cash dividends will be made at the discretion of our board of directors (“Board”), subject to compliance with applicable laws and covenants under current or future credit facilities, which may restrict or limit our ability to pay dividends, and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our Board may deem relevant.

DILUTION

Our net tangible book value as of June 30, 2024 was \$46.9 million, or \$4.66 per share. Net tangible book value per share is determined by dividing our total tangible assets, less total liabilities, by the number of shares of our common stock outstanding as of June 30, 2024. Dilution with respect to net tangible book value per share represents the difference between the amount per share paid by purchasers of shares of common stock in this offering and the net tangible book value per share of our common stock immediately after this offering.

After giving effect to (i) the potential sale of 7,928,118 shares of our common stock in this offering at an assumed offering price of \$9.46 per share if the full \$75.0 million is sold, the last reported sale price of our common stock on the Nasdaq Capital Market on October 8, 2024, and after deducting offering commissions and estimated offering expenses payable by us, and (ii) the issuance of 7,807,646 shares of common stock upon the exercise of warrants since June 30, 2024 as of October 8, 2024 for aggregate proceeds of \$21.6 million, our as-adjusted net tangible book value as of June 30, 2024 would have been \$141.1 million, or \$5.46 per share. This represents an immediate increase of \$0.80 per share in net tangible book value for existing stockholders and immediate dilution of \$4.00 per share to investors purchasing our common stock in this offering.

The following table illustrates this dilution on a per share basis. The as adjusted information is illustrative only and will adjust based on the actual price to the public, the actual number of shares sold and other terms of the offering determined at the time shares of our common stock are sold pursuant to this prospectus. The shares sold in this offering, if any, will be sold from time to time at various prices.

Assumed public offering price per share	\$9.46
Net tangible book value per share as of June 30, 2024	\$4.66
Increase in net tangible book value attributable to the pro forma transaction and warrant exercises since June 30, 2024 described above	<u>\$0.80</u>
As adjusted net tangible book value per share after giving effect to this offering and warrant exercises since June 30, 2024	<u>\$5.46</u>
Dilution per share to new investors participating in this offering	<u>\$4.00</u>

The shares sold in this offering, if any, will be sold from time to time at various prices. An increase of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$9.46 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$75.0 million is sold at that price, would cause our as adjusted net tangible book value per share after the offering to be \$5.63 per share and would increase the dilution to new investors to \$4.83 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of \$1.00 per share in the price at which the shares are sold from the assumed offering price of \$9.46 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$75.0 million is sold at that price, would cause our as adjusted net tangible book value per share after the offering to be \$5.27 per share and would decrease the dilution to new investors to \$3.19 per share, after deducting commissions and estimated aggregate offering expenses payable by us.

To the extent that any outstanding warrants or options are exercised or settled, new options are issued, or we issue additional shares of common stock or other equity or convertible debt securities in the future, there will be further dilution to investors participating in this offering.

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The above discussion and table are based on 10,086,119 shares of common stock outstanding at June 30, 2024, as adjusted to reflect the issuance of 7,807,646 shares of common stock upon the exercise of warrants since June 30, 2024 and excludes the following as of June 30, 2024:

- 1,182,140 shares of common stock issuable upon exercise of stock options outstanding at a weighted-average exercise price of \$6.58 per share;
- 1,204,537 shares of common stock reserved for future issuance under our 2020 Equity and Incentive Compensation Plan;
- 6,300 shares of common stock issuable upon the exercise of common warrants exercisable for shares of common stock outstanding at an exercise price of \$178.50 per share;
- 1,655,494 shares of common stock issuable upon the exercise of common warrants issued on September 15, 2022 exercisable for shares of common stock at an exercise price of \$1.9299 per share (797,620 shares after giving effect to the exercise of warrants since June 30, 2024);
- 15,263,988 shares of common stock issuable upon the exercise of common warrants issued on August 11, 2023 exercisable for shares of common stock at an exercise price of \$3.86 (10,082,641 shares after giving effect to the exercise of warrants since June 30, 2024);
- 588,236 shares of common stock issuable upon the exercise of pre-funded warrants issued on September 15, 2022 exercisable for shares of common stock outstanding at an exercise price of \$0.0017 per share;
- 14,172,919 shares of common stock issuable upon the exercise of pre-funded warrants issued on August 11, 2023 exercisable for shares of common stock outstanding at an exercise price of \$0.0001 per share (12,604,739 shares after giving effect to the exercise of warrants since June 30, 2024); and
- 2,584,239 shares of common stock issuable upon the exercise of pre-funded warrants issued on April 22, 2024 exercisable for shares of common stock outstanding at an exercise price of \$0.0001 per share (2,383,963 shares after giving effect to the exercise of warrants since June 30, 2024).

PLAN OF DISTRIBUTION

We have entered into a Sales Agreement with Leerink Partners, under which we may issue and sell from time to time up to \$75,000,000 of our common stock through or to Leerink Partners as our sales agent. The Sales Agreement will be filed with the SEC as an exhibit to a Current Report on Form 8-K and is incorporated by reference in this prospectus supplement. Sales of our common stock, if any, will be made at market prices by any method that is 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 any other existing trading market for our common stock.

Leerink Partners will offer our common stock subject to the terms and conditions of the Sales Agreement on a daily basis or as otherwise agreed upon by us and Leerink Partners. We will designate the maximum amount of common stock to be sold through Leerink Partners on a daily basis or otherwise determine such maximum amount together with Leerink Partners. Subject to the terms and conditions of the Sales Agreement, Leerink Partners will use its commercially reasonable efforts consistent with its normal trading and sales practices and applicable state and federal laws, rules and regulations and the rules of the Nasdaq Capital Market to sell on our behalf all of the shares of common stock requested to be sold by us. We may instruct Leerink Partners not to sell common stock if the sales cannot be effected at or above the price designated by us in any such instruction. Leerink Partners or we may suspend the offering of our common stock being made through Leerink Partners under the Sales Agreement upon proper notice to the other party. Leerink Partners and we each have the right, by giving written notice as specified in the Sales Agreement, to terminate the Sales Agreement in each party’s sole discretion at any time. The offering of our common stock pursuant to the Sales Agreement will otherwise terminate upon the termination of the Sales Agreement as provided therein.

The compensation payable to Leerink Partners as sales agent will be 3.0% of the gross sales price of the shares sold through it pursuant to the Sales Agreement. We have also agreed to reimburse Leerink Partners up to \$75,000 of Leerink Partners’ actual outside legal expenses incurred by Leerink Partners in connection with executing the Sales Agreement, plus certain ongoing outside legal expenses up to \$25,000 in connection with quarterly diligence bringdowns thereafter, and for certain other expenses, including Leerink Partners’ FINRA counsel fees in an amount up to \$15,000. In accordance with FINRA Rule 5110, these reimbursed fees and expenses are deemed sales compensation to Leerink Partners in connection with this offering. We estimate that the total expenses of the offering payable by us, excluding commissions payable to Leerink Partners under the Sales Agreement, will be approximately \$290,000.

The remaining sales proceeds, after deducting any expenses payable by us and any transaction fees imposed by any governmental, regulatory, or self-regulatory organization in connection with the sales, will equal our net proceeds for the sale of such common stock.

Leerink Partners will provide written confirmation to us following the close of trading on the Nasdaq Capital Market on each day in which common stock is sold through it as sales agent under the Sales Agreement. Each confirmation will include the number of shares of common stock sold through it as sales agent on that day, the volume weighted average price of the shares sold, the percentage of the daily trading volume and the net proceeds to us.

We will report at least quarterly the number of shares of common stock sold through Leerink Partners under the Sales Agreement, the net proceeds to us and the compensation paid by us to Leerink Partners in connection with the sales of common stock during the relevant period.

Settlement for sales of common stock will occur, unless the parties agree otherwise, 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.

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In connection with the sales of our common stock on our behalf, Leerink Partners may be deemed to be an “underwriter” within the meaning of the Securities Act, and the compensation paid to Leerink Partners may be deemed to be underwriting commissions or discounts. We have agreed in the Sales Agreement to provide indemnification and contribution to Leerink Partners against certain liabilities, including liabilities under the Securities Act. As sales agent, Leerink Partners will not engage in any transactions that stabilize our common stock.

Our common stock is listed on the Nasdaq Capital Market and trades under the symbol “BNTC.” The transfer agent of our common stock is Computershare Trust Company, N.A.

Leerink Partners and/or its affiliates have provided, and may in the future provide, various investment banking and other financial services for us for which services they have received and, may in the future receive, customary fees.

LEGAL MATTERS

The validity of the common stock offered by this prospectus supplement will be passed upon by Proskauer Rose LLP, Los Angeles, California. Leerink Partners LLC is being represented in connection with this offering by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts.

EXPERTS

The consolidated financial statements of Benitec Biopharma Inc. as of June 30, 2024 and 2023 incorporated by reference in this registration statement have been audited by Baker Tilly US, LLP, an independent registered public accounting firm, as set forth in their report thereon, and is incorporated by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3 under the Securities Act, of which this prospectus supplement and the accompanying prospectus form a part. For further information about us and the securities we are offering under this prospectus supplement, you should refer to the registration statement and the exhibits and schedules filed with the registration statement. With respect to the statements contained in this prospectus supplement and the accompanying prospectus regarding the contents of any agreement or any other document, in each instance, the statement is qualified in all respects by the complete text of the agreement or document, a copy of which has been filed as an exhibit to the registration statement.

We file reports, proxy statements and other information with the SEC under the Exchange Act. The SEC maintains an Internet website that contains reports, proxy statements and other information about issuers, like us, that file electronically with the SEC. The address of that website is www.sec.gov. We maintain a website at www.benitec.com. Information contained in or accessible through our website does not constitute a part of this prospectus.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC's rules allow us to "incorporate by reference" information into this prospectus supplement, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is deemed to be part of this prospectus, and subsequent information that we file with the SEC will automatically update and supersede that information. Any statement contained in this prospectus or a previously filed document incorporated by reference will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus or a subsequently filed document incorporated by reference modifies or replaces that statement.

This prospectus supplement and any accompanying prospectus supplement incorporates by reference the documents set forth below that have previously been filed with the SEC (excluding any information in the documents that is deemed by the rules of the SEC to be furnished and not filed):

- our Annual Report on [Form 10-K](#) for the year ended June 30, 2024, filed with the SEC on September 26, 2024 (including the portions of our definitive proxy statement on [Schedule 14A](#) incorporated by reference into the Form 10-K);
- our Current Reports on Form 8-K filed with the SEC on [July 1, 2024](#), [September 5, 2024](#), [October 8, 2024](#), and [October 11, 2024](#); and
- The description of the Company's Common Stock contained in the Company's [Form 8-K12B](#), filed with the SEC on April 15, 2020, together with any amendment or report filed for the purpose of updating such description.

All documents filed by us pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (excluding any information in those documents that is deemed by the rules of the SEC to be furnished and not filed) between the date of this prospectus supplement and the termination of the offering of securities under this prospectus supplement shall also be deemed to be incorporated herein by reference. 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 supplement to the extent that a statement contained in this prospectus supplement or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this prospectus modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement.

We will furnish without charge to each person, including any beneficial owner, to whom a prospectus is delivered, on written or oral request, a copy of any or all of the documents incorporated by reference in this prospectus, including exhibits to these documents. You may request a copy of these filings (not including the exhibits to such documents unless the exhibits are specifically incorporated by reference in the information contained in this prospectus supplement), at no cost, by writing or telephoning us at the following address:

Benitec Biopharma Inc.
3940 Trust Way
Hayward, California 94545
(510) 780-0819

Exhibits to the filings will not be sent, however, unless those exhibits have specifically been incorporated by reference in this prospectus or any accompanying prospectus supplement.

PROSPECTUS

\$125,000,000



**Common Stock
Debt Securities
Warrants
Units**

We may offer, from time to time, separately or together in any combination, common stock, debt securities, warrants or units consisting of all or some of such securities having an aggregate offering price of up to \$125,000,000.

We may offer the securities in one or more series, in amounts, at prices and on terms determined at the time of offering. We will provide the specific terms of any securities we actually offer for sale in supplements to this prospectus.

We may sell these securities directly, through agents, dealers or underwriters as designated from time to time, or through a combination of these methods. We reserve the sole right to accept, and together with our agents, from time to time, to reject in whole or in part any proposed purchase of securities to be made directly or through agents. If our agents or any dealers or underwriters are involved in the sale of securities, the applicable prospectus supplement will set forth the names of the agents, dealers or underwriters and any applicable commissions or discounts.

You should read carefully this prospectus, each prospectus supplement and the documents incorporated by reference into this prospectus and any prospectus supplement before you invest in any of our securities. This prospectus may not be used to sell securities unless accompanied by a prospectus supplement.

Our common stock is listed on The Nasdaq Capital Market under the symbol "BNTC." On February 22, 2024, the last reported sale price of our common stock on The Nasdaq Capital Market was \$3.64 per share and the aggregate market value of the common stock held by non-affiliates as of such date was approximately \$9.1 million, based on 2,592,434 shares of outstanding common stock, of which 2,514,113 shares are held by non-affiliates. In no event will we sell securities in a primary offering in reliance on General Instruction I.B.6 of Form S-3 with a value exceeding more than one-third of our public float in any 12-month calendar period so long as our public float remains below \$75.0 million. We have not offered any securities pursuant to General Instruction I.B.6 of Form S-3 during the 12 calendar months prior to and including the date of this prospectus.

Investing in our securities involves risks. You should carefully consider the risk factors included under the heading "[Risk Factors](#)" in the applicable prospectus supplement and under that heading or similar headings in the other documents incorporated by reference in this prospectus or any prospectus supplement before making a decision to purchase our securities.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the securities described in this prospectus or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is March 5, 2024.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or the SEC, using a “shelf” registration process. Under the shelf registration process, using this prospectus, together with a prospectus supplement, we may sell, from time to time, in one or more offerings, any combination of the securities described in this prospectus in a dollar amount that does not exceed \$125,000,000 in the aggregate. This prospectus provides you with a general description of the securities we may offer. Each time we offer securities, a prospectus supplement will be provided that will contain specific information about the terms of that offering. The prospectus supplement may also add, update or change information contained in this prospectus. To the extent that any statement we make in a prospectus supplement is inconsistent with statements made in this prospectus, the statements made in this prospectus will be deemed modified or superseded by those made in the prospectus supplement.

You should read this prospectus, the applicable prospectus supplement and the information incorporated by reference in this prospectus or any prospectus supplement before making an investment in our securities. See “Documents Incorporated by Reference” and “Where You Can Find More Information” for more information. You should rely only on the information contained in or incorporated by reference in this prospectus or a prospectus supplement. We have not authorized anyone to provide you with different information. This prospectus and the information incorporated herein by reference contain summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. This document may be used only in jurisdictions where offers and sales of these securities are permitted. You should not assume that information contained in this prospectus, in any supplement to this prospectus, or in any document incorporated by reference is accurate as of any date other than the date on the front page of the document that contains the information, regardless of when this prospectus or a prospectus supplement is delivered or when any sale of our securities occurs.

We further note that the representations, warranties and covenants made by us in any document that is filed as an exhibit to the registration statement of which this prospectus is a part and in any document that is incorporated by reference herein were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

TRADEMARKS AND TRADENAMES

We have proprietary and licensed rights to trademarks used in this prospectus which are important to our business, many of which are registered under applicable intellectual property laws. These trademarks include:

- BENITEC BIOPHARMA®
- BENITEC®
- GIVING DISEASE THE SILENT TREATMENT®
- SILENCING GENES FOR LIFE®

Solely for convenience, trademarks and trade names referred to in this prospectus appear without the “®” or “™” symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent possible under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names. We do not intend our use or display of other companies’ trade names, trademarks or service marks to imply a relationship with, or endorsement or sponsorship of us by, any other companies. Each trademark, trade name or service mark of any other company appearing in this prospectus is the property of its respective holder.

SUMMARY

This summary highlights information contained elsewhere or incorporated by reference into this prospectus. This summary does not contain all of the information that you should consider before deciding to invest in our securities. You should read this entire prospectus and each applicable prospectus supplement carefully, including the “Risk Factors” section contained in this prospectus and in each applicable prospectus supplement, and our consolidated financial statements and the related notes and the other documents incorporated by reference into this prospectus and into each applicable prospectus supplement.

Company Overview

We endeavor to become the leader in discovery, development, and commercialization of therapeutic agents capable of addressing significant unmet medical needs via the application of the silence and replace approach to the treatment of genetic disorders.

Benitec Biopharma Inc. (“Benitec” or the “Company” or in the third person, “we” or “our”) is a clinical-stage biotechnology company focused on the advancement of novel genetic medicines with headquarters in Hayward, California. The proprietary platform, called DNA-directed RNA interference, or ddRNAi, combines RNA interference, or RNAi, with gene therapy to create medicines that facilitate sustained silencing of disease-causing genes following a single administration. The unique therapeutic constructs also enable the simultaneous delivery of wildtype replacement genes, facilitating the proprietary “silence and replace” approach to the treatment of genetically defined diseases. The Company is developing a silence and replace-based therapeutic (BB-301) for the treatment of Oculopharyngeal Muscular Dystrophy (OPMD), a chronic, life-threatening genetic disorder.

BB-301 is a silence and replace-based genetic medicine currently under development by Benitec. BB-301 is an AAV-based gene therapy designed to permanently silence the expression of the disease-causing gene (to slow, or halt, the biological mechanisms underlying disease progression in OPMD) and to simultaneously replace the mutant gene with a wildtype gene (to drive restoration of function in diseased cells). This fundamental therapeutic approach to disease management is called “silence and replace.” The silence and replace mechanism offers the potential to restore the normative physiology of diseased cells and tissues and to improve treatment outcomes for patients suffering from the chronic, and potentially fatal, effects of OPMD. BB-301 has been granted Orphan Drug Designation in the United States and the European Union.

Corporate Information

We were incorporated as a Delaware corporation on November 22, 2019 and completed a re-domiciliation to Delaware on April 15, 2020. Our predecessor, Benitec Limited, was incorporated under the laws of Australia in 1995. Our stock is traded on The Nasdaq Capital Market, or Nasdaq, under the symbol “BNTC.”

Our principal executive offices are located at 3940 Trust Way, Hayward, California 94545. Our telephone number is (510) 780-0819, and our Internet website is <https://benitec.com>. The information on, or that can be accessed through, our website is not part of this prospectus and is not incorporated by reference herein.

The Securities We May Offer

With this prospectus, we may offer common stock, debt securities, warrants and units consisting of some or all of such securities, separately or together in any combination of the foregoing. The aggregate initial offering price of all securities we sell in the primary offerings under this prospectus will not exceed \$125,000,000. Each time we offer securities with this prospectus, we will provide offerees with a prospectus supplement that will contain the specific terms of the securities being offered. The following is a summary of the securities we may offer with this prospectus.

We may sell the securities to or through underwriters, dealers or agents or directly to purchasers. We, as well as any agents acting on our behalf, reserve the sole right to accept and to reject in whole or in part any proposed purchase of securities. Each prospectus supplement will set forth the names of any underwriters, dealers or agents involved in the sale of securities described in that prospectus supplement and any applicable fee, commission or discount arrangements with them.

Common Stock

We may offer shares of our common stock, par value \$0.0001 per share, either alone or underlying other registered securities convertible into or exchangeable for our common stock. Holders of our common stock are entitled to such dividends as our board of directors, or Board, may declare from time to time out of legally available funds, subject to the preferential rights of the holders of any shares of our preferred stock that we may issue in the future. We have never declared or paid dividends on our common stock and we do not anticipate paying dividends in the foreseeable future. Each holder of our common stock is entitled to one vote per share. Holders of our common stock have no preemptive rights. In this prospectus, we provide a general description of, among other things, the dividend, voting and liquidation rights that apply to holders of our common stock.

Debt Securities

We may issue debt securities from time to time, in one or more series, as either senior or subordinated debt or as senior or subordinated convertible debt. While the terms we have summarized herein will apply generally to any debt securities that we may offer under this prospectus, we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement and in any related free writing prospectus that we may authorize to be distributed to you. The terms of any debt securities offered under a prospectus supplement may differ from the terms described herein.

Warrants

We may offer warrants for the purchase of shares of common stock or debt securities. We may issue the warrants by themselves or together with common stock or debt securities, and the warrants may be attached to or separate from any offered securities. Each series of warrants may be issued under a separate warrant agreement to be entered into between us and a warrant agent. Our Board or a committee designated by our Board will determine the terms of the warrants at the time of sale. This prospectus contains only general terms and provisions of the warrants. The applicable prospectus supplement will describe the particular terms of the warrants being offered thereby.

Units

We may offer units consisting of some or all of our common stock, debt securities and warrants. The units may be issued in the form of a unit agreement and/or unit certificate. This prospectus contains only general terms and provisions of the units. The applicable prospectus supplement will describe the particular terms of the warrants being offered thereby.

RISK FACTORS SUMMARY

An investment in our securities involves a high degree of risk. Any of the risk factors included in our Annual Report on Form 10-K for the fiscal year ended June 30, 2023 and any subsequent Quarterly Report on Form 10-Q, which are incorporated by reference into this prospectus, may limit our ability to successfully execute our business strategy. You should carefully consider all of the information set forth in this prospectus, any prospectus supplement and in the documents incorporated by reference herein and, in particular, should evaluate the risk factors included in our Annual Report on Form 10-K for the fiscal year ended June 30, 2023 and any subsequent Quarterly Report on Form 10-Q in deciding whether to invest in our securities. These risk factors include, among others:

- We have incurred significant losses since inception and anticipate that we will continue to incur losses for the foreseeable future. If we are unable to achieve or sustain profitability, the market value of our common stock will likely decline;
- We have never generated any revenue from product sales and may never be profitable;
- We will need to continue our efforts to raise additional funding, which may not be available on acceptable terms, or at all. Failure to obtain capital when needed may negatively impact our ability to continue as a going concern;
- Our product candidates are based on ddRNAi and silence and replace technology. Currently, no product candidates utilizing ddRNAi technology or silence and replace technology have been approved for commercial sale and our approach to the development of ddRNAi technology and silence and replace technology may not result in safe, effective or marketable products;
- We are early in our product development efforts and our current product candidate is in the early clinical stage. We may not be able to obtain regulatory approvals for the commercialization of our product candidates;
- Issues that may impact delivery of our therapeutics to the cell could adversely affect or limit our ability to develop and commercialize product candidates;
- We face competition from entities that have developed or may develop product candidates for our target disease indications, including companies developing novel treatments and technology platforms based on modalities and technology similar to ours; and
- If we are unable to obtain or protect sufficient intellectual property rights related to our product candidates, we may not be able to obtain exclusivity for our product candidates or prevent others from developing similar competitive products.

RISK FACTORS

We have included discussions of cautionary factors describing risks relating to our business and an investment in our securities in our Annual Report on Form 10-K for the year ended June 30, 2023, which is incorporated by reference into this prospectus. See “Where You Can Find More Information” for an explanation of how to get a copy of this report. Additional risks related to our securities may also be described in a prospectus supplement or our other filings with the SEC. Before purchasing our securities, you should carefully consider the risk factors we describe in any prospectus supplement or in any report incorporated by reference into this prospectus or such prospectus supplement, including our Annual Report on Form 10-K for the year ended June 30, 2023, or any Annual Report on Form 10-K or Quarterly Report on Form 10-Q that is incorporated by reference into this prospectus or such prospectus supplement after the date of this prospectus. Although we discuss key risks in those risk factor descriptions, additional risks not currently known to us or that we currently deem immaterial also may impair our business. Our subsequent filings with the SEC may contain amended and updated discussions of significant risks. We cannot predict future risks or estimate the extent to which they may affect our financial performance.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains, and may incorporate by reference, forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. We claim the protection of the safe harbor contained in the Private Securities Litigation Reform Act of 1995 for these forward looking statements. Our forward-looking statements relate to future events or our future performance and include, but are not limited to, statements concerning our business strategy, future commercial revenues, market growth, capital requirements, new product introductions, expansion plans and the adequacy of our funding. Other statements contained in this prospectus and in any applicable prospectus supplement that are not historical facts are also forward-looking statements. We have tried, wherever possible, to identify forward-looking statements by terminology such as “may,” “will,” “could,” “should,” “expects,” “anticipates,” “intends,” “plans,” “believes,” “seeks,” “estimates” and other comparable terminology.

Some of the risks and uncertainties that may cause our actual results, performance or achievements to differ materially from those expressed or implied by forward-looking statements include the following:

- the success of our plans to develop and potentially commercialize our product candidates;
- the timing of the initiation and completion of our preclinical studies and clinical trials;
- the timing and sufficiency of patient enrollment and dosing in our clinical trials;
- the timing of the availability of data from our clinical trials;
- the timing and outcome of regulatory filings and approvals;
- unanticipated delays;
- sales, marketing, manufacturing and distribution requirements;
- market competition and the acceptance of our products in the marketplace;
- regulatory developments in the United States, France and Canada;
- the development of novel AAV vectors;
- the plans of licensees of our technology;
- the clinical utility and potential attributes and benefits of ddRNAi and our product candidates, including the potential duration of treatment effects and the potential for a “one shot” cure;
- our dependence on our relationships with collaborators and other third parties;
- expenses, ongoing losses, future revenue, capital needs and needs for additional financing, and our ability to access additional financing given market conditions and other factors, including our capital structure;
- our ability to continue as a going concern;
- the length of time over which we expect our cash and cash equivalents to be sufficient to execute on our business plan;
- our intellectual property position and the duration of our patent portfolio;
- the impact of local, regional, and national and international economic conditions and events; and
- the impact of the COVID-19 pandemic, the disease caused by the SARS-CoV-2 virus and similar events, which may adversely impact our business and preclinical and clinical trials;

as well as other risks detailed under the caption “Risk Factors” in this prospectus and in each applicable prospectus supplement and our reports filed with the SEC.

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We caution investors that any forward-looking statements presented in this prospectus or any prospectus supplement or the documents incorporated by reference herein or therein, or those that we may make orally or in writing from time to time, are based upon management's beliefs and assumptions and are made based on information available to us as of the time made. Such statements are based on assumptions and the actual outcome will be affected by known and unknown risks, trends, uncertainties and factors that are beyond our control or ability to predict. Although we believe that our assumptions are reasonable, they are not guarantees of future performance and some will inevitably prove to be incorrect. As a result, our actual future results can be expected to differ from our expectations, and those differences may be material. Accordingly, investors should use caution in relying on past forward-looking statements, which are based on known results and trends at the time they are made, to anticipate future results or trends. Except as required by law, we undertake no obligation to publicly update or revise any forward-looking statements included or incorporated by reference in this prospectus or any prospectus supplement or to update the reasons why actual results could differ from those contained in such statements, whether as a result of new information, future events or otherwise, except to the extent required by federal securities laws. Any investor in us should consider all risks and uncertainties disclosed in our filings with the SEC described below under the heading "Where You Can Find More Information," all of which are accessible on the SEC's website at <https://www.sec.gov>.

All forward-looking statements included herein or in documents incorporated herein by reference are expressly qualified in their entirety by the cautionary statements contained or referred to elsewhere in this prospectus.

USE OF PROCEEDS

Unless otherwise indicated in the applicable prospectus supplement, we anticipate that the net proceeds from the sale of the securities under this prospectus will be used for general corporate purposes. General corporate purposes may include repayment of debt, capital expenditures, and any other purposes that we may specify in any prospectus supplement. In addition, we may use a portion of any net proceeds for the continued advancement of development activities for our product pipeline and strategic growth opportunities. We will have significant discretion in the use of any net proceeds. Investors will be relying on the judgment of our management regarding the application of the proceeds of any sale of the securities. We may invest the net proceeds temporarily until we use them for their stated purpose.

DESCRIPTION OF CAPITAL STOCK

The following description of our common stock, together with the additional information we include in any applicable prospectus supplement, summarizes the material terms and provisions of the common stock that we may offer pursuant to this prospectus. While the terms we have summarized below will apply generally to any future common stock that we may offer, we will describe the particular terms of any class of common stock in more detail in the applicable prospectus supplement. For the complete terms of our common stock, please refer to our amended and restated certificate of incorporation, or our Certificate, and our amended and restated bylaws, or our Bylaws, each as amended from time to time, which are exhibits to the registration statement of which this prospectus is a part. The terms of these securities may also be affected by the General Corporation Law of the State of Delaware, or the DGCL. The summary below and that contained in any prospectus supplement is qualified in its entirety by reference to our Annual Report on Form 10-K for the fiscal year ended June 30, 2023, our Certificate and our Bylaws, as either may be amended from time to time after the date of this prospectus, but before the date of any such prospectus supplement, and the applicable provisions of the DGCL.

General

Our authorized capital stock consists of 160,000,000 shares of our common stock, par value \$0.0001 per share.

Common Stock

Dividend Rights. Subject to preferences that may be applicable to any then outstanding preferred stock, holders of the Company's common stock are entitled to receive dividends, if any, as may be declared from time to time by the Company's Board out of legally available funds. Dividends may be paid in cash, in property or in shares of common stock, subject to the provisions of the Certificate and applicable law. Declaration and payment of any dividend will be subject to the discretion of the Board. The time and amount of dividends will be dependent upon the Company's financial condition, operations, cash requirements and availability, debt repayment obligations, capital expenditure needs, restrictions in the Company's debt instruments, industry trends, the provisions of Delaware law affecting the payment of distributions to stockholders and any other factors the Board may consider relevant.

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, including the election of directors. The Company's stockholders do not have cumulative voting rights in the election of directors.

Liquidation Rights. In the event of the Company's liquidation, dissolution or winding up, holders of the Company's common stock are entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of the Company's debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then outstanding shares of preferred stock.

Rights and Preferences. Holders of the Company's common stock have no pre-emptive, conversion, subscription or other rights, and there are no redemption or sinking fund provisions applicable to the Company's common stock. The rights, preferences and privileges of the holders of the Company's 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 the Company may designate in the future.

Fully Paid and Nonassessable. All outstanding shares of the Company's common stock are fully paid and non-assessable.

Annual Stockholder Meetings. The Certificate and Bylaws provide that annual stockholder meetings will be held at a date, place (if any) and time, as exclusively selected by the Board. To the extent permitted under applicable law, the Company may but is not obligated to conduct meetings by remote communications, including by webcast.

Anti-Takeover Effects of Provisions of the Certificate and Bylaws and DGCL

Some provisions of the DGCL, the Certificate and Bylaws could make the following transactions difficult: (i) acquisition of the Company by means of a tender offer; (ii) acquisition of the Company by means of a proxy contest or otherwise; or (iii) removal of incumbent officers and directors of the Company. 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 the best interests of the Company, including transactions that might result in a premium over the market price for the Company's common stock.

These provisions, summarized below, are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of the Company to first negotiate with the Board.

Delaware Anti-Takeover Statute. The Company is subject to Section 203 of the DGCL, which prohibits persons deemed "interested stockholders" from engaging in a "business combination" with a publicly-held 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, and 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, such as discouraging takeover attempts that might result in a premium over the market price of the Company's common stock.

Special Stockholder Meetings. The Bylaws provide that a special meeting of stockholders may be called by (i) the Chairman of the Board, if any, (ii) the President or Chief Executive Officer, or (iii) the Board pursuant to a resolution adopted by a majority of the total number of directors then in office.

Requirements for Advance Notification of Stockholder Nominations and Proposals. The Bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors.

Composition of the Board of Directors; Election and Removal of Directors; Filling Vacancies

The Company's Board consists of five directors and the Board may, from time to time, fix the authorized number of directors by resolution of the Board. The Board is divided into three classes, designated Class I, Class II and Class III. Directors need not be stockholders of the Company.

Directors shall serve for a term ending on the date of the third annual meeting of stockholders following the annual meeting of stockholders at which such director was elected. The term of each director shall continue until the election and qualification of his or her successor and be subject to his or her earlier death, disqualification, resignation or removal. Except as otherwise provided by the DGCL, the Certificate or the Bylaws, directors shall be elected by a plurality of the votes of the shares present in person, by remote communication, if applicable, or represented by a duly authorized and executed proxy at the meeting and entitled to vote on the election of directors.

Subject to applicable law or by the Certificate, any director of the entire Board of the Company may be removed without cause by the affirmative vote of a majority of the holders of the Company's then-outstanding common stock entitled to vote generally at an election of directors. Furthermore, any vacancy on the Company's Board, however occurring, including a vacancy resulting from an increase in the size of the board, may be filled only by a majority vote of the Board then in office, even if less than a quorum, or by the sole remaining director.

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Amendment of the Certificate and Bylaws. The Certificate may be amended in any manner permitted under the DGCL and the Bylaws may be amended by the vote or written consent of holders of a majority of the outstanding shares entitled to vote. The Board may also amend the Bylaws, other than a bylaw or amendment thereof specifying or changing a fixed number of directors or the maximum or minimum number or changing from a fixed to a variable board or vice versa.

Limitations of Liability and Indemnification Matters

Each of the Certificate and Bylaws provide that the Company is required to indemnify its directors and officers to the fullest extent not prohibited by Delaware law. The Bylaws also obligates the Company to advance expenses incurred by a director or officer in advance of the final disposition of any action or proceeding upon delivery to the Company of an undertaking, by or on behalf of such indemnitee, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision, from which there is no further right to appeal, that such indemnitee is not entitled to be indemnified for such expenses.

To the fullest extent permitted by the DGCL, or any other applicable law, the Company, upon approval by the Board, may purchase insurance on behalf of any person required or permitted to be indemnified pursuant to the Bylaws.

Forum for Adjudication of Disputes

The Certificate provides that, unless the Company consents in writing to the selection of an alternative forum, the sole and exclusive forum for (i) derivative actions or proceedings brought on behalf of the Company, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or employee of the Company to the Company or the Company's stockholders, (iii) an action asserting a claim arising pursuant to any provision of the DGCL, or (iv) any action asserting a claim governed by the internal affairs doctrine shall be a state or federal court located within the state of Delaware. The Certificate further provides that the federal district courts of the United States of America shall, to the fullest extent permitted by law, be the exclusive forum for any complaint asserting a cause of action arising under the Securities Act.

Transfer Agent and Registrar

The transfer agent and registrar for the Company's common stock is Computershare Trust Company, N.A. The transfer agent and registrar's address is 150 Royall St., Canton, Massachusetts 02021.

Listing

Our common stock is listed on Nasdaq under the symbol "BNTC."

DESCRIPTION OF DEBT SECURITIES

We may issue debt securities from time to time, in one or more series, as either senior or subordinated debt or as senior or subordinated convertible debt. While the terms we have summarized below will apply generally to any debt securities that we may offer under this prospectus, we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement and in any related free writing prospectus that we may authorize to be distributed to you. The terms of any debt securities offered under a prospectus supplement may differ from the terms described below.

We refer to the indenture we would enter if we issued new debt securities as the indenture. Unless the context requires otherwise, whenever we refer to the indenture, we also are referring to any supplemental indentures that specify the terms of a particular series of debt securities.

We will issue the debt securities under the indenture that we will enter into with the trustee named in the indenture. The indenture will be qualified under the Trust Indenture Act of 1939, as amended, or the Trust Indenture Act. We have filed the form of indenture as an exhibit to the registration statement of which this prospectus is a part, and supplemental indentures and forms of debt securities containing the terms (which terms have not currently been determined and are not currently known) of the debt securities being offered will be filed as exhibits to the registration statement of which this prospectus is a part or will be incorporated by reference from reports that we file with the SEC.

The summary below and that contained in any prospectus supplement is qualified in its entirety by reference to all of the provisions of the indenture applicable to a particular series of debt securities. We urge you to read the applicable prospectus supplements and any related free writing prospectuses related to the debt securities that we may offer under this prospectus, as well as the complete indenture that contains the terms of the debt securities.

General

The indenture does not limit the amount of debt securities that we may issue. It provides that we may issue debt securities up to the principal amount that we may authorize and may be in any currency that we may designate. Except for the limitations on consolidation, merger and sale of all or substantially all of our assets contained in the indenture, the terms of the indenture will not contain any covenants or other provisions designed to give holders of any debt securities protection against changes in our operations, financial condition or transactions involving us.

We may issue the debt securities issued under the indenture as “discount securities,” which means they may be sold at a discount below their stated principal amount. These debt securities, as well as other debt securities that are not issued at a discount, may be issued with “original issue discount,” or OID, for U.S. federal income tax purposes because of interest payment and other characteristics or terms of the debt securities. Material U.S. federal income tax considerations applicable to debt securities issued with OID will be described in more detail in any applicable prospectus supplement.

We will describe in the applicable prospectus supplement the terms of the series of debt securities being offered, including:

- the title of the series of debt securities;
- any limit upon the aggregate principal amount that may be issued;
- the maturity date or dates;
- the form of the debt securities of the series;
- the applicability of any guarantees;
- whether or not the debt securities will be secured or unsecured, and the terms of any secured debt;

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- whether the debt securities rank as senior debt, senior subordinated debt, subordinated debt or any combination thereof, and the terms of any subordination;
- if the price (expressed as a percentage of the aggregate principal amount thereof) at which such debt securities will be issued is a price other than the principal amount thereof, the portion of the principal amount thereof payable upon declaration of acceleration of the maturity thereof, or if applicable, the portion of the principal amount of such debt securities that is convertible into another security or the method by which any such portion shall be determined;
- the interest rate or rates, which may be fixed or variable, or the method for determining the rate and the date interest will begin to accrue, the dates interest will be payable and the regular record dates for interest payment dates or the method for determining such dates;
- our right, if any, to defer payment of interest and the maximum length of any such deferral period;
- if applicable, the date or dates after which, or the period or periods during which, and the price or prices at which, we may, at our option, redeem the series of debt securities pursuant to any optional or provisional redemption provisions and the terms of those redemption provisions;
- the date or dates, if any, on which, and the price or prices at which we are obligated, pursuant to any mandatory sinking fund or analogous fund provisions or otherwise, to redeem, or at the holder's option to purchase, the series of debt securities and the currency or currency unit in which the debt securities are payable;
- the denominations in which we will issue the series of debt securities, if other than denominations of \$1,000 and any integral multiple thereof;
- any and all terms, if applicable, relating to any auction or remarketing of the debt securities of that series and any security for our obligations with respect to such debt securities and any other terms which may be advisable in connection with the marketing of debt securities of that series;
- whether the debt securities of the series shall be issued in whole or in part in the form of a global security or securities; the terms and conditions, if any, upon which such global security or securities may be exchanged in whole or in part for other individual securities; and the depositary for such global security or securities;
- if applicable, the provisions relating to conversion or exchange of any debt securities of the series and the terms and conditions upon which such debt securities will be so convertible or exchangeable, including the conversion or exchange price, as applicable, or how it will be calculated and may be adjusted, any mandatory or optional (at our option or the holders' option) conversion or exchange features, the applicable conversion or exchange period and the manner of settlement for any conversion or exchange;
- if other than the full principal amount thereof, the portion of the principal amount of debt securities of the series which shall be payable upon declaration of acceleration of the maturity thereof;
- additions to or changes in the covenants applicable to the particular debt securities being issued, including, among others, the consolidation, merger or sale covenant;
- additions to or changes in the events of default with respect to the securities and any change in the right of the trustee or the holders to declare the principal, premium, if any, and interest, if any, with respect to such securities to be due and payable;
- additions to or changes in or deletions of the provisions relating to covenant defeasance and legal defeasance;
- additions to or changes in the provisions relating to satisfaction and discharge of the indenture;
- additions to or changes in the provisions relating to the modification of the indenture both with and without the consent of holders of debt securities issued under the indenture;

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- the currency of payment of debt securities if other than U.S. dollars and the manner of determining the equivalent amount in U.S. dollars;
- whether interest will be payable in cash or additional debt securities at our or the holders' option and the terms and conditions upon which the election may be made;
- the terms and conditions, if any, upon which we will pay amounts in addition to the stated interest, premium, if any and principal amounts of the debt securities of the series to any holder that is not a "United States person" for federal tax purposes;
- any restrictions on transfer, sale or assignment of the debt securities of the series; and
- any other specific terms, preferences, rights or limitations of, or restrictions on, the debt securities, any other additions or changes in the provisions of the indenture, and any terms that may be required by us or advisable under applicable laws or regulations.

Conversion or Exchange Rights

We will set forth in the prospectus supplement the terms on which a series of debt securities may be convertible into or exchangeable for our common stock or our other securities or other property or assets. We will include provisions as to settlement upon conversion or exchange and whether conversion or exchange is mandatory, at the option of the holder or at our option. We may include provisions pursuant to which the number of shares of our common stock or our other securities or units of other property or assets that the holders of the series of debt securities receive would be subject to adjustment.

Consolidation, Merger or Sale

Unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, the indenture will not contain any covenant that restricts our ability to merge or consolidate, or sell, convey, transfer or otherwise dispose of all or substantially all of our assets. However, any successor to or acquirer of such assets must assume all of our obligations under the indenture or the debt securities, as appropriate.

Events of Default under the Indenture

Unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, the following are events of default under the indenture with respect to any series of debt securities that we may issue:

- if we fail to pay any installment of interest on any series of debt securities, as and when the same shall become due and payable, and such default continues for a period of 90 days; provided, however, that a valid extension of an interest payment period by us in accordance with the terms of any indenture supplemental thereto shall not constitute a default in the payment of interest for this purpose;
- if we fail to pay the principal of, or premium, if any, on any series of debt securities as and when the same shall become due and payable whether at maturity, upon redemption, by declaration or otherwise, or in any payment required by any sinking or analogous fund established with respect to such series; provided, however, that a valid extension of the maturity of such debt securities in accordance with the terms of any indenture supplemental thereto shall not constitute a default in the payment of principal or premium, if any;
- if we fail to observe or perform any other covenant or agreement contained in the debt securities or the indenture, other than a covenant specifically relating to another series of debt securities, and our failure continues for 90 days after we receive written notice of such failure, requiring the same to be remedied and stating that such is a notice of default thereunder, from the trustee or holders of at least 25% in aggregate principal amount of the outstanding debt securities of the applicable series; and
- if specified events of bankruptcy, insolvency or reorganization occur.

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If an event of default with respect to debt securities of any series occurs and is continuing, other than an event of default specified in the last bullet point above, the trustee or the holders of at least 25% in aggregate principal amount of the outstanding debt securities of that series, by notice to us in writing, and to the trustee if notice is given by such holders, may declare the unpaid principal of, premium, if any, and accrued interest, if any, due and payable immediately. If an event of default specified in the last bullet point above occurs with respect to us, the principal amount of and accrued interest, if any, of each issue of debt securities then outstanding shall be due and payable without any notice or other action on the part of the trustee or any holder.

The holders of a majority in principal amount of the outstanding debt securities of an affected series may waive any default or event of default with respect to the series and its consequences, except defaults or events of default regarding payment of principal, premium, if any, or interest, unless we have cured the default or event of default in accordance with the indenture. Any waiver shall cure the default or event of default.

Subject to the terms of the indenture, if an event of default under an indenture shall occur and be continuing, the trustee will be under no obligation to exercise any of its rights or powers under such indenture at the request or direction of any of the holders of the applicable series of debt securities, unless such holders have offered the trustee reasonable indemnity. The holders of a majority in principal amount of the outstanding debt securities of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the trustee, or exercising any trust or power conferred on the trustee, with respect to the debt securities of that series, provided that:

- the direction so given by the holder is not in conflict with any law or the applicable indenture; and
- subject to its duties under the Trust Indenture Act, the trustee need not take any action that might involve it in personal liability or might be unduly prejudicial to the holders not involved in the proceeding.

A holder of the debt securities of any series will have the right to institute a proceeding under the indenture or to appoint a receiver or trustee, or to seek other remedies only if:

- the holder has given written notice to the trustee of a continuing event of default with respect to that series;
- the holders of at least 25% in aggregate principal amount of the outstanding debt securities of that series have made written request, and such holders have offered reasonable indemnity to the trustee to institute the proceeding as trustee; and
- the trustee does not institute the proceeding, and does not receive from the holders of a majority in aggregate principal amount of the outstanding debt securities of that series other conflicting directions within 90 days after the notice, request and offer.

These limitations do not apply to a suit instituted by a holder of debt securities if we default in the payment of the principal, premium, if any, or interest on, the debt securities.

We will periodically file statements with the trustee regarding our compliance with specified covenants in the indenture.

Modification of Indenture; Waiver

We and the trustee may change an indenture without the consent of any holders with respect to specific matters:

- to cure any ambiguity, defect or inconsistency in the indenture or in the debt securities of any series;
- to comply with the provisions described above under “Description of Debt Securities—Consolidation, Merger or Sale;”
- to provide for uncertificated debt securities in addition to or in place of certificated debt securities;

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- to add to our covenants, restrictions, conditions or provisions such new covenants, restrictions, conditions or provisions for the benefit of the holders of all or any series of debt securities, to make the occurrence, or the occurrence and the continuance, of a default in any such additional covenants, restrictions, conditions or provisions an event of default or to surrender any right or power conferred upon us in the indenture;
- to add to, delete from or revise the conditions, limitations, and restrictions on the authorized amount, terms, or purposes of issue, authentication and delivery of debt securities, as set forth in the indenture;
- to make any change that does not adversely affect the interests of any holder of debt securities of any series in any material respect;
- to provide for the issuance of and establish the form and terms and conditions of the debt securities of any series as provided above under “Description of Debt Securities—General” to establish the form of any certifications required to be furnished pursuant to the terms of the indenture or any series of debt securities, or to add to the rights of the holders of any series of debt securities;
- to evidence and provide for the acceptance of appointment under any indenture by a successor trustee; or
- to comply with any requirements of the SEC in connection with the qualification of any indenture under the Trust Indenture Act.

In addition, under the indenture, the rights of holders of a series of debt securities may be changed by us and the trustee with the written consent of the holders of a majority in aggregate principal amount of the outstanding debt securities of each series that is affected. However, unless we provide otherwise in the prospectus supplement applicable to a particular series of debt securities, we and the trustee may make the following changes only with the consent of each holder of any outstanding debt securities affected:

- extending the fixed maturity of any debt securities of any series;
- reducing the principal amount, reducing the rate of or extending the time of payment of interest, or reducing any premium payable upon the redemption of any series of any debt securities; or
- reducing the percentage of debt securities, the holders of which are required to consent to any amendment, supplement, modification or waiver.

Discharge

Each indenture will provide that we can elect to be discharged from our obligations with respect to one or more series of debt securities, except for specified obligations, including obligations to:

- provide for payment;
- register the transfer or exchange of debt securities of the series;
- replace stolen, lost or mutilated debt securities of the series;
- pay principal of and premium and interest on any debt securities of the series;
- maintain paying agencies;
- hold monies for payment in trust;
- recover excess money held by the trustee;
- compensate and indemnify the trustee; and
- appoint any successor trustee.

In order to exercise our rights to be discharged, we must deposit with the trustee money or government obligations sufficient to pay all the principal of, any premium, if any, and interest on, the debt securities of the series on the dates payments are due.

Form, Exchange and Transfer

We will issue the debt securities of each series only in fully registered form without coupons and, unless we provide otherwise in the applicable prospectus supplement, in denominations of \$1,000 and any integral multiple thereof. The indenture will provide that we may issue debt securities of a series in temporary or permanent global form and as book-entry securities that will be deposited with, or on behalf of, The Depository Trust Company or another depository named by us and identified in a prospectus supplement with respect to that series. To the extent the debt securities of a series are issued in global form and as book-entry, a description of terms relating thereto will be set forth in the applicable prospectus supplement.

At the option of the holder, subject to the terms of the indenture and the limitations applicable to global securities described in the applicable prospectus supplement, the holder of the debt securities of any series can exchange the debt securities for other debt securities of the same series, in any authorized denomination and of like tenor and aggregate principal amount.

Subject to the terms of the indenture and the limitations applicable to global securities set forth in the applicable prospectus supplement, holders of the debt securities may present the debt securities for exchange or for registration of transfer, duly endorsed or with the form of transfer endorsed thereon duly executed if so required by us or the security registrar, at the office of the security registrar or at the office of any transfer agent designated by us for this purpose. Unless otherwise provided in the debt securities that the holder presents for transfer or exchange, we will impose no service charge for any registration of transfer or exchange, but we may require payment of any taxes or other governmental charges.

We will name in the applicable prospectus supplement the security registrar, and any transfer agent in addition to the security registrar, that we initially designate for any debt securities. We may at any time designate additional transfer agents or rescind the designation of any transfer agent or approve a change in the office through which any transfer agent acts, except that we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

If we elect to redeem the debt securities of any series, we will not be required to:

- issue, register the transfer of, or exchange any debt securities of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption of any debt securities that may be selected for redemption and ending at the close of business on the day of the mailing; or
- register the transfer of or exchange any debt securities so selected for redemption, in whole or in part, except the unredeemed portion of any debt securities we are redeeming in part.

Information Concerning the Trustee

The trustee, other than during the occurrence and continuance of an event of default under an indenture will undertake to perform only those duties as are specifically set forth in the applicable indenture. Upon an event of default under an indenture, the trustee must use the same degree of care as a prudent person would exercise or use in the conduct of his or her own affairs. Subject to this provision, the trustee is under no obligation to exercise any of the powers given it by the indenture at the request of any holder of debt securities unless it is offered reasonable security and indemnity against the costs, expenses and liabilities that it might incur.

Payment and Paying Agents

Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of the interest on any debt securities on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

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We will pay principal of and any premium and interest on the debt securities of a particular series at the office of the paying agents designated by us, except that unless we otherwise indicate in the applicable prospectus supplement, we will make interest payments by check that we will mail to the holder or by wire transfer to certain holders. Unless we otherwise indicate in the applicable prospectus supplement, we will designate the corporate trust office of the trustee as our sole paying agent for payments with respect to debt securities of each series. We will name in the applicable prospectus supplement any other paying agents that we initially designate for the debt securities of a particular series. We will maintain a paying agent in each place of payment for the debt securities of a particular series.

All money we pay to a paying agent or the trustee for the payment of the principal of or any premium or interest on any debt securities that remains unclaimed at the end of two years after such principal, premium or interest has become due and payable will be repaid to us, and the holder of the debt security thereafter may look only to us for payment thereof.

Governing Law

The indenture and the debt securities will be governed by and construed in accordance with the laws of the State of New York, except to the extent that the Trust Indenture Act is applicable.

DESCRIPTION OF WARRANTS

We may issue warrants for the purchase of common stock or debt securities. Warrants may be issued independently or together with common stock, debt securities or as a component of a unit and may be attached to or separate from any offered securities. Each series of warrants may be issued under a separate warrant agreement to be entered into between us and a warrant agent. The warrant agreement may provide that, in certain circumstances, we and the warrant agent will be permitted to amend the warrant agreement without the consent of the holders of warrants. The warrant agent will act solely as our agent in connection with the warrants and will not assume any obligation or relationship of agency or trust for or with any registered holders of warrants or beneficial owners of warrants. This summary of certain provisions of the warrants is not complete. You should refer to the warrant agreement, including the forms of warrant certificate representing the warrants, relating to the specific warrants being offered for the complete terms of the warrant agreement and the warrants. The warrant agreement, together with the terms of warrant certificate and warrants, will be filed with the SEC in connection with the offering of the specific warrants.

The particular terms of any issue of warrants will be described in the prospectus supplement relating to the issue. Those terms may include:

- the title of such warrants;
- the aggregate number of such warrants;
- the price or prices at which such warrants will be issued;
- the currency or currencies (including composite currencies) in which the price of such warrants may be payable;
- the amount and terms of the securities purchasable upon exercise of such warrants and the procedures and conditions relating to the exercise of such warrants;
- the purchase price of each of the securities purchasable upon exercise of such warrants;
- the date on which the right to exercise such warrants will commence and the date on which such right shall expire;
- any provisions for adjustment of the number or amount of securities to be received upon exercise of the warrants or of the exercise price of the warrants;
- if applicable, the minimum or maximum amount of such warrants that may be exercised at any one time;
- if applicable, the designation and terms of the securities with which such warrants are issued and the number of such warrants issued with each such security;
- if applicable, the date on and after which such warrants and the related securities will be separately transferable;
- information with respect to book-entry procedures, if any; and
- any other terms of such warrants, including terms, procedures, conditions and limitations relating to the exercise of such warrants.

The prospectus supplement relating to any warrants to purchase equity securities may also include, if applicable, a discussion of certain U.S. federal income tax and ERISA considerations.

Warrants for the purchase of or common stock will be offered and exercisable for U.S. dollars only. Warrants will be issued in registered form only.

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Each warrant will entitle its holder to purchase the number of shares of common stock or debt securities at the exercise price set forth in, or calculable as set forth in, the applicable prospectus supplement. The applicable prospectus supplement will also describe the circumstances pursuant to which the exercise price and/or the number or amount of the securities to be issued upon exercise of the warrants would be adjusted and the method of making and notifying the holder of any such adjustment.

After the close of business on the applicable expiration date, unexercised warrants will become void. We will specify the place or places where, and the manner in which, warrants may be exercised in the applicable prospectus supplement.

Upon receipt of payment and the warrant certificate properly completed and duly executed at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement, we will, as soon as practicable, issue and deliver the purchased securities in the manner described in the applicable prospectus supplement. If less than all of the warrants represented by the warrant certificate are exercised, a new warrant certificate will be issued for the remaining unexpired warrants.

Prior to the exercise of any warrants to purchase common stock or debt securities, holders of the warrants will not have any of the rights of holders of the common stock or debt securities purchasable upon exercise, including the right to vote or to receive any payments of dividends or interest on the common stock or debt securities purchasable upon exercise.

DESCRIPTION OF UNITS

We may issue units consisting of any combination of our common stock, debt securities and warrants. We will issue each unit so that the holder of the unit is also the holder of each security included in the unit. As a result, the holder of a unit will have the rights and obligations of a holder of each included security. The unit agreement under which a unit is issued may provide that the securities included in the unit may not be held or transferred separately, at any time or at any time before a specified date. This summary of certain provisions of the units is not complete. You should refer to the unit agreement and/or unit certificate, and depositary arrangements, relating to the specific units being offered for the complete terms of the units. The unit agreement and/or unit certificate, and depositary arrangements, as applicable, will be filed with the SEC in connection with the offering of the specific units.

The particular terms of any issue of units will be described in the prospectus supplement relating to the issue. Those terms may include:

- the designation and terms of the units and of the securities comprising the units, including whether and under what circumstances those securities may be held or transferred separately;
- any provisions for the issuance, payment, settlement, transfer, or exchange of the units or of the securities composing the units;
- whether the units will be issued in fully registered or global form; and
- any other terms of the units.

PLAN OF DISTRIBUTION

We may sell the securities being offered hereby in one or more of the following ways from time to time:

- through agents to the public or to investors;
- to underwriters for resale to the public or to investors;
- in “at the market offerings,” within the meaning of Rule 415(a)(4) of the Securities Act, into an existing trading market, at prevailing market price;
- directly to investors; or
- through a combination of any of these methods of sale.

We will set forth in a prospectus supplement the terms of that particular offering of securities, including:

- the name or names of any agents or underwriters;
- the purchase price of the securities being offered and the proceeds we will receive from the sale;
- any over-allotment options under which underwriters may purchase additional securities from us;
- any agency fees or underwriting discounts and other items constituting agents’ or underwriters’ compensation;
- any initial public offering price;
- any discounts or concessions allowed or reallocated or paid to dealers; and
- any securities exchanges or markets on which such securities may be listed.

Agents

We may designate agents who agree to use their reasonable efforts to solicit purchases of our securities for the period of their appointment or to sell our securities on a continuing basis.

Underwriters

If we use underwriters for a sale of securities, the underwriters will acquire the securities for their own account. The underwriters may resell the securities in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. The underwriters will be obligated to purchase all the securities of the series offered if they purchase any of the securities of that series. We may change from time to time any initial public offering price and any discounts or concessions the underwriters allow or reallocate or pay to dealers.

Direct Sales

We may also sell securities directly to one or more purchasers without using underwriters or agents. Underwriters, dealers and agents that participate in the distribution of the securities may be underwriters as defined in the Securities Act, and any discounts or commissions they receive from us and any profit on their resale of the securities may be treated as underwriting discounts and commissions under the Securities Act. To the extent known to us, we will identify in the applicable prospectus supplement any underwriters, dealers or agents and will describe their compensation.

Derivative Securities

We may enter into derivative transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. If the applicable prospectus supplement indicates, in

connection with those derivatives, the third parties may sell securities covered by this prospectus and the applicable prospectus supplement, including in short sale transactions. If so, the third party may use securities pledged by us or borrowed from us or others to settle those sales or to close out any related open borrowings of stock, and may use securities received from us in settlement of those derivatives to close out any related open borrowings of stock. The third party in such sale transactions will be an underwriter and will be identified in the applicable prospectus supplement (or a post-effective amendment).

Trading Markets and Listing of Securities

Unless otherwise specified in the applicable prospectus supplement, each class or series of securities will be a new issue with no established trading market, other than our common stock, which is listed on Nasdaq. We may elect to list any other class or series of securities on any exchange or market, but we are not obligated to do so. It is possible that one or more underwriters may make a market in a class or series of securities, but the underwriters will not be obligated to do so and may discontinue any market making at any time without notice. We cannot give any assurance as to the liquidity of the trading market for any of the securities.

Stabilization Activities

Any underwriter may engage in overallotment, stabilizing transactions, short covering transactions and penalty bids in accordance with Regulation M under the Exchange Act. Overallotment involves sales in excess of the offering size, which create a short position. Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum. Short covering transactions involve purchases of the securities in the open market after the distribution is completed to cover short positions. Penalty bids permit the underwriters to reclaim a selling concession from a dealer when the securities originally sold by the dealer are purchased in a covering transaction to cover short positions. Those activities may cause the price of the securities to be higher than it would otherwise be. If commenced, the underwriters may discontinue any of these activities at any time.

Passive Market Making

Any underwriters who are qualified market makers on Nasdaq may engage in passive market making transactions in the securities on Nasdaq in accordance with Rule 103 of Regulation M, during the business day prior to the pricing of the offering, before the commencement of offers or sales of the securities. Passive market makers must comply with applicable volume and price limitations and must be identified as passive market makers. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for such security. If all independent bids are lowered below the passive market maker's bid, however, the passive market maker's bid must then be lowered when certain purchase limits are exceeded.

Material Relationships

We may use underwriters, dealers and agents with whom we have a material relationship. To the extent required, we will describe the nature of any such relationship in any prospectus supplement naming any such underwriter, dealer or agent. Underwriters, dealers and agents may engage in transactions with or perform services for us in the ordinary course of their businesses, and we will include in any prospectus supplement any required disclosure related to such transactions or services. We may have agreements with the underwriters, dealers and agents to indemnify them against specified civil liabilities, including liabilities under the Securities Act.

LEGAL MATTERS

Certain legal matters relating to the validity of the securities offered by this prospectus will be passed upon for us by Proskauer Rose LLP, Los Angeles, California.

EXPERTS

The consolidated financial statements of Benitec Biopharma Inc. as of June 30, 2023 and 2022 and for each of the years then ended, incorporated by reference in this prospectus, have been audited by Baker Tilly US, LLP, an independent registered public accounting firm, as set forth in their report thereon, and is incorporated by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

DOCUMENTS INCORPORATED BY REFERENCE

The SEC allows us to “incorporate by reference” information that we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus, and the information that we file later with the SEC will automatically update and supersede this information. The following documents have been previously filed by us with the SEC pursuant to the Exchange Act and are hereby incorporated by reference in this prospectus and the registration statement of which this prospectus forms a part (excluding any document or portion thereof to the extent such disclosure is furnished and not filed):

- our Annual Report on [Form 10-K](#) for the fiscal year ended June 30, 2023, filed with the SEC on September 21, 2023;
- our Quarterly Reports on Form 10-Q for the fiscal quarter ended September 30, 2023, filed with the SEC on [November 13, 2023](#), and for the fiscal quarter ended December 31, 2023, filed with the SEC on [February 13, 2024](#);
- our Current Reports on Form 8-K filed with the SEC on [July 25, 2023](#), [August 10, 2023](#), [August 11, 2023](#), [September 18, 2023](#), [September 28, 2023](#), October 16, 2023 and [December 7, 2023](#); and
- the description of our common stock contained in [Exhibit 4.3](#) to the Company’s Annual Report on Form 10-K for the fiscal year ended June 30, 2021, filed with the SEC on September 21, 2021, together with that portion of any amendment or report filed for the purpose of updating such description.

Certain Current Reports on Form 8-K dated both prior to and after the date of this prospectus are or will be furnished to the SEC and shall not be deemed “filed” with the SEC and will not be incorporated by reference into this prospectus. However, all other reports and documents filed by us after the date of this prospectus under Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act prior to the termination of the offering of the securities covered by this prospectus will also be deemed incorporated by reference in this prospectus and considered to be part of this prospectus from the date those documents are filed. If you make a request, orally or in writing, for any information that has been incorporated by reference into this prospectus but not delivered with this prospectus, we will provide you, without charge, a copy of any or all of that information. Requests for this information should be submitted in writing or by telephone at the following address or phone number:

Benitec Biopharma Inc.
3940 Trust Way
Hayward, CA 94545
(510) 780-0819
info@benitec.com

This prospectus is part of a registration statement we have filed with the SEC. You should rely only on the information incorporated by reference or provided in this prospectus, or any applicable prospectus supplement. No one else is authorized to provide you with different information. You should not rely on any other representations. We are not making an offer of these securities in any state where the offer is not permitted. Our affairs may change after this prospectus or any prospectus supplement is distributed. You should not assume that the information in or incorporated by reference into this prospectus or any prospectus supplement is accurate as of any date other than the date on the front of those documents. You should read all information supplementing or incorporated by reference into this prospectus or any prospectus supplement.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3, of which this prospectus is a part, including exhibits, schedules and amendments filed with, or incorporated by reference in, this registration statement, under the Securities Act, with respect to the securities registered thereby. This prospectus does not contain all of the information set forth in the registration statement and exhibits and schedules to the registration statement. For further information with respect to our company and the securities registered thereby, reference is made to the registration statement, including the exhibits to the registration statement. Statements contained in this prospectus as to the contents of any contract or other document referred to in, or incorporated by reference in, this prospectus are not necessarily complete and, where that contract is an exhibit to the registration statement, each statement is qualified in all respects by the exhibit to which the reference relates. Copies of the registration statement, including the exhibits and schedules to the registration statement, may be examined and copied (upon payment of applicable fees) at the SEC's Public Reference Room at 100 F Street, N.E., Washington D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room. The SEC also maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the SEC. The Internet address is <https://www.sec.gov>.

We are subject to the information and periodic reporting requirements of the Exchange Act, and we file periodic reports, proxy statements and other information with the SEC. These periodic reports, proxy statements and other information are available for inspection and copying at the public reference room and website of the SEC referred to above. We maintain a website at <https://benitec.com>. You may access 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 with the SEC free of charge at our website as soon as reasonably practicable after such material is electronically filed with, or furnished to, the SEC. The information contained in, or that can be accessed through, our website is not incorporated by reference in, and is not part of, this prospectus, and any references to such website or any other website are inactive textual references only. You may also request a copy of these filings, at no cost, by writing us at 3940 Trust Way, Hayward, California 94545 or info@benitec.com or telephoning us at (510) 780-0819.

BENITEC BIOPHARMA INC.

Up to \$75,000,000

Common Stock

PROSPECTUS SUPPLEMENT

Leerink Partners

October 14, 2024
