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

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**FORM S-3  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

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**Arrowhead Pharmaceuticals, Inc.**

(Exact name of Registrant as Specified in Its Charter)

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**Delaware**  
(State or other jurisdiction of  
incorporation or organization)

**46-0408024**  
(I.R.S. Employer  
Identification Number)

**177 E. Colorado Blvd., Suite 700  
Pasadena, California 91105  
(626) 304-3400**

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

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**Christopher Anzalone, Chief Executive Officer  
Arrowhead Pharmaceuticals, Inc.  
177 E. Colorado Blvd., Suite 700  
Pasadena, CA 91105  
(626) 304-3400**

(Name, address, including zip code, and telephone number, including area code, of agent for service)

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**Copies to:**

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**Approximate date of commencement of proposed sale to the public:** From time to time after this registration statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer   
Non-accelerated filer

Accelerated filer   
Smaller reporting company   
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of Securities Act.

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## EXPLANATORY NOTE

This registration statement contains the following documents:

- a base prospectus which covers the offering, issuance and sale by us of an indeterminate amount of common stock, preferred stock, debt securities, warrants or a combination of any of these securities, in each case from time to time in one or more offerings; and
- a sale agreement prospectus supplement covering the offering, issuance and sale by us of up to a maximum aggregate offering price of \$250,000,000 of our common stock that may be issued and sold under a sale agreement, dated December 2, 2022, with Jefferies LLC (“Jefferies”).

The base prospectus immediately follows this explanatory note. The specific terms of any securities to be offered pursuant to the base prospectus other than the shares of common stock offered under the Sales Agreement (defined below) will be specified in a prospectus supplement to the base prospectus. The specific terms of the shares of common stock to be issued and sold under the Sales Agreement are specified in the sale agreement prospectus supplement that immediately follows the base prospectus.

Prospectus

# Arrowhead Pharmaceuticals, Inc.

## Common Stock Preferred Stock Debt Securities Warrants

From time to time, we or any selling stockholder may offer common stock, preferred stock, debt securities, warrants or a combination of any of these securities. The debt securities that we may offer may consist of senior debt securities or subordinated debt securities, in each case consisting of notes or other evidence of indebtedness in one or more series. The warrants that we may offer may consist of warrants to purchase any of the other securities that may be sold under this prospectus. The securities offered under this prospectus may be offered separately, together or in series separate, and in amounts, at prices and on terms to be determined at the time of sale. A prospectus supplement that will set forth the terms of the offering of any securities will accompany this prospectus.

We or any selling stockholder may offer these securities through agents, underwriters or dealers or directly to investors. See “*Plan of Distribution*” in this prospectus. Each prospectus supplement will provide the amount, price and terms of the plan of distribution relating to the securities to be sold pursuant to such prospectus supplement. We will set forth the names of any underwriters or agents in the accompanying prospectus supplement, as well as the net proceeds we expect to receive from any such sale.

You should read this prospectus, any accompanying prospectus supplement and the documents incorporated by reference in this prospectus and any such prospectus supplement carefully before you invest. This prospectus may not be used to offer or sell any of the common stock, preferred stock, debt securities or warrants unless accompanied by a prospectus supplement.

Our common stock is traded on The Nasdaq Global Select Market (“Nasdaq”) under the symbol “ARWR.” On December 1, 2022, the closing sale price of our common stock on Nasdaq was \$32.02 per share. Our principal executive offices are located at 177 E. Colorado Blvd, Suite 700, Pasadena, California 91105, and our telephone number is (626) 304-3400.

***Investing in our securities involves a high degree of risk. You should carefully consider the risk and uncertainties referenced under the heading “[Risk Factors](#)” beginning on page 4 of this prospectus as well as those contained in the applicable prospectus supplement and any related free writing prospectus, and in the other documents that are incorporated by referenced into this prospectus or any accompanying prospectus supplement.***

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

The date of this prospectus is December 2, 2022

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## ABOUT THIS PROSPECTUS

This prospectus is part of an automatic shelf registration statement that we filed with the Securities and Exchange Commission (the “SEC”), as a “well-known seasoned issuer” as defined in Rule 405 under the Securities Act of 1933, as amended (the “Securities Act”). Under this shelf registration process, we and/or selling stockholders may offer common stock, preferred stock, debt securities or warrants over time in one or more offerings at prices and on terms to be determined by market conditions at the time of the offering. This prospectus only provides you with a general description of the securities we and/or selling stockholders may offer. Each time we and/or selling stockholders sell any common stock, preferred stock, debt securities or warrants under this prospectus, we will provide a prospectus supplement that will contain more specific information about the securities being offered and the terms of that offering. We may also authorize one or more free writing prospectuses to be provided to you that may contain material information relating to these offerings. Each prospectus supplement and any relating free writing prospectus that we may authorize to be provided to you may also add, update or change information contained in this prospectus or in documents incorporated by reference into this prospectus. If there is any inconsistency between the information in this prospectus and any accompanying prospectus supplement or related free writing prospectus, you should rely on the information in the prospectus supplement or any related free writing prospectus we may authorize to be provided to you. This prospectus may not be used to sell any common stock, preferred stock, debt securities or warrants unless accompanied by a prospectus supplement. You should carefully read this prospectus, any applicable prospectus supplement and any related free writing prospectus, together with the additional information incorporated herein by reference as described under the headings “*Where You Can Find More Information*” and “*Incorporation of Certain Information by Reference*” in this prospectus, before you invest in any of the securities being offered hereby.

Neither we nor any selling stockholder have authorized anyone to provide you with information in addition to or different from that contained in this prospectus, any applicable prospectus supplement and any related free writing prospectus. We take no responsibility for, and can provide no assurances as to the reliability of, any information not contained in this prospectus, any applicable prospectus supplement or any related free writing prospectus that we may authorize to be provided to you. This prospectus is an offer to sell only the securities offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. You should assume that the information in this prospectus, any applicable prospectus supplement or any related free writing prospectus is accurate only as of the date on the front of the document (unless the information specifically indicates that another date applies) and that any information incorporated by reference is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus, any applicable prospectus supplement or any related free writing prospectus, or any sale of a security.

This prospectus contains 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. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under the heading “*Where You Can Find More Information.*”

## SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus (including the documents incorporated by reference herein) contains certain forward-looking statements within the meaning of federal securities laws, and we intend that such forward-looking statements be subject to the safe harbors created thereby. For this purpose, any statements contained in this prospectus or any document incorporated by reference herein, except for historical information, may be deemed to be forward-looking statements. Without limiting the generality of the foregoing, words such as “may,” “will,” “expect,” “believe,” “anticipate,” “intend,” “could,” “estimate,” or “continue” or the negative or other variations thereof or comparable terminology are intended to identify forward-looking statements. In addition, any statements that refer to projections of our future financial performance, trends in our businesses, or other characterizations of future events or circumstances are forward-looking statements.

The forward-looking statements included herein are based on current expectations of our management based on available information and involve a number of risks and uncertainties, all of which are difficult or impossible to predict accurately and many of which are beyond our control. As such, our actual results may differ significantly from those expressed in any forward-looking statements. Factors that may cause or contribute to such differences include, but are not limited to, those discussed in more detail in Item 1 (Business) and Item 1A (Risk Factors) of Part I and Item 7 (Management’s Discussion and Analysis of Financial Condition and Results of Operations) of Part II of our most recent Annual Report on Form 10-K and in subsequent Quarterly Reports on Form 10-Q, factors described under the section entitled “*Risk Factors*” in this prospectus, as may be updated from time to time by our future filings under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and elsewhere in the documents incorporated by reference in this prospectus. Readers should carefully review these risks, as well as the additional risks described in other documents we file from time to time with the SEC. In light of the significant risks and uncertainties inherent in the forward-looking information included herein, the inclusion of such information should not be regarded as a representation by us or any other person that such results will be achieved, and readers are cautioned not to place undue reliance on such forward-looking information. Except as may be required by law, we disclaim any intent to revise the forward-looking statements contained herein to reflect events or circumstances after the date hereof or to reflect the occurrence of unanticipated events.

## ABOUT THE COMPANY

*Unless otherwise noted, (1) the term “Arrowhead” refers to Arrowhead Pharmaceuticals, Inc., a Delaware corporation and its Subsidiaries, (2) the terms “Company,” “we,” “us,” and “our,” refer to the ongoing business operations of Arrowhead and its Subsidiaries, whether conducted through Arrowhead or its Subsidiaries, (3) the term “Subsidiaries” refers collectively to Arrowhead Madison Inc., Arrowhead Australia Pty Ltd and Visirna Therapeutics Inc., (4) the term “common stock” refers to Arrowhead’s common stock, par value \$0.001 per share, (5) the term “preferred stock” refers to Arrowhead’s preferred stock, par value \$0.001 per share and (6) the term “Stockholder(s)” refers to the holders of Arrowhead common stock.*

Arrowhead develops medicines that treat intractable diseases by silencing the genes that cause them. Arrowhead’s pipeline of 14 development programs ranges from pre-clinical discovery to late-stage clinical development, and it is focused on developing its most advanced therapies for late-stage clinical trials. Using a broad portfolio of RNA chemistries and efficient modes of delivery, Arrowhead therapies trigger the RNA interference mechanism to induce rapid, deep and durable knockdown of target genes. RNA interference (“RNAi”) is a mechanism present in living cells that inhibits the expression of a specific gene, thereby affecting the production of a specific protein. RNAi-based therapeutics may leverage this natural pathway of gene silencing to target and shut down specific disease-causing genes. Arrowhead is focused on developing innovative drugs for diseases with a genetic basis, typically characterized by the overproduction of one or more proteins that are involved with disease. The depth and versatility of Arrowhead’s RNAi technologies enables Arrowhead to potentially address conditions in virtually any therapeutic area and pursue disease targets that are not otherwise addressable by small molecules and biologic. Arrowhead is focused on bringing the promise of RNAi to address diseases outside of the liver, and its pipeline now includes disease targets in the liver, lung, muscle and other undisclosed tissue types.

Our principal executive offices are located at 177 E. Colorado Blvd., Suite 700, Pasadena, CA 91105 and our telephone number is (626) 304-3400. Additional information regarding our company, including our audited financial statements and descriptions of our business, is contained in the documents incorporated by reference in this prospectus. See “*Where You Can Find More Information*” and “*Incorporation of Certain Information by Reference.*”

## RISK FACTORS

Investing in our securities involves a high degree of risk. Before making an investment decision, you should carefully consider the risks described in the sections entitled “*Risk Factors*” in our most recent Annual Report on Form 10-K and subsequent Quarterly Reports on form 10-Q, as filed with the SEC, which are incorporated herein by reference in their entirety, as well any amendment or updates to our risk factors reflected in subsequent filings with the SEC, including the applicable prospectus supplement. Our business, financial condition or results of operations could be materially adversely affected by any of these risks. The trading price of our securities could decline due to any of these risks, and you may lose all or part of your investment. This prospectus and the incorporated documents also contain forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including the risks mentioned elsewhere in this prospectus. Please read carefully the discussion above under the heading “*Special Note Regarding Forward-Looking Statements.*” For more information, see the section entitled “*Where You Can Find More Information.*”



**USE OF PROCEEDS**

We intend to use the net proceeds we receive from the sale of securities by us as set forth in the applicable prospectus supplement. Unless otherwise set forth in a prospectus supplement, we will not receive any proceeds from the sale of securities by any selling stockholder.

## DESCRIPTION OF SECURITIES

### Description of Capital Stock

The following is a description of our common stock and our preferred stock. You should refer to our Amended and Restated Certificate of Incorporation (the “Certificate of Incorporation”) and our Amended and Restated Bylaws (the “Bylaws”), which are incorporated by reference into this prospectus. Copies of our Certificate of Incorporation and Bylaws may be obtained as described under the heading “*Where You Can Find More Information*” in this prospectus.

We are authorized to issue up to 145,000,000 shares of common stock, par value \$0.001 per share, and 5,000,000 shares of preferred stock, par value \$0.001 per share. As of November 16, 2022, 106,005,722 shares of our common stock were issued and outstanding.

#### **Common Stock**

We may issue shares of our common stock from time to time. Holders of our common stock are entitled to one vote for each share held on each matter to be voted on by stockholders. There is no cumulative voting in the election of directors. The holders of our common stock have no preemptive or conversion rights and are not subject to further calls or assessments. There are no redemption or sinking fund provisions applicable to our common stock. The rights of the holders of our common stock are subject to any rights that may be fixed for holders of preferred stock, if any. Holders of our common stock are entitled to receive ratably dividends out of funds legally available, if and when declared from time to time by our board of directors. In the event of liquidation, dissolution or winding up of the affairs of the Company, holders of our common stock are to share in all assets remaining after the payment of liabilities and any preferential distributions payable to preferred stockholders, if any.

Our common stock is listed on the Nasdaq under the symbol “ARWR”. The transfer agent and registrar for our common stock is Computershare Trust Company.

#### **Preferred Stock**

We may issue shares of our preferred stock from time to time, in one or more series. Under our certificate of incorporation, our board of directors has the authority, without further action by stockholders, to designate up to 5,000,000 shares of preferred stock, \$0.001 par value per share, in one or more series and to fix the rights, preferences, privileges, qualifications and restrictions granted to or imposed upon the preferred stock, including but not limited to dividend rights, conversion rights, voting rights, rights and terms of redemption, liquidation preference and sinking fund terms, any or all of which may be greater than the rights of our common stock.

If we issue preferred stock, we will fix the rights, preferences, privileges, qualifications and restrictions of the preferred stock of each series that we sell under this prospectus and applicable prospectus supplements in the certificate of designations relating to that series. If we issue preferred stock, we will incorporate by reference into the registration statement of which this prospectus is a part the form of any certificate of designations that describes the terms of the series of preferred stock we are offering before the issuance of the related series of preferred stock. We urge you to read the prospectus supplement related to any series of preferred stock we may offer, as well as the complete certificate of designations that contains the terms of the applicable series of preferred stock.

#### **Delaware Anti-Takeover Law**

We are subject to Section 203 of the General Corporation Law of the State of Delaware (the “DGCL”). Section 203 of the DGCL generally prohibits a public Delaware corporation from engaging in a “business

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combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;
- the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (1) shares owned by persons who are directors and also officers and (2) shares owned by employee stock plans in which employee participants do not have the right to determine whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the date of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock that is not owned by the interested stockholder.

Section 203 of the DGCL defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder; and
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 of the DGCL defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

## Description of Debt Securities

We may issue debt securities under an indenture to be entered into between us and a trustee chosen by us, qualified to act as such under the Trust Indenture Act of 1939, as amended (the “Trust Indenture Act”) and appointed under an indenture. The indenture will be governed by the Trust Indenture Act. The paragraphs below describe the general terms and provisions of the debt securities we may issue. When we offer to sell a particular series of debt securities, we will describe the specific terms of the securities in a supplement to this prospectus, including any additional covenants or changes to existing covenants relating to such series.

The following is a summary of the material provisions of the indenture. It does not restate the indenture entirely. We urge you to read the indenture. We have filed the form of indenture as an exhibit to the registration statement of which this prospectus is a part, and we will file the indenture we enter into and the supplemental indentures or authorizing resolutions with respect to particular series of debt securities as exhibits to current or other reports we file with the SEC. See “*Where You Can Find More Information*” for information on how to obtain copies of the indentures and the supplemental indentures or authorizing resolutions. You may also inspect copies of the documents for the particular series at the office of the trustee. References below to an “indenture” are references to the applicable indenture, as supplemented, under which a particular series of debt securities is issued.

### *Terms of the Debt Securities*

Our debt securities will be general obligations of Arrowhead. We may issue them in one or more series. Authorizing resolutions or a supplemental indenture will set forth the specific terms of each series of debt securities. We will provide a prospectus supplement for each series of debt securities that will describe:

- the title of the debt securities and whether the debt securities are senior, senior subordinated, or subordinated debt securities;
- the aggregate principal amount of the debt securities being offered and any limit upon the aggregate principal amount of the series of debt securities, and, if the series is to be issued at a discount from its face amount, the method of computing the accretion of such discount;
- the percentage of the principal amount at which debt securities will be issued and, if other than the full principal amount thereof, the percentage of the principal amount of the debt securities that is payable if maturity of the debt securities is accelerated because of a default;
- the date or dates, or the method for determining the date or dates, on which the principal of the debt securities will be payable and the amount of principal that will be payable;
- the rate or rates (which may be fixed or variable) at which the debt securities will bear interest, if any, or the method of calculation of such rate or rates, as well as the dates from which interest will accrue, the dates on which interest will be payable and the record date for the interest payable on any payment date;
- any collateral securing the performance of our obligations under the debt securities;
- the currency or currencies (including any composite currency) in which principal, premium, if any, and interest, if any, will be payable, and if such payments may be made in a currency other than that in which the debt securities are denominated, the manner for determining such payments, including the time and manner of determining the exchange rate between the currency in which such securities are denominated and the currency in which such securities or any of them may be paid, and any additions to, modifications of or deletions from the terms of the debt securities to provide for or to facilitate the issuance of debt securities denominated or payable in a currency other than U.S. dollars;
- the place or places where principal, premium, if any, and interest, if any, on the debt securities will be payable and where debt securities that are in registered form can be presented for registration of transfer or exchange;

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- the denominations in which the debt securities will be issuable, if different from \$2,000 and multiples of \$1,000 in excess thereof;
- any provisions regarding our right to redeem or purchase debt securities or the right of holders to require us to redeem or purchase debt securities;
- the right, if any, of holders of the debt securities to convert or exchange them into our common stock or other securities of any kind of us or another obligor, including any provisions intended to prevent dilution of the conversion rights and, if so, the terms and conditions upon which such securities will be so convertible or exchangeable, including the initial conversion or exchange price or rate or the method of calculation, how and when the conversion price or exchange ratio may be adjusted, whether conversion or exchange is mandatory, at the option of the holder or at our option, the conversion or exchange period, and any other provision in relation thereto;
- any provisions requiring or permitting us to make payments to a sinking fund to be used to redeem debt securities or a purchase fund to be used to purchase debt securities;
- the terms, if any, upon which debt securities may be senior or subordinated to our other indebtedness;
- any additions to, modifications of or deletions from the terms of the debt securities with respect to events of default or covenants or other provisions set forth in the indenture for the series to which the supplemental indenture or authorizing resolution relates;
- whether and upon what terms the debt securities of such series may be defeased or discharged, if different from the provisions set forth in the indenture for the series to which the supplemental indenture or authorizing resolution relates;
- whether the debt securities will be issued in registered or bearer form and the terms of these forms;
- whether the debt securities will be issued in whole or in part in the form of a global security and, if applicable, the identity of the depository for such global security;
- any provision for electronic issuance of the debt securities or issuance of the debt securities in uncertificated form; and
- any other material terms of the debt securities, which may be different from the terms set forth in this prospectus.

The applicable prospectus supplement will also describe any material covenants to which a series of debt securities will be subject and the applicability of those covenants to any of our subsidiaries to be restricted thereby, which are referred to herein as “restricted subsidiaries.” The applicable prospectus supplement will also describe provisions for restricted subsidiaries to cease to be restricted by those covenants.

### ***Events of Default and Remedies***

Unless otherwise described in the applicable prospectus supplement, an event of default with respect to any series of debt securities will be defined in the indenture or applicable supplemental indenture or authorizing resolution as being:

- our failure to pay interest on any debt security of such series when the same becomes due and payable and the continuance of any such failure for a period of 30 days;
- our failure to pay the principal or premium of any debt security of such series when the same becomes due and payable at maturity, upon acceleration, redemption or otherwise;
- our failure or the failure of any restricted subsidiary to comply with any of its agreements or covenants in, or provisions of, the debt securities of such series or the indenture (as they relate thereto) and such failure continues for a period of 60 days after our receipt of notice of the default from the trustee or

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from the holders of at least 25% in aggregate principal amount of the then outstanding debt securities of that series (except in the case of a default with respect to the provisions of the indenture regarding the consolidation, merger, sale, lease, conveyance or other disposition of all or substantially all of the assets of us (or any other provision specified in the applicable supplemental indenture or authorizing resolution), which will constitute an event of default with notice but without passage of time);

- default under any mortgage, indenture or instrument under which there may be issued or by which there may be secured or evidenced any indebtedness (other than non-recourse indebtedness, as defined in the indenture) for money borrowed by us or any of our restricted subsidiaries (or the payment of which is guaranteed by us or any of our restricted subsidiaries), whether such indebtedness or guarantee now exists or is created after the date we issue debt securities, if that default:
  - (a) is caused by a failure to pay at final stated maturity the principal amount of such indebtedness prior to the expiration of the grace period provided in such indebtedness on the date of such default (a “Payment Default”); or
  - (b) results in the acceleration of such indebtedness prior to its express maturity without such indebtedness having been discharged or such acceleration having been cured, waived, rescinded or annulled for the period and after the notice had been provided, and, in each case, the principal amount of any such indebtedness, together with the principal amount of any other such indebtedness under which there has been a Payment Default or the maturity of which has been so accelerated, aggregates \$50 million or more; or
- certain events of bankruptcy, insolvency or reorganization occur with respect to us or any restricted subsidiary that is a significant subsidiary (as defined in the indenture).

The indenture will provide that the trustee may withhold notice to the holders of any series of debt securities of any default, except a default in payment of principal or interest, if any, with respect to such series of debt securities, if the trustee considers it in the interest of the holders of such series of debt securities to do so.

The indenture will provide that if any event of default has occurred and is continuing with respect to any series of debt securities, the trustee or the holders of not less than 25% in principal amount of such series of debt securities then outstanding may declare the principal of all the debt securities of such series to be due and payable immediately. However, the holders of a majority in principal amount of the debt securities of such series then outstanding by notice to the trustee may waive any existing default and its consequences with respect to such series of debt securities, other than any event of default in payment of principal or interest. Holders of a majority in principal amount of the then outstanding debt securities of any series may rescind an acceleration with respect to such series and its consequences, except an acceleration due to nonpayment of principal or interest on such series, if the rescission would not conflict with any judgment or decree and if all existing events of default with respect to such series have been cured or waived.

The holders of a majority of the outstanding principal amount of the debt securities of any series will have the right to direct the time, method and place of conducting any proceedings for any remedy available to the trustee with respect to such series, subject to limitations specified in the indenture.

### ***Defeasance***

The indenture will permit us to terminate all our respective obligations under the indenture as they relate to any particular series of debt securities, other than the obligation to pay interest, if any, on and the principal of the debt securities of such series and certain other obligations, at any time by:

- depositing in trust with the trustee, under an irrevocable trust agreement, money or government obligations in an amount sufficient to pay principal of and interest, if any, on the debt securities of such series to their maturity or redemption; and

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- complying with other conditions, including delivery to the trustee of an opinion of counsel to the effect that holders will not recognize income, gain or loss for federal income tax purposes as a result of our exercise of such right and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case otherwise.

The indenture will also permit us to terminate all of our respective obligations under the indenture as they relate to any particular series of debt securities, including the obligations to pay interest, if any, on and the principal of the debt securities of such series and certain other obligations, at any time by:

- depositing in trust with the trustee, under an irrevocable trust agreement, money or government obligations in an amount sufficient to pay principal and interest, if any, on the debt securities of such series to their maturity or redemption; and
- complying with other conditions, including delivery to the trustee of an opinion of counsel to the effect that (A) we have received from, or there has been published by, the Internal Revenue Service a ruling, or (B) since the date such series of debt securities were originally issued, there has been a change in the applicable federal income tax law, in either case to the effect that, and based thereon such opinion of counsel shall state that, holders will not recognize income, gain or loss for federal income tax purposes as a result of our exercise of such right and will be subject to federal income tax on the same amount and in the same manner and at the same times as would have been the case otherwise.

In addition, the indenture will permit us to terminate substantially all our respective obligations under the indenture as they relate to a particular series of debt securities by depositing with the trustee money or government obligations sufficient to pay all principal and interest on such series at its maturity or redemption date if the debt securities of such series will become due and payable at maturity within one year or are to be called for redemption within one year of the deposit.

### ***Transfer and Exchange***

A holder will be able to transfer or exchange debt securities only in accordance with the indenture. The registrar may require a holder, among other things, to furnish appropriate endorsements and transfer documents, and to pay any taxes and fees required by law or permitted by the indenture.

### ***Amendment, Supplement and Waiver***

Without notice to or the consent of any holder, we and the trustee may amend or supplement the indenture or the debt securities of a series to:

- cure any ambiguity, omission, defect or inconsistency;
- comply with the provisions of the indenture regarding the consolidation, merger, sale, lease, conveyance or other disposition of all or substantially all of our assets;
- provide that specific provisions of the indenture shall not apply to a series of debt securities not previously issued or to make a change to specific provisions of the indenture that only applies to any series of debt securities not previously issued or to additional debt securities of a series not previously issued;
- create a series and establish its terms;
- provide for uncertificated debt securities in addition to or in place of certificated debt securities;
- add a guarantor subsidiary in respect of any series of debt securities;
- secure any series of debt securities;
- comply with requirements of the SEC in order to effect or maintain the qualification of the indenture under the Trust Indenture Act;

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- make any change that does not adversely affect the rights of any holder; or
- conform the provisions of the indenture to the final offering document in respect of any series of debt securities.

With the exceptions discussed below, we and the trustee may amend or supplement the indenture or the debt securities of a particular series with the written consent of the holders of at least a majority in principal amount of the debt securities of such series then outstanding. In addition, the holders of a majority in principal amount of the debt securities of such series then outstanding may waive any existing default under, or compliance with, any provision of the debt securities of a particular series or of the indenture relating to a particular series of debt securities, other than any event of default in payment of interest or principal. These consents and waivers may be obtained in connection with a purchase of, or tender offer or exchange offer for, debt securities.

Without the consent of each holder affected, we and the trustee may not:

- reduce the amount of debt securities of such series whose holders must consent to an amendment, supplement or waiver;
- reduce the rate of or extend the time for payment of interest, including defaulted interest;
- reduce the principal of or extend the fixed maturity of any debt security or alter the provisions with respect to redemptions or mandatory offers to repurchase debt securities;
- make any change that adversely affects any right of a holder to convert or exchange any debt security into or for shares of our common stock or other securities, cash or other property in accordance with the terms of such security;
- modify the ranking or priority of the debt securities;
- make any change to any provision of the indenture relating to the waiver of existing defaults, the rights of holders to receive payment of principal and interest on the debt securities, or to the provisions regarding amending or supplementing the indenture or the debt securities of a particular series with the written consent of the holders of such series;
- waive a continuing default or event of default in the payment of principal of or interest on the debt securities; or
- make any debt security payable at a place or in money other than that stated in the debt security, or impair the right of any holder of a debt security to bring suit as permitted by the indenture.

The right of any holder to participate in any consent required or sought pursuant to any provision of the indenture, and our obligation to obtain any such consent otherwise required from such holder, may be subject to the requirement that such holder shall have been the holder of record of debt securities with respect to which such consent is required or sought as of a record date fixed by us in accordance with the indenture.

### ***Concerning the Trustee***

The indenture will contain limitations on the rights of the trustee, should it become our creditor, to obtain payment of claims in specified cases or to realize on property received in respect of any such claim as security or otherwise. The indenture will permit the trustee to engage in other transactions; however, if it acquires any conflicting interest, it must eliminate such conflict or resign.

The indenture will provide that in case an event of default occurs and is not cured, the trustee will be required, in the exercise of its power, to use the degree of care of a prudent person in similar circumstances in the conduct of such person's own affairs. The trustee shall be under no obligation to exercise any of the rights or powers vested in it by the indenture at the request or direction of any of the holders pursuant to the indenture, unless such holders shall have offered to the trustee security or indemnity satisfactory to the trustee against the costs, expenses and liabilities which might be incurred by it in compliance with such request or direction.



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***No Recourse against Others***

The indenture will provide that a director, officer, employee or stockholder, as such, of the Company shall not have any liability for any obligations of the Company under the debt securities or the indenture or for any claim based on, in respect of or by reason of, such obligations or their creation.

***Governing Law***

The laws of the State of New York will govern the indenture and the debt securities.

## Description of Warrants

### *General Description of Warrants*

We may issue warrants for the purchase of debt securities, common stock, preferred stock or any combination of these securities. Warrants may be issued independently or together with other securities and may be attached to or separate from any offered securities. Each series of warrants will be issued under a separate warrant agreement to be entered into between a warrant agent and us. The warrant agent will act solely as our agent in connection with the warrants and will not have any obligation or relationship of agency or trust for or with any holders or beneficial owners of warrants. The following outlines some of the general terms and provisions of the warrants that we may issue from time to time. Additional terms of the warrants and the applicable warrant agreement will be set forth in the applicable prospectus supplement. The following description, and any description of the warrants included in a prospectus supplement, may not be complete and is subject to and qualified in its entirety by reference to the terms and provisions of the applicable warrant agreement, which we will file with the SEC in connection with any offering of warrants.

### *Debt Warrants*

The prospectus supplement relating to a particular issue of warrants exercisable for debt securities will describe the terms of those warrants, including the following:

- the title of the warrants;
- the offering price for the warrants, if any;
- the aggregate number of the warrants;
- the designation and terms of the debt securities purchasable upon exercise of the warrants;
- if applicable, the designation and terms of the securities that the warrants are issued with and the number of warrants issued with each security;
- if applicable, the date from and after which the warrants and any securities issued with the warrants will be separately transferable;
- the principal amount and price of debt securities that may be purchased upon exercise of a warrant;
- the dates on which the right to exercise the warrants commences and expires;
- if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;
- whether the warrants represented by the warrant certificates or debt securities that may be issued upon exercise of the warrants will be issued in registered or bearer form;
- information relating to book-entry procedures, if any;
- if applicable, a discussion of material U.S. federal income tax considerations;
- anti-dilution provisions of the warrants, if any;
- redemption or call provisions, if any, applicable to the warrants; and
- any additional terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of the warrants.

### *Stock Warrants*

The prospectus supplement relating to a particular issue of warrants exercisable for common stock or preferred stock will describe the terms of the common stock warrants and preferred stock warrants, including the following:

- the title of the warrants;

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- the offering price for the warrants, if any;
- the aggregate number of the warrants;
- the designation and terms of the common stock or preferred stock that may be purchased upon exercise of the warrants;
- if applicable, the designation and terms of the securities that the warrants are issued with and the number of warrants issued with each security;
- if applicable, the date from and after which the warrants and any securities issued with the warrants will be separately transferable;
- the number of shares and price of common stock or preferred stock that may be purchased upon exercise of a warrant;
- the dates on which the right to exercise the warrants commences and expires;
- if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;
- if applicable, a discussion of material U.S. federal income tax considerations;
- anti-dilution provisions of the warrants, if any;
- redemption or call provisions, if any, applicable to the warrants; and
- any additional terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of the warrants.

### ***Exercise of Warrants***

Each warrant will entitle the holder of the warrant to purchase at the exercise price set forth in the applicable prospectus supplement the principal amount of debt securities or shares of common stock or preferred stock being offered. Holders may exercise warrants at any time up to the close of business on the expiration date set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will be void. Holders may exercise warrants as set forth in the prospectus supplement relating to the warrants being offered. Until a holder exercises the warrants to purchase any securities underlying the warrants, the holder will not have any rights as a holder of the underlying securities by virtue of ownership of warrants.

## **SELLING STOCKHOLDERS**

Selling stockholders are persons or entities that, directly or indirectly, have acquired or will from time to time acquire from us, our securities. Such selling stockholders may be parties to registration rights agreements with us, or we otherwise may have agreed or will agree to register their securities for resale. The initial purchasers of our securities, as well as their transferees, pledgees, donees or successors, all of whom we refer to as “selling stockholders,” may from time to time offer and sell our securities pursuant to this prospectus, any applicable prospectus supplement or post-effective amendment.

Information regarding the beneficial ownership of our securities by a selling stockholder, the number of securities being offered by a selling stockholder and the number of securities beneficially owned by a selling stockholder after the applicable offering, where applicable, will be set forth in a prospectus supplement or in a post-effective amendment. The applicable prospectus supplement or post-effective amendment will also disclose whether any of the selling stockholders has held any position or office with, has been employed by or otherwise has had a material relationship with us during the three years prior to the date of the applicable prospectus supplement, or post-effective amendment.

## PLAN OF DISTRIBUTION

We may sell the securities covered by this prospectus from time to time in any manner permitted under the Securities Act. Registration of the securities covered by this prospectus does not mean, however, that those securities will necessarily be offered or sold.

We may sell the securities separately or together:

- through one or more underwriters or dealers in a public offering and sale by them;
- directly to investors;
- to dealers; or
- through agents.

We may also make direct sales through subscription rights distributed to our stockholders on a pro rata basis, which may or may not be transferable. In any distribution of subscription rights to stockholders, if all of the underlying securities are not subscribed for, we may then sell the unsubscribed securities directly to third parties or may engage the services of one or more underwriters, dealers or agents, including standby underwriters, to sell the unsubscribed securities to third parties.

We may sell the securities from time to time:

- in one or more transactions at a fixed price or prices, which may be changed from time to time;
- at market prices prevailing at the time of sale;
- at prices related to such prevailing market prices; or
- at negotiated prices.

Any of the prices may represent a discount from prevailing market prices. We will describe the method of distribution of the securities and the terms of the offering in the applicable prospectus supplement. Any discounts or concessions allowed or re-allowed or paid to dealers may be changed from time to time.

We may also sell equity securities covered by this registration statement in an “at the market offering” as defined in Rule 415(a)(4) under the Securities Act. Such offering may be made into an existing trading market for such securities in transactions at other than a fixed price, either:

- on or through the facilities of Nasdaq or any other securities exchange or quotation or trading service on which such securities may be listed, quoted or traded at the time of sale; and/or
- to or through a market maker otherwise than on Nasdaq or such other securities exchanges or quotation or trading services.

Such at the market offerings, if any, may be conducted by underwriters acting as principal or agent.

If underwriters are used in the sale of any securities, the securities will be acquired by the underwriters for their own account and may be resold from time to time in one or more of the transactions described above. Any underwritten offering may be on a best efforts or firm commitment basis. The securities may be either offered to the public through underwriting syndicates represented by managing underwriters, or directly by underwriters. Generally, the underwriters’ obligations to purchase the securities will be subject to conditions precedent and the underwriters will be obligated to purchase all of the securities if they purchase any of the securities. We may use underwriters with whom we have a material relationship. We will describe in the applicable prospectus supplement, naming the underwriter, the nature of any such relationship.

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In any sale of the securities, underwriters or agents may receive compensation from us or from purchasers of the securities, for whom they may act as agents, in the form of discounts, concessions or commissions. Underwriters may sell the securities to or through dealers, and such dealers may receive compensation in the form of discounts, concessions or commissions from the underwriters and/or commissions from the purchasers for whom they may act as agents. Underwriters, dealers and agents that participate in the distribution of the securities may be deemed to be underwriters under the Securities Act, and any discounts or commissions they receive from us and any profit on the resale of securities they realize may be deemed to be underwriting discounts and commissions under the Securities Act. Any initial public offering price and any discounts or concessions allowed or re-allowed or paid to dealers may be changed from time to time.

Each time we sell securities, we will describe the method of distribution of the securities in the applicable prospectus supplement relating to such transaction. The applicable prospectus supplement will, where applicable:

- identify any such underwriter, dealer or agent;
- describe any compensation in the form of discounts, concessions, commissions or otherwise received from us by each such underwriter, dealer or agent and in the aggregate to all underwriters, dealers and agents;
- any public offering price;
- identify the amounts underwritten or to be sold through the agent;
- identify the nature of the underwriter's, dealer's or agent's obligation to take the securities; and
- any securities exchange or market on which the securities may be listed.

We may authorize underwriters, dealers or agents to solicit offers by certain purchasers to purchase the securities from us at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. The contracts will be subject only to those conditions set forth in the prospectus supplement, and the prospectus supplement will set forth any commissions we pay for solicitation of these contracts.

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 in a post-effective amendment.

Underwriters, dealers and agents may be entitled to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments made by the underwriters, dealers or agents, under agreements between us and the underwriters, dealers and agents.

We may grant underwriters who participate in the distribution of securities an option to purchase additional securities to cover over-allotments, if any, in connection with the distribution.

Unless otherwise specified in the related prospectus supplement, all securities we offer, other than common stock, will be new issues of securities with no established trading market. Any underwriters may make a market in these securities, but will not be obligated to do so and may discontinue any market making at any time without notice. Any common stock sold pursuant to a prospectus supplement will be listed for trading on Nasdaq or other principal market for our common stock. We may apply to list any series of debt securities, preferred stock or warrants on an exchange, but we are not obligated to do so. Therefore, there may not be liquidity or a trading market for any series of securities.

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Any underwriter may engage in over-allotment transactions, stabilizing transactions, short-covering transactions and penalty bids in accordance with Regulation M under the Exchange Act. Over-allotment 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 the activities at any time. These transactions may be effected on any exchange or over-the-counter market or otherwise. We make no representation or prediction as to the direction or magnitude of any effect that such transactions may have on the price of the securities. For a description of these activities, see the information under the heading “*Underwriting*” or “*Plan of Distribution*” in the applicable prospectus supplement.

Underwriters, broker-dealers or agents who may become involved in the sale of the common stock may engage in transactions with and perform other services for us in the ordinary course of their business for which they receive compensation.

To comply with applicable state securities laws, the securities offered by this prospectus will be sold, if necessary, in such jurisdictions only through registered or licensed brokers or dealers. In addition, securities may not be sold in some states unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

**EXPERTS**

The financial statements of the Company incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K for the year ended September 30, 2022 have been audited by Rose, Snyder & Jacobs, LLP as stated in their report incorporated by reference in this prospectus and elsewhere in this registration statement, and given upon the authority of said firm as experts in auditing and accounting.

**LEGAL MATTERS**

The legality of the issuance of the securities being offered hereby and the binding nature of any debt securities or warrants being offered hereby is being passed upon by Gibson, Dunn & Crutcher LLP, San Francisco, California. The legality of the securities will be passed upon by counsel for any underwriters, dealers or agents as may be specified in the applicable prospectus supplement.



## WHERE YOU CAN FIND MORE INFORMATION

We must comply with the informational requirements of the Exchange Act, and we are required to file reports and proxy statements and other information with the SEC. This prospectus, which forms part of the registration statement, does not contain all of the information included in the registration statement, including its exhibits and schedules. For further information about us and the securities described in this prospectus, you should refer to the registration statement, its exhibits and schedules and our reports, proxies, information statements and other information filed with the SEC. Our filings are available to the public on the Internet, through a database maintained by the SEC at <http://www.sec.gov>. Our filings are also available, free of charge, on our website at [www.arrowheadpharma.com](http://www.arrowheadpharma.com). The information contained in, or that can be accessed through, our website is not incorporated by reference herein and is not part of this prospectus.

Statements contained in this prospectus as to the contents of any contract or other document are not necessarily complete, and in each instance we refer you to the copy of the contract or document filed as an exhibit to the registration statement, each such statement being qualified in all respects by such reference.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference in this prospectus the information that we file with it. Incorporation by reference means that we can disclose important information to you by referring you to other documents that are legally considered to be part of this prospectus. Later information that we file with the SEC will automatically update and supersede the information in this prospectus, any supplement and the documents listed below. Our SEC file number is 0-21898. We incorporate by reference the specific documents listed below:

- The Company's Annual Report on [Form 10-K](#) for the fiscal year ended September 30, 2022, filed on November 28, 2022;
- The Company's [Definitive Proxy Statement on Schedule 14A](#), filed on January 26, 2022, as supplemented by our [Definitive Additional Materials on Schedule 14A](#), filed with the SEC on March 9, 2022;
- The Company's Current Report on [Form 8-K](#) filed on November 10, 2022; and
- The description of the Company's common stock contained in its registration statement on [Form 8-A/A](#) (Registration No. 000-21898), filed on April 7, 2016, including any amendments or reports filed for the purpose of updating such description.

All documents filed by the Company pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, except as to any portion of any report or documents that is not deemed filed under such provisions on or after the date of this prospectus until the earlier of the date on which all of the securities registered hereunder have been sold or the registration statement of which this prospectus is a part has been withdrawn, shall be deemed incorporated by reference in this prospectus and to be a part of this prospectus from the date of filing of those documents.

Nothing in this prospectus shall be deemed to incorporate information furnished but not filed with the SEC pursuant to Item 2.02 or 7.01 of Form 8-K.

Upon written or oral request, we will furnish without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request, a copy of any document incorporated by reference. Requests should be addressed to Corporate Secretary, 177 E Colorado Blvd., Suite 700, Pasadena, California 91105 or may be made telephonically at (626) 304-3400. We have not authorized anyone to provide you with different information. You should not assume that the information contained in this prospectus or the accompanying prospectus supplement is accurate on any date subsequent to the date set forth on the front of the document or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus and any accompanying prospectus supplement is delivered or securities are sold on a later date.

**PROSPECTUS SUPPLEMENT**  
(to Prospectus dated December 2, 2022)



# **ARROWHEAD PHARMACEUTICALS, INC.**

## **Up to \$250,000,000**

### **Common Stock**

We have entered into an Open Market Sale Agreement<sup>SM</sup> (the "Sales Agreement"), with Jefferies LLC ("Jefferies"), relating to shares of our common stock offered by this prospectus supplement and the accompanying prospectus. In accordance with the terms of the Sales Agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to \$250,000,000 from time to time through Jefferies, acting as our sales agent.

Our common stock is listed on The Nasdaq Global Select Market ("Nasdaq") under the symbol "ARWR." On December 1, 2022, the last reported sale price of our common stock on Nasdaq was \$32.02 per share.

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

Jefferies will receive from us a commission of up to 3.0% of the gross proceeds of any shares of common stock sold through it under the Sales Agreement. In connection with the sale of our common stock on our behalf, Jefferies will be deemed to be an "underwriter" within the meaning of the Securities Act and the compensation of Jefferies will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to Jefferies with respect to certain liabilities, including liabilities under the Securities Act.

**An investment in our securities involves a high degree of risk. Please read "[Risk Factors](#)" on page S-6 of this prospectus supplement and in the documents incorporated by reference into this prospectus supplement before investing in our securities.**

**Neither the Securities and Exchange Commission 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.**

### **Jefferies**

**The date of this prospectus supplement is December 2, 2022**

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## ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus relate to the offering of our common stock. Before buying any of the common stock that we are offering, we urge you to carefully read this prospectus supplement and the accompanying prospectus, together with the information incorporated by reference as described under the headings “*Where You Can Find More Information*” and “*Incorporation of Certain Information by Reference*” in this prospectus supplement. These documents contain important information that you should consider when making your investment decision.

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this offering and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference herein or therein. The second part, the accompanying prospectus, provides more general information, some of which may not apply to this offering. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in any document incorporated by reference into this prospectus supplement that was filed with the Securities and Exchange Commission (the “SEC”), before the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference into this prospectus supplement—the statement in the document having the later date modifies or supersedes the earlier statement.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein or in the accompanying prospectus 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 agreement, 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.

We have not, and Jefferies has not, authorized anyone to provide you with any information other than the information contained in this prospectus supplement and the accompanying prospectus, including the documents incorporated by reference herein and therein, and in any free writing prospectuses that we have authorized for use in connection with this offering. We take no responsibility for, and can provide no assurances as to the reliability of, any information that is in addition to or different from that contained or incorporated by reference in this prospectus supplement and the accompanying prospectus. We are not, and Jefferies is not, making an offer to sell or seeking an offer to buy our common stock under this prospectus in any jurisdiction where the offer or sale is not permitted. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the securities and the distribution of this prospectus outside the United States. Furthermore, you should not consider this prospectus to be an offer or solicitation relating to the securities if the person making the offer or solicitation is not qualified to do so, or if it is unlawful for you to receive such an offer or solicitation. You should not assume that the information contained in this prospectus or any free writing prospectus is accurate as of any date other than the date on the front cover of those documents, or that the information contained in any document incorporated by reference is accurate as of any date other than the date of the document incorporated by reference, regardless of the time of delivery of this prospectus or any sale of a security. Our business, financial condition, results of operations and prospects may have changed since those dates. It is important for you to read and consider all information contained in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference herein and therein, and any free writing prospectus prepared by or on behalf of us 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 entitled “*Where You Can Find More Information*” and “*Incorporation of Certain Information by Reference*” in this prospectus supplement and in the accompanying prospectus.

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In this prospectus supplement, “Arrowhead,” the “Company,” “we,” “us,” and “our” and similar terms refer to Arrowhead Pharmaceuticals, Inc. and its subsidiaries, unless the context indicates otherwise. References to our “common stock” refer to the common stock, par value \$0.001 per share, of Arrowhead Pharmaceuticals, Inc.

All references in this prospectus supplement to our financial statements include, unless the context indicates otherwise, the related notes.

The industry and market data and other statistical information contained in this prospectus supplement, the accompanying prospectus and the documents we incorporate by reference herein and therein are based on management’s own estimates, independent publications, government publications, reports by market research firms or other published independent sources, and, in each case, are believed by management to be reasonable estimates. Although we believe these sources are reliable, we have not independently verified the information.

This prospectus supplement and the accompanying prospectus contain references to our trademarks and to trademarks belonging to other entities. Solely for convenience, trademarks and trade names referred to in this prospectus supplement and the accompanying prospectus, including logos, artwork and other visual displays, may appear without the ® or TM 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’ trademarks or trade names to imply a relationship with, or endorsement or sponsorship of us by, any other companies.

## CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein contain or incorporate forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”). These forward-looking statements reflect management’s beliefs and assumptions. In addition, these forward-looking statements reflect management’s current views with respect to future events or our financial performance, and involve certain known and unknown risks, uncertainties and other factors, including those identified below, which may cause our or our industry’s actual or future results, levels of activity, performance or achievements to differ materially from those expressed or implied by any forward-looking statements or from historical results. We intend the forward-looking statements to be covered by the safe harbor provisions for forward-looking statements contained in Section 27A of the Securities Act and Section 21E of the Exchange Act. Forward-looking statements include information concerning our possible or assumed future results of operations and statements preceded by, followed by, or that include the words “may,” “will,” “could,” “would,” “should,” “believe,” “expect,” “plan,” “anticipate,” “intend,” “estimate,” “predict,” “potential” or similar expressions.

Forward-looking statements are inherently subject to risks and uncertainties, many of which we cannot predict with accuracy and some of which we might not even anticipate. Although we believe that the expectations reflected in the forward-looking statements are based upon reasonable assumptions at the time made, we can give no assurance that the expectations will be achieved. Future events and actual results, financial and otherwise, may differ materially from the results discussed in the forward-looking statements. Readers are cautioned not to place undue reliance on these forward-looking statements.

The factors described under “*Risk Factors*” in this prospectus supplement and in any documents incorporated by reference herein and other factors could cause our or our industry’s future results to differ materially from historical results or those anticipated or expressed in any of our forward-looking statements. We operate in a continually changing business environment, and new risk factors emerge from time to time. Other unknown or unpredictable factors also could have material adverse effects on our future results, performance or achievements. We cannot assure you that projected results or events will be achieved or will occur.

You should read this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein completely and with the understanding that our actual future results may be materially different from what we expect. Any forward-looking statement speaks only as of the date of this prospectus supplement. We do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

## PROSPECTUS SUPPLEMENT SUMMARY

*This summary highlights certain information about this offering and selected information contained elsewhere in or incorporated by reference into this prospectus supplement and the accompanying prospectus. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in our shares of common stock. You should carefully read this entire prospectus supplement and accompanying prospectus, including the information incorporated herein and therein, including the “Risk Factors” section contained in this prospectus supplement and the other documents incorporated by reference into this prospectus supplement.*

### Overview

Arrowhead develops medicines that treat intractable diseases by silencing the genes that cause them. Arrowhead’s pipeline of 14 development programs ranges from pre-clinical discovery to late-stage clinical development, and it is focused on developing its most advanced therapies for late-stage clinical trials. Using a broad portfolio of RNA chemistries and efficient modes of delivery, Arrowhead therapies trigger the RNA interference mechanism to induce rapid, deep and durable knockdown of target genes. RNA interference (“RNAi”) is a mechanism present in living cells that inhibits the expression of a specific gene, thereby affecting the production of a specific protein. RNAi-based therapeutics may leverage this natural pathway of gene silencing to target and shut down specific disease-causing genes. Arrowhead is focused on developing innovative drugs for diseases with a genetic basis, typically characterized by the overproduction of one or more proteins that are involved with disease. The depth and versatility of Arrowhead’s RNAi technologies enables Arrowhead to potentially address conditions in virtually any therapeutic area and pursue disease targets that are not otherwise addressable by small molecules and biologic. Arrowhead is focused on bringing the promise of RNAi to address diseases outside of the liver, and its pipeline now includes disease targets in the liver, lung, muscle and other undisclosed tissue types.

### Corporate Information

Our executive offices are located at 177 E. Colorado Blvd., Suite 700, Pasadena CA 91105, and our telephone number is (626) 304-3400. Additional information regarding our company, including our audited financial statements and descriptions of our business, is contained in the documents incorporated by reference in this prospectus. See “*Incorporation of Certain Information by Reference*” and “*Where You Can Find More Information*” on page S-14 of this prospectus supplement.



## THE OFFERING

Shares of common stock offered by us	Shares of our common stock having an aggregate offering price of up to \$250,000,000.
Shares of common stock to be outstanding after this offering	Up to 113,767,620 shares of common stock (as more fully described in the notes following this table), assuming sales of 7,807,620 shares of our common stock in this offering at an offering price of \$32.02 per share, which was the last reported sale price of our common stock on Nasdaq on December 1, 2022. The actual number of shares issued will vary depending on the sales prices under this offering.
Plan of Distribution	“At the market offering” that may be made from time to time through our sales agent, Jefferies. See the section entitled “ <i>Plan of Distribution</i> ” on page S-11 of this prospectus supplement.
Use of Proceeds	We intend to use the net proceeds from this offering for general corporate purposes, including working capital, capital expenditures, research and development expenditures and clinical trial expenditures. A portion of the net proceeds may also be used for the acquisition of businesses, products and technologies or for other strategic purposes. See the section titled “ <i>Use of Proceeds</i> ” on page S-8 of this prospectus supplement.
Risk Factors	See “ <i>Risk Factors</i> ” beginning on page S-6 of this prospectus supplement and in the documents incorporated by reference herein for a discussion of factors you should consider carefully before investing in shares of our common stock.
Nasdaq symbol	“ARWR”

The number of shares of our common stock to be outstanding after this offering is based on 105,960,000 shares of our common stock outstanding as of September 30, 2022, and excludes:

- 2,721,384 shares of our common stock subject to options outstanding as of September 30, 2022 having a weighted average exercise price of \$20.73 per share; and
- 3,145,886 restricted stock units granted and outstanding as of September 30, 2022 under our 2013 Equity Incentive Plan and issued as inducement grants to new employees outside of our equity compensation plans.
- 923,545 restricted stock units granted and outstanding as of September 30, 2022 under our 2021 Incentive Plan.

## RISK FACTORS

*An investment in shares of our common stock involves a high degree of risk. Prior to making a decision about investing in shares of our common stock, you should carefully consider the risk factors described below and the risk factors discussed in the sections entitled “Risk Factors” contained in our most recent Annual Report on Form 10-K, Quarterly Reports in Form 10-Qs and our other filings with the SEC incorporated by reference in this prospectus supplement, together with all of the other information contained in this prospectus supplement. Additional risks and uncertainties not presently known to us, or that we currently view as immaterial, may also impair our business. Our business, financial condition and results of operations could be materially and adversely affected as a result of these risks. This could cause the trading price of our common stock to decline, resulting in a loss of all or part of your investment.*

### **Risks Related to this Offering**

***We will have broad discretion in the use of the net proceeds from this offering and, despite our efforts, we may use the net proceeds in a manner that does not increase the value of your investment.***

We currently intend to use the net proceeds from this offering for general corporate purposes, including working capital, capital expenditures, research and development expenditures and clinical trial expenditures. A portion of the net proceeds may also be used for the acquisition of businesses, products and technologies or for other strategic purposes. However, we have not determined the specific allocation of the net proceeds among these potential uses. Our management will have broad discretion over the use and investment of the net proceeds from this offering, and, accordingly, investors in this offering will need to rely upon the judgment of our management with respect to the use of proceeds, with only limited information concerning our specific intentions. These proceeds could be applied in ways that do not improve our operating results or increase the value of your investment.

***You may experience immediate and substantial dilution in the net tangible book value per share of the common stock you purchase in the offering. In addition, we may issue additional equity or convertible debt securities in the future, which may result in additional dilution to you.***

The offering price per share in this offering may exceed the pro forma net tangible book value per share of our common stock outstanding as of September 30, 2022. Assuming that an aggregate of 7,807,620 shares of our common stock are sold at a price of \$32.02 per share, the last reported sale price of our common stock on Nasdaq on December 1, 2022, for aggregate gross proceeds of approximately \$250,000,000, and after deducting commissions and estimated aggregate offering expenses payable by us, you would experience immediate dilution of \$26.32 per share, representing the difference between our pro forma as adjusted net tangible book value per share as of September 30, 2022, after giving effect to this offering and the assumed offering price. The exercise of outstanding stock options could result in further dilution of your investment. See the section titled “Dilution” below for a more detailed illustration of the dilution you may incur if you participate in this offering. 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 shares of our common stock, our then existing stockholders may experience dilution and the new securities may have rights senior to those shares of our common stock offered in this offering.

***Sales of our common stock in this offering, or the perception that such sales may occur, could cause the market price of our common stock to fall.***

We may issue and sell shares of our common stock for aggregate gross proceeds of up to \$250,000,000 from time to time in connection with this offering. The actual number of shares of common stock that may be issued and sold in this offering, as well as the timing of any such sales, will depend on a number of factors, including, among others, the prices at which any shares are actually sold this offering (which may be influenced by market

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conditions, the trading price of our common stock and other factors) and our determinations as to the appropriate timing, sources and amounts of funding we need. The issuance and sale from time to time of these new shares of common stock, or the mere fact that we are able to issue and sell these shares in this offering, could cause the market price of our common stock to decline.

***Because we do not intend to declare cash dividends on our shares of common stock in the foreseeable future, stockholders must rely on appreciation of the value of our common stock for any return on their investment.***

We will not distribute cash to our stockholders unless and until we can develop sufficient funds from operations to meet our ongoing needs and implement our business plan. In addition, the terms of any existing or future debt agreements may preclude us from paying dividends. As a result, we expect that only appreciation of the price of our common stock, if any, will provide a return to investors in this offering for the foreseeable future.

***It is not possible to predict the actual number of shares of common stock we will sell under the Sales Agreement, or the gross proceeds resulting from those sales.***

Subject to certain limitations in the Sales Agreement and compliance with applicable law, we have the discretion to deliver a placement notice to Jefferies at any time throughout the term of the Sales Agreement. The number of shares that are sold through Jefferies after delivering a placement notice will fluctuate based on a number of factors, including the market price of our shares during the sales period, the limits we set with Jefferies in any applicable placement notice, and the demand for our shares during the sales period. Because the price of each share sold will fluctuate during this offering, it is not currently possible to predict the number of shares that will be sold or the gross proceeds to be raised in connection with those sales.

***If securities or industry analysts either do not publish research about us or publish inaccurate or unfavorable research about us, our business, our market or our competitors, or if they change their recommendations regarding our common stock adversely, the trading price or trading volume of our common stock could decline.***

The trading market for our common stock will be influenced in part by the research and reports that securities or industry analysts may publish about us, our business, our market, or our competitors. If one or more of these analysts initiate research with an unfavorable rating or downgrade our common stock, provide a more favorable recommendation about our competitors or publish inaccurate or unfavorable research about our business, the trading price of our common stock would likely decline. If any analyst who may cover us were to cease coverage of us or fail to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause the trading price or trading volume of our common stock to decline.

## USE OF PROCEEDS

We may issue and sell shares of our common stock having aggregate gross sales proceeds of up to \$250,000,000 from time to time. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time.

We will retain broad discretion over the use of the net proceeds from the sale of the securities offered hereby. We currently intend to use the net proceeds from this offering for general corporate purposes, including working capital, capital expenditures, research and development expenditures and clinical trial expenditures. A portion of the net proceeds may also be used for the acquisition of businesses, products and technologies or for other strategic purposes. The precise amount and timing of the application of such proceeds will depend upon our funding requirements and the availability and cost of other capital. As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses for the net proceeds that we will have from the sale of the shares of our common stock. Pending these uses of the net proceeds from this offering, if any, we may invest the net proceeds in investment grade, short-term interest-bearing obligations, such as money-market funds, certificates of deposit, or direct or guaranteed obligations of the United States government, or hold the net proceeds as cash.

## DILUTION

If you purchase shares of our common stock in this offering, your interest will be diluted to the extent of the difference between the public offering price per share and the net tangible book value per share of our common stock after this offering. We calculate net tangible book value per share by dividing our net tangible assets (tangible assets less total liabilities) by the number of shares of our common stock issued and outstanding as of September 30, 2022.

Our historical net tangible book value at September 30, 2022 was \$406,377,000 or approximately \$3.84 per share of our common stock. After giving effect to the sale of our common stock in the aggregate amount of \$250,000,000 in this offering, at an assumed offering price of \$32.02 per share, the last reported sale price of our common stock on Nasdaq on December 1, 2022, and after deducting estimated offering expenses and commissions payable by us, our adjusted net tangible book value as of September 30, 2022 would have been approximately \$648,592,000, or approximately \$5.70 per share of our common stock. This represents an immediate increase in the net tangible book value of \$1.87 per share of our common stock to our existing stockholders and an immediate dilution in net tangible book value of approximately \$26.32 per share of our common stock to new investors. The following table illustrates per share dilution:

Assumed offering price per share	\$32.02
Net tangible book value per share as of September 30, 2022	\$ 3.84
Increase in net tangible book value per share attributable to this offering	\$ 1.87
Adjusted net tangible book value per share as of September 30, 2022, after giving effect to this offering	\$ 5.70
Dilution per share to new investors purchasing shares in this offering	\$26.32

The table above assumes for illustrative purposes that an aggregate of 7,807,620 shares of our common stock are sold at a price of \$32.02 per share, the last reported sale price of our common stock on Nasdaq on December 1, 2022, for aggregate gross proceeds of \$250,000,000. 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 \$32.02 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$250,000,000 is sold at that price, would increase our adjusted net tangible book value per share after the offering by \$0.012 per share and would increase the dilution in net tangible book value per share to new investors in this offering to \$5.71 per share, after deducting estimated offering expenses and commissions 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 \$32.02 per share shown in the table above, assuming all of our common stock in the aggregate amount of \$250,000,000 is sold at that price, would decrease our adjusted net tangible book value per share after the offering by \$0.013 per share and would decrease the dilution in net tangible book value per share to new investors in this offering to \$5.69 per share, after deducting estimated offering expenses and commissions payable by us. This information is supplied for illustrative purposes only.

Unless we indicate otherwise, all information in this prospectus supplement is based on 105,960,000 shares of our common stock outstanding as of September 30, 2022, and excludes:

- 2,721,384 shares of our common stock subject to options outstanding as of September 30, 2022 having a weighted average exercise price of \$20.73 per share; and
- 3,145,886 restricted stock units granted and outstanding as of September 30, 2022 under our 2013 Equity Incentive Plan and issued as inducement grants to new employees outside of our equity compensation plans.

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- 923,545 restricted stock units granted and outstanding as of September 30, 2022 under our 2021 Incentive Plan.

To the extent that outstanding options are exercised, or we issue other shares, investors purchasing shares in this offering could experience further dilution. In addition, we may choose to raise additional capital due to market conditions or strategic considerations, even if we believe we have sufficient funds for our current or future operating plans. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the issuance of those securities could result in further dilution to our stockholders.

## PLAN OF DISTRIBUTION

We have entered into a Sales Agreement with Jefferies, under which we may offer and sell up to \$250,000,000 of our shares of common stock from time to time through Jefferies acting as agent. Sales of our shares of common stock, if any, under this prospectus supplement and the accompanying prospectus will be made by any method that is deemed to be an “at the market offering” as defined in Rule 415(a)(4) under the Securities Act.

Each time we wish to issue and sell shares of common stock under the Sales Agreement, we will notify Jefferies of the number of shares to be issued, the dates on which such sales are anticipated to be made, any limitation on the number of shares to be sold in any one day and any minimum price below which sales may not be made. Once we have so instructed Jefferies, unless Jefferies declines to accept the terms of such notice, Jefferies has agreed to use its commercially reasonable efforts consistent with its normal trading and sales practices to sell such shares up to the amount specified on such terms. The obligations of Jefferies under the Sales Agreement to sell our shares of common stock are subject to a number of conditions that we must meet.

The settlement of sales of shares between us and Jefferies is generally anticipated to occur on the second trading day following the date on which the sale was made. Sales of our shares of common stock as contemplated in this prospectus supplement will be settled through the facilities of The Depository Trust Company or by such other means as we and Jefferies may agree upon. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

We will pay Jefferies a commission of up to 3.0% of the aggregate gross proceeds we receive from each sale of our shares of common stock. Because there is no minimum offering amount required as a condition to close this offering, the actual total public offering amount, commissions and proceeds to us, if any, are not determinable at this time. In addition, we have agreed to reimburse Jefferies for the fees and disbursements of its counsel, payable upon execution of the Sales Agreement, in an amount not to exceed \$75,000, in addition to certain ongoing disbursements of its legal counsel in the amount of \$25,000 or \$15,000 in connection with certain events described in the Sales Agreement. We estimate that the total expenses for the offering, excluding any commissions or expense reimbursement payable to Jefferies under the terms of the Sales Agreement, will be approximately \$210,000. The remaining sale proceeds, after deducting any other transaction fees, will equal our net proceeds from the sale of such shares.

Jefferies will provide written confirmation to us before the open on The Nasdaq Global Select Market on the day following each day on which our shares of common stock are sold under the Sales Agreement. Each confirmation will include the number of shares sold on that day, the aggregate gross proceeds of such sales and the proceeds to us.

In connection with the sale of our shares of common stock on our behalf, Jefferies will be deemed to be an “underwriter” within the meaning of the Securities Act, and the compensation of Jefferies will be deemed to be underwriting commissions or discounts. We have agreed to indemnify Jefferies against certain civil liabilities, including liabilities under the Securities Act. We have also agreed to contribute to payments Jefferies may be required to make in respect of such liabilities.

The offering of our shares of common stock pursuant to the Sales Agreement will terminate upon the earlier of (i) the sale of all shares of common stock subject to the Sales Agreement and (ii) the termination of the Sales Agreement as permitted therein. We and Jefferies may each terminate the Sales Agreement at any time upon prior notice.

This summary of the material provisions of the Sales Agreement does not purport to be a complete statement of its terms and conditions. A copy of the Sales Agreement is filed as an exhibit to the Registration Statement of which this prospectus supplement forms a part.

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Jefferies and its affiliates may in the future provide various investment banking, commercial banking, financial advisory and other financial services for us and our affiliates, for which services they may in the future receive customary fees. In the course of its business, Jefferies may actively trade our securities for its own account or for the accounts of customers, and, accordingly, Jefferies may at any time hold long or short positions in such securities. For example, Jefferies acted as an underwriter in our public offering consummated in December 2019, for which it received compensation.

A prospectus supplement and the accompanying prospectus in electronic format may be made available on a website maintained by Jefferies, and Jefferies may distribute the prospectus supplement and the accompanying prospectus electronically.



**LEGAL MATTERS**

The validity of the shares of common stock offered hereby will be passed upon for us by Gibson, Dunn & Crutcher LLP, San Francisco, California. Latham & Watkins LLP, San Diego, California is counsel to Jefferies in connection with this offering.

**EXPERTS**

The financial statements of the Company incorporated in this prospectus by reference from the Company's Annual Report on Form 10-K for the year ended September 30, 2022 have been audited by Rose, Snyder & Jacobs, LLP as stated in their report incorporated by reference in this prospectus and elsewhere in this registration statement, and given upon the authority of said firm as experts in auditing and accounting.

## WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public at the SEC's website at <http://www.sec.gov>.

We make available free of charge on or through our Internet website [www.arrowheadpharma.com](http://www.arrowheadpharma.com), our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file the material with, or furnish it to, the SEC. The references to [www.arrowheadpharma.com](http://www.arrowheadpharma.com) in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein or therein are inactive textual references only, and the information found on our internet website is not incorporated by reference into, and should not be considered part of, this prospectus supplement, the accompanying base shelf prospectus or the documents incorporated by reference herein or therein. Investors should not rely on any such information in deciding whether to invest in our common stock.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference information contained in documents we file with it, which means that we can disclose important information to you by referring you to those documents already on file with the SEC that contain that information. The information incorporated by reference is considered to be part of this prospectus supplement, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future information filed (rather than furnished) with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, between the date of this prospectus supplement and the termination of the offering of the securities covered by this prospectus supplement, provided, however, that we are not incorporating any information furnished under any of Item 2.02 or Item 7.01 of any Current Report on Form 8-K (and exhibits filed on such form that are related to such items):

- The Company's Annual Report on [Form 10-K](#) for the fiscal year ended September 30, 2022, filed on November 28, 2022;
- The Company's [Definitive Proxy Statement on Schedule 14A](#), filed on January 26, 2022, as supplemented by our [Definitive Additional Materials on Schedule 14A](#), filed with the SEC on March 9, 2022;
- The Company's Current Report on [Form 8-K](#) filed on November 10, 2022; and
- The description of the Company's common stock contained in its registration statement on [Form 8-A/A](#) (Registration No. 000-21898), filed on April 7, 2016, including any amendments or reports filed for the purpose of updating such description.

Upon written or oral request, we will provide at no cost to the requester a copy of all of the information that has been incorporated by reference in this prospectus supplement but not delivered with this prospectus supplement. You may obtain copies of these documents from us, without charge (other than exhibits, unless the exhibits are specifically incorporated by reference), by contacting our Corporate Secretary, 177 E. Colorado Blvd., Suite 700, Pasadena, California 91105. Our telephone number is (626) 304-3400.

You may also access the documents incorporated by reference in this prospectus supplement through our website at [www.arrowheadpharma.com](http://www.arrowheadpharma.com). Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus supplement or the registration statement of which it forms a part.

**Up to \$250,000,000**



**Common Stock**

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**Prospectus Supplement**  
December 2, 2022

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**Jefferies**

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**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 14. Other Expenses of Issuance and Distribution.**

The following table sets forth the costs and expenses, other than the underwriting discounts and commissions, payable by the registrant in connection with the issuance and distribution of the securities registered hereby.

<u>Item</u>	<u>Amount to be paid</u>
SEC registration fee Nasdaq listing fee	\$ *
Nasdaq listing fee	**
Printing and engraving expenses	**
Legal fees and expenses	**
Accounting fees and expenses	**
Transfer Agent fees and expenses	**
Miscellaneous expenses	**
Total	\$ **

\* The registrant is deferring payment of the registration fee in reliance on Rule 456(b) and Rule 457(r) under the Securities Act, other than the \$27,550 of fees due in connection with the \$250,000,000 of our common stock that may be issued and sold from time to time under the Sales Agreement with Jefferies LLC.

\*\* Estimated expenses are not presently known. The foregoing sets forth the general categories of expenses (other than underwriting discounts and commissions) that we anticipate we will incur in connection with the offering of securities under this registration statement. An estimate of the aggregate expenses in connection with the issuance and distribution of the securities being offered will be included in the applicable prospectus supplement.

**Item 15. Indemnification of Directors and Officers.**

The Company's Certificate of Incorporation provides for the elimination of personal monetary liability of directors to the fullest extent permissible under Delaware law. Delaware law does not permit the elimination or limitation of director monetary liability for: (i) breaches of the director's duty of loyalty to the corporation or its stockholders; (ii) acts or omissions not in good faith or involving intentional misconduct or knowing violations of law; (iii) the payment of unlawful dividends or unlawful stock repurchases or redemptions or (iv) transactions in which the director received an improper personal benefit.

Section 145 of the DGCL permits a Delaware corporation to indemnify, on certain terms and conditions, any person who was or is a party or is threatened to be made a party to any threatened pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he is or was a director, officer, employee or agent of the corporation or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by him in connection with such action. The Certificate of Incorporation and Bylaws of the Company require the Company to indemnify the Company's directors and officers to the fullest extent permitted under Delaware law.

Inssofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Company pursuant to the foregoing provisions, the Company has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable.

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### **Item 16. Exhibit Index.**

The following documents are filed herewith (unless otherwise indicated) and made a part of this registration statement.

Exhibit NO.	Description
1.1	Form of Underwriting Agreement*
1.2	<a href="#">Open Market Sale Agreement, dated December 2, 2022, by and between Arrowhead Pharmaceuticals, Inc. and Jefferies LLC</a>
3.1	<a href="#">Amended and Restated Certificate of Incorporation of Arrowhead Pharmaceuticals, Inc. (incorporated by reference to Exhibit 3.3 to the Company's Current Report on Form 8-K, filed on April 6, 2016)</a>
3.2	<a href="#">Amended and Restated Bylaws of Arrowhead Pharmaceuticals, Inc. (incorporated by reference to Exhibit 3.4 to the Company's Current Report on Form 8-K, filed on April 6, 2016)</a>
4.1	<a href="#">Form of Common Stock Certificate of Arrowhead Pharmaceuticals, Inc. (incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K, filed on April 6, 2016)</a>
4.2	<a href="#">Form of Indenture</a>
4.3	Form of Debt Security*
4.4	Form of Preferred Stock Certificate*
4.5	Form of Certificate of Designations*
4.6	Form of Warrant Agreement*
4.7	Form of Warrant Certificate*
5.1	<a href="#">Opinion of Gibson, Dunn &amp; Crutcher LLP, relating to the base prospectus</a>
5.2	<a href="#">Opinion of Gibson, Dunn &amp; Crutcher LLP, relating to the sale agreement prospectus supplement</a>
23.1	<a href="#">Consent of Rose, Snyder &amp; Jacobs, the registrant's independent registered public accounting firm</a>
23.2	<a href="#">Consent of Gibson, Dunn &amp; Crutcher LLP (included in legal opinion filed as Exhibit 5.1)</a>
23.3	<a href="#">Consent of Gibson, Dunn &amp; Crutcher LLP (included in legal opinion filed as Exhibit 5.2)</a>
24.1	<a href="#">Power of Attorney (included on signature page)</a>
25.1	Statement of Eligibility of Trustee on Form T-1 under the Trust Indenture Act of 1939, as amended*
107	<a href="#">Filing Fee Table</a>

\* To be filed, if necessary, subsequent to the effectiveness of this registration statement as an exhibit to a report filed under the Exchange Act to be incorporated by reference herein or to a post-effective amendment hereto, if applicable.

### **Item 17. Undertakings.**

*Item 512(a) of Regulation S-K.* The undersigned registrant hereby undertakes:

- (1) to file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
  - (i) to include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;
  - (ii) to reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total

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dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the “*Calculation of Registration Fee*” table in the effective registration statement; and

- (iii) to include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

*provided, however*, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) of this section do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

- (2) that, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.
- (3) to remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) that, for the purpose of determining liability under the Securities Act of 1933 to any purchaser:
  - (i) each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in this registration statement; and
  - (ii) each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933 shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof. *Provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of this registration statement or made in any such document immediately prior to such effective date.
- (5) that, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:
  - (i) any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
  - (ii) any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

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- (iii) the portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
- (iv) any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

*Item 512(b) of Regulation S-K.* The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934, as amended (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

*Item 512(h) of Regulation S-K.* Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act of 1933, and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act of 1933 and will be governed by the final adjudication of such issue.

*Item 512(i) of Regulation S-K.* The undersigned registrant hereby undertakes that:

- (i) for purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b) (1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (ii) for the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

*Item 512(j) of Regulation S-K.* The undersigned registrant hereby undertakes to file an application for the purpose of determining the eligibility of the trustee to act under subsection (a) of section 310 of the Trust Indenture Act ("Act") in accordance with the rules and regulations prescribed by the Commission under section 305(b)(2) of the Act.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Pasadena, State of California, on December 2, 2022.

### ARROWHEAD PHARMACEUTICALS, INC.

By: /s/ Christopher Anzalone

Christopher Anzalone

Chief Executive Officer

## POWER OF ATTORNEY

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated, each of whom also constitutes and appoints Christopher Anzalone and Kenneth A. Myszkowski, and each of them singly, his or her true and lawful attorney-in-fact and agent, for him or her, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this registration statement, and to file the same and all exhibits thereto and any other documents in connection therewith with the Securities and Exchange Commission, granting unto each attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that each attorney-in-fact and agent or his or her substitute or substitutes may lawfully do or cause to be done by virtue hereof.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Christopher Anzalone</u> Christopher Anzalone	Chief Executive Officer and President and Director (Principal Executive Officer)	December 2, 2022
<u>/s/ Kenneth A. Myszkowski</u> Kenneth A. Myszkowski	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	December 2, 2022
<u>/s/ Douglass Given</u> Douglass Given	Director, Chairman of the Board of Directors	December 2, 2022
<u>/s/ Marianne De Backer</u> Marianne De Backer	Director	December 2, 2022
<u>/s/ Mauro Ferrari</u> Mauro Ferrari	Director	December 2, 2022
<u>/s/ Adeoye Olukotun</u> Adeoye Olukotun	Director	December 2, 2022
<u>/s/ Michael S. Perry</u> Michael S. Perry	Director	December 2, 2022
<u>/s/ Victoria Vakiener</u> Victoria Vakiener	Director	December 2, 2022
<u>/s/ William Waddill</u> William Waddill	Director	December 2, 2022



**OPEN MARKET SALE AGREEMENT**<sup>SM</sup>

December 2, 2022

JEFFERIES LLC  
520 Madison Avenue  
New York, New York 10022

Ladies and Gentlemen:

Arrowhead Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), proposes, subject to the terms and conditions stated herein, to issue and sell from time to time through Jefferies LLC, as sales agent and/or principal (the “**Agent**”), shares of the Company’s common stock, par value \$0.001 per share (the “**Common Shares**”), having an aggregate offering price of up to \$250,000,000 on the terms set forth in this agreement (this “**Agreement**”).

**Section 1. DEFINITIONS**

(a) Certain Definitions. For purposes of this Agreement, capitalized terms used herein and not otherwise defined shall have the following respective meanings:

“**Affiliate**” of a Person means another Person that directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such first- mentioned Person. The term “control” (including the terms “controlling,” “controlled by” and “under common control with”) means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise; provided that for the purposes of this Agreement, Visirna Therapeutics, Inc. (“**Visirna**”) and its subsidiaries shall not be considered Affiliates of the Company.

“**Agency Period**” means the period commencing on the date of this Agreement and expiring on the earliest to occur of (x) the date on which the Agent shall have placed the Maximum Program Amount pursuant to this Agreement and (y) the date this Agreement is terminated pursuant to Section 7.

“**Commission**” means the U.S. Securities and Exchange Commission.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations of the Commission thereunder.

“**Floor Price**” means the minimum price set by the Company in the Issuance Notice below which the Agent shall not sell Shares during the applicable period set forth in the Issuance Notice, which may be adjusted by the Company at any time during the period set forth in the Issuance Notice by delivering written notice of such change to the Agent and which in no event shall be less than \$1.00 without the prior written consent of the Agent, which may be withheld in the Agent’s sole discretion.

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<sup>SM</sup> “Open Market Sale Agreement” is a service mark of Jefferies LLC

**“Issuance Amount”** means the aggregate Sales Price of the Shares to be sold by the Agent pursuant to any Issuance Notice.

**“Issuance Notice”** means a written notice delivered to the Agent by the Company in accordance with this Agreement in the form attached hereto as Exhibit A that is executed by its Chief Executive Officer, President, Chief Financial Officer or Chief Operating Officer.

**“Issuance Notice Date”** means any Trading Day during the Agency Period that an Issuance Notice is delivered pursuant to Section 3(b)(i).

**“Issuance Price”** means the Sales Price less the Selling Commission.

**“Maximum Program Amount”** means Common Shares with an aggregate Sales Price of the lesser of (a) the number or dollar amount of Common Shares registered under the effective Registration Statement (as defined below) pursuant to which the offering is being made, (b) the number of authorized but unissued Common Shares (less Common Shares issuable upon exercise, conversion or exchange of any outstanding securities of the Company or otherwise reserved from the Company’s authorized capital stock), (c) the number or dollar amount of Common Shares permitted to be sold under Form S-3 (including General Instruction I.B.6 thereof, if applicable), or (d) the number or dollar amount of Common Shares for which the Company has filed a Prospectus (as defined below).

**“Person”** means an individual or a corporation, partnership, limited liability company, trust, incorporated or unincorporated association, joint venture, joint stock company, governmental authority or other entity of any kind.

**“Principal Market”** means the Nasdaq Global Select Market or such other national securities exchange on which the Common Shares, including any Shares, are then listed.

**“Sales Price”** means the actual sale execution price of each Share placed by the Agent pursuant to this Agreement.

**“Securities Act”** means the Securities Act of 1933, as amended, and the rules and regulations of the Commission thereunder.

**“Selling Commission”** means up to three percent (3%) of the gross proceeds of Shares sold pursuant to this Agreement, or as otherwise agreed between the Company and the Agent with respect to any Shares sold pursuant to this Agreement.

**“Settlement Date”** means the second business day following each Trading Day during the period set forth in the Issuance Notice on which Shares are sold pursuant to this Agreement, when the Company shall deliver to the Agent the amount of Shares sold on such Trading Day and the Agent shall deliver to the Company the Issuance Price received on such sales.

“**Shares**” means the Company’s Common Shares issued or issuable pursuant to this Agreement.

“**Trading Day**” means any day on which the Principal Market is open for trading.

## Section 2. REPRESENTATIONS AND WARRANTIES OF THE COMPANY

The Company represents and warrants to, and agrees with, the Agent that as of (1) the date of this Agreement, (2) each Issuance Notice Date, (3) each Settlement Date, (4) each Triggering Event Date (as defined below) and (5) as of each Time of Sale (as defined below) (each of the times referenced above is referred to herein as a “**Representation Date**”), except as may be disclosed in the Prospectus (including any documents incorporated by reference therein and any supplements thereto) on or before a Representation Date:

(a) **Registration Statement.** The Company has prepared and filed with the Commission a shelf registration statement on Form S-3 that contains a base prospectus. Such registration statement registers the issuance and sale by the Company of the Shares under the Securities Act. The Company may file one or more additional registration statements from time to time that will contain a base prospectus and related prospectus or prospectus supplement, if applicable, with respect to the Shares. Except where the context otherwise requires, such registration statement(s), including any information deemed to be a part thereof pursuant to Rule 430B under the Securities Act, including all financial statements, exhibits and schedules thereto and all documents incorporated or deemed to be incorporated therein by reference pursuant to Item 12 of Form S-3 under the Securities Act as from time to time amended or supplemented, is herein referred to as the “**Registration Statement**,” and the prospectus constituting a part of such registration statement(s), together with any prospectus supplement filed with the Commission pursuant to Rule 424(b) under the Securities Act relating to a particular issuance of the Shares, including all documents incorporated or deemed to be incorporated therein by reference pursuant to Item 12 of Form S-3 under the Securities Act, in each case, as from time to time amended or supplemented, is referred to herein as the “**Prospectus**,” except that if any revised prospectus is provided to the Agent by the Company for use in connection with the offering of the Shares that is not required to be filed by the Company pursuant to Rule 424(b) under the Securities Act, the term “**Prospectus**” shall refer to such revised prospectus from and after the time it is first provided to the Agent for such use. The Registration Statement at the time it originally became effective is herein called the “**Original Registration Statement**.” As used in this Agreement, the terms “amendment” or “supplement” when applied to the Registration Statement or the Prospectus shall be deemed to include the filing by the Company with the Commission of any document under the Exchange Act after the date hereof that is or is deemed to be incorporated therein by reference.

All references in this Agreement to financial statements and schedules and other information which is “contained,” “included” or “stated” in the Registration Statement or the Prospectus (and all other references of like import) shall be deemed to mean and include all such financial statements and schedules and other information which is or is deemed to be incorporated by reference in or otherwise deemed under the Securities Act to be a part of or included in the Registration Statement or the Prospectus, as the case may be, as of any specified date; and all references in this Agreement to amendments or supplements to the Registration Statement or the Prospectus shall be deemed to mean and include, without limitation, the filing of any document under the Exchange Act which is or is deemed to be incorporated by reference in or otherwise deemed under the Securities Act to be a part of or included in the Registration Statement or the Prospectus, as the case may be, as of any specified date.

At the time the Registration Statement was or will be originally declared effective and at the time the Company's most recent annual report on Form 10-K was filed with the Commission, if later, the Company met the then-applicable requirements for use of Form S-3 under the Securities Act. During the Agency Period, each time the Company files an annual report on Form 10-K the Company will meet the then-applicable requirements for use of Form S-3 under the Securities Act.

(b) Compliance with Registration Requirements. The Original Registration Statement and any Rule 462(b) Registration Statement have been declared effective by Commission under the Securities Act. The Company has complied to the Commission's satisfaction with all requests of the Commission for additional or supplemental information. No stop order suspending the effectiveness of the Registration Statement or any Rule 462(b) Registration Statement is in effect and no proceedings for such purpose have been instituted or are pending or, to the best knowledge of the Company, are contemplated or threatened by the Commission.

The Prospectus when filed complied in all material respects with the Securities Act and, if filed with the Commission through its Electronic Data Gathering, Analysis and Retrieval system (except as may be permitted by Regulation S-T under the Securities Act), was identical to the copy thereof delivered to the Agent for use in connection with the issuance and sale of the Shares. Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment thereto, at the time it became effective and at all subsequent times, complied and will comply in all material respects with the Securities Act and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. As of the date of this Agreement, the Prospectus and any Free Writing Prospectus (as defined below) considered together (collectively, the "**Time of Sale Information**") did not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading. The Prospectus, as amended or supplemented, as of its date and at all subsequent times, did not and will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the three immediately preceding sentences do not apply to statements in or omissions from the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment thereto, or the Prospectus, or any amendments or supplements thereto, made in reliance upon and in conformity with information relating to the Agent furnished to the Company in writing by the Agent expressly for use therein, it being understood and agreed that the only such information furnished by the Agent to the Company consists of the information described in Section 6 below. There are no contracts or other documents required to be described in the Prospectus or to be filed as exhibits to the Registration Statement which have not been described or filed as required. The Registration Statement and the offer and sale of the Shares as contemplated hereby meet the requirements of Rule 415 under the Securities Act and comply in all material respects with said rule.

(c) Ineligible Issuer Status. The Company is not an “ineligible issuer” in connection with the offering of the Shares pursuant to Rules 164, 405 and 433 under the Securities Act. Any Free Writing Prospectus that the Company is required to file pursuant to Rule 433(d) under the Securities Act has been, or will be, filed with the Commission in accordance with the requirements of the Securities Act. Each Free Writing Prospectus that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act or that was prepared by or on behalf of or used or referred to by the Company complies or will comply in all material respects with the requirements of Rule 433 under the Securities Act including timely filing with the Commission or retention where required and legending, and each such Free Writing Prospectus, as of its issue date and at all subsequent times through the completion of the issuance and sale of the Shares did not, does not and will not include any information that conflicted, conflicts with or will conflict with the information contained in the Registration Statement or the Prospectus, including any document incorporated by reference therein. Except for the Free Writing Prospectuses, if any, and electronic road shows, if any, furnished to you before first use, the Company has not prepared, used or referred to, and will not, without your prior consent, prepare, use or refer to, any Free Writing Prospectus.

(d) Incorporated Documents. The documents incorporated or deemed to be incorporated by reference in the Registration Statement and the Prospectus, at the time they were filed with the Commission, complied in all material respects with the requirements of the Exchange Act, as applicable, and, when read together with the other information in the Prospectus, do not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances under which they were made, not misleading.

(e) Exchange Act Compliance. The documents incorporated or deemed to be incorporated by reference in the Prospectus, at the time they were or hereafter are filed with the Commission, and any Free Writing Prospectus or amendment or supplement thereto complied and will comply in all material respects with the requirements of the Exchange Act, and, when read together with the other information in the Prospectus, at the time the Registration Statement and any amendments thereto become effective and at each Time of Sale, as the case may be, will not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(f) This Agreement. This Agreement has been duly authorized, executed and delivered by the Company.

(g) Authorization of the Shares. The Shares have been duly authorized for issuance and sale pursuant to this Agreement and, when issued and delivered by the Company against payment therefor pursuant to this Agreement, will be validly issued, fully paid and nonassessable, and the issuance and sale of the Shares is not subject to any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase the Shares.

(h) No Applicable Registration or Other Similar Rights. There are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by this Agreement.

(i) **No Material Adverse Change.** Except as otherwise disclosed in the Registration Statement and the Prospectus, subsequent to the respective dates as of which information is given in the Registration Statement and the Prospectus: (i) there has been no material adverse change, or any development that could reasonably be expected to result in a material adverse change, in (A) the condition, financial or otherwise, or in the earnings, business, properties, operations, assets, liabilities or prospects, whether or not arising from transactions in the ordinary course of business, of the Company and its subsidiaries, considered as one entity or (B) the ability of the Company to consummate the transactions contemplated by this Agreement or perform its obligations hereunder (any such change being referred to herein as a “**Material Adverse Change**”); (ii) the Company and its subsidiaries, considered as one entity, have not incurred any material liability or obligation, indirect, direct or contingent, including without limitation any losses or interference with its business from fire, explosion, flood, earthquakes, accident or other calamity, whether or not covered by insurance, or from any strike, labor dispute or court or governmental action, order or decree, that are material, individually or in the aggregate, to the Company and its subsidiaries, considered as one entity, or have not entered into any material transactions not in the ordinary course of business; and (iii) there has not been any material decrease in the capital stock or any material increase in any short-term or long-term indebtedness of the Company or its subsidiaries, and there has been no dividend or distribution of any kind declared, paid or made by the Company or, except for dividends paid to the Company or other subsidiaries, by any of the Company’s subsidiaries on any class of capital stock, or any repurchase or redemption by the Company or any of its subsidiaries of any class of capital stock.

(j) **Independent Accountants.** Rose, Snyder & Jacobs, LLP, which has expressed its opinion with respect to the financial statements (which term as used in this Agreement includes the related notes thereto) filed with the Commission as a part of the Registration Statement and the Prospectus, is (i) an independent registered public accounting firm as required by the Exchange Act, and the rules of the Public Company Accounting Oversight Board (“PCAOB”), (ii) in compliance with the applicable requirements relating to the qualification of accountants under Rule 2-01 of Regulation S-X under the Securities Act and (iii) a registered public accounting firm as defined by the PCAOB whose registration has not been suspended or revoked and who has not requested such registration to be withdrawn.

(k) **Financial Statements.** The financial statements filed with the Commission as a part of the Registration Statement and the Prospectus present fairly the consolidated financial position of the Company and its subsidiaries as of the dates indicated and the results of their operations, changes in stockholders’ equity and cash flows for the periods specified. Such financial statements have been prepared in conformity with generally accepted accounting principles as applied in the United States applied on a consistent basis throughout the periods involved, except as may be expressly stated in the related notes thereto. The interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and has been prepared in accordance with the Commission’s rules and guidelines applicable thereto. No other financial statements or supporting schedules are required to be included in the Registration Statement or the Prospectus. All disclosures, if any, contained in the Registration Statement, the Prospectus and any Free Writing Prospectus that constitute non-GAAP financial measures (as defined by the rules and regulations under the Securities Act and the Exchange Act) comply with Regulation G under the Exchange Act and Item 10 of Regulation S-K under the Securities Act, as applicable. To the Company’s

knowledge, no person who has been suspended or barred from being associated with a registered public accounting firm, or who has failed to comply with any sanction pursuant to Rule 5300 promulgated by the PCAOB, has participated in or otherwise aided the preparation of, or audited, the financial statements, supporting schedules or other financial data filed with the Commission as a part of the Registration Statement and the Prospectus.

(l) Company's Accounting System. The Company and each of its subsidiaries make and keep accurate books and records and maintain a system of internal accounting controls sufficient to provide reasonable assurance that: (i) transactions are executed in accordance with management's general or specific authorization; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with generally accepted accounting principles as applied in the United States and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management's general or specific authorization; (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences; and (v) the interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement and the Prospectus fairly presents the information called for in all material respects and is prepared in accordance with the Commission's rules and guidelines applicable thereto.

(m) Disclosure Controls and Procedures; Deficiencies in or Changes to Internal Control Over Financial Reporting. The Company has established and maintains disclosure controls and procedures (as defined in Rules 13a-15 and 15d-15 under the Exchange Act), which (i) are designed to ensure that material information relating to the Company, including its consolidated subsidiaries, is made known to the Company's principal executive officer and its principal financial officer by others within those entities, particularly during the periods in which the periodic reports required under the Exchange Act are being prepared; (ii) have been evaluated by management of the Company for effectiveness as of the end of the Company's most recent fiscal quarter; and (iii) are effective in all material respects to perform the functions for which they were established. Since the end of the Company's most recent audited fiscal year, there have been no significant deficiencies or material weaknesses in the Company's internal control over financial reporting (whether or not remediated) and no change in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting. The Company is not aware of any change in its internal control over financial reporting that has occurred during its most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(n) Incorporation and Good Standing of the Company. The Company has been duly incorporated and is validly existing as a corporation in good standing under the laws of the jurisdiction of its incorporation and has the corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Registration Statement and the Prospectus and to enter into and perform its obligations under this Agreement. The Company is duly qualified as a foreign corporation to transact business and is in good standing in the State of California and each other jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except where the failure to be so qualified and in good standing could not be expected, individually or in the aggregate, to result in a Material Adverse Change.

(o) Subsidiaries. Each of the Company's "subsidiaries" (for purposes of this Agreement, shall not include Visirna and shall otherwise have the meaning set forth in Rule 405 under the Securities Act) has been duly incorporated or organized, as the case may be, and is validly existing as a corporation, partnership or limited liability company, as applicable, in good standing, if applicable, under the laws of the jurisdiction of its incorporation or organization and has the power and authority (corporate or other) to own, lease and operate its properties and to conduct its business as described in the Registration Statement and the Prospectus. Each of the Company's subsidiaries is duly qualified as a foreign corporation, partnership or limited liability company, as applicable, to transact business and is in good standing in each jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except where the failure to be so qualified and in good standing could not be expected, individually or in the aggregate, to result in a Material Adverse Change. All of the issued and outstanding capital stock or other equity or ownership interests of each of the Company's subsidiaries have been duly authorized and validly issued, are fully paid and nonassessable and, except as disclosed in the Registration Statement and the Prospectus, are owned by the Company, directly or through subsidiaries, free and clear of any security interest, mortgage, pledge, lien, encumbrance or adverse claim. None of the outstanding capital stock or equity interest in any subsidiary was issued in violation of preemptive or similar rights of any security holder of such subsidiary. The constitutive or organizational documents of each of the subsidiaries comply in all material respects with the requirements of applicable laws of its jurisdiction of incorporation or organization and are in full force and effect. Other than Visirna and Tego Biosciences Corporation, the Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to the Company's most recent Annual Report on Form 10-K.

(p) Capitalization and Other Capital Stock Matters. The authorized, issued and outstanding capital stock of the Company is as set forth in the Registration Statement and the Prospectus under the captions "The Offering" and "Description of Securities" (other than for subsequent issuances, if any, pursuant to employee benefit plans, upon the exercise of outstanding options or warrants or the vesting of restricted stock units, in each case as described in the Registration Statement and the Prospectus). The Common Shares (including the Shares) conform in all material respects to the description thereof contained in the Prospectus. All of the issued and outstanding Common Shares have been duly authorized and validly issued, are fully paid and nonassessable and have been issued in compliance with all federal and state securities laws. None of the outstanding Common Shares was issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. There are no authorized or outstanding options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any capital stock of the Company or any of its subsidiaries other than those described in the Registration Statement and the Prospectus. The descriptions of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted thereunder, set forth in the Registration Statement and the Prospectus accurately and fairly presents the information required to be shown with respect to such plans, arrangements, options and rights.

(q) Stock Exchange Listing. The Common Shares are registered pursuant to Section 12(b) of the Exchange Act and are listed on the Principal Market, and the Company has taken no action designed to, or likely to have the effect of, terminating the registration of the Common Shares under the Exchange Act or delisting the Common Shares from the Principal Market, nor has the Company received any notification that the Commission or the Principal Market is contemplating terminating such registration or listing. To the Company's knowledge, it is in compliance with all applicable listing requirements of the Principal Market.



(r) **Non-Contravention of Existing Instruments; No Further Authorizations or Approvals Required.** Neither the Company nor any of its subsidiaries is in violation of its charter or by-laws, partnership agreement or operating agreement or similar organizational documents, as applicable, or is in default (or, with the giving of notice or lapse of time, would be in default) (“**Default**”) under any indenture, loan, credit agreement, note, lease, license agreement, contract, franchise or other instrument (including, without limitation, any pledge agreement, security agreement, mortgage or other instrument or agreement evidencing, guaranteeing, securing or relating to indebtedness) to which the Company or any of its subsidiaries is a party or by which it or any of them may be bound, or to which any of their respective properties or assets are subject (each, an “**Existing Instrument**”), except for such Defaults as could not be expected, individually or in the aggregate, to result in a Material Adverse Change. The Company’s execution, delivery and performance of this Agreement, consummation of the transactions contemplated hereby and by the Registration Statement and the Prospectus and the issuance and sale of the Shares (including the use of proceeds from the sales of the Shares as described in the Registration Statement and the Prospectus under the caption “Use of Proceeds”) (i) have been duly authorized by all necessary corporate action and will not result in any violation of the provisions of the charter or by-laws, partnership agreement or operating agreement or similar organizational documents, as applicable, of the Company or any subsidiary, (ii) will not conflict with or constitute a breach of, or Default or a Debt Repayment Triggering Event (as defined below) under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, or require the consent of any other party to, any Existing Instrument and (iii) will not result in any violation of any law, administrative regulation or administrative or court decree applicable to the Company or any of its subsidiaries, except, in case of each of clauses (ii) and (iii) (but only in respect of laws other than federal securities laws and of administrative regulations or administrative or court decrees other than under federal securities laws) above, for any such conflict, breach, violation, Default, lien, charge or encumbrance that could not be expected, individually or in the aggregate, to result in a Material Adverse Change or materially and adversely affect the consummation of the transactions contemplated by this Agreement or the performance by the Company of its obligations hereunder. No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental or regulatory authority or agency, is required for the Company’s execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Registration Statement and the Prospectus, except such as have been obtained or made by the Company and are in full force and effect under the Securities Act and such as may be required under applicable state securities or blue sky laws or the Financial Industry Regulatory Authority, Inc. (“**FINRA**”). As used herein, a “**Debt Repayment Triggering Event**” means any event or condition which gives, or with the giving of notice or lapse of time would give, the holder of any note, debenture or other evidence of indebtedness (or any person acting on such holder’s behalf) the right to require the repurchase, redemption or repayment of all or a portion of such indebtedness by the Company or any of its subsidiaries.

(s) **Compliance with Laws.** The Company and its subsidiaries have been and are in compliance with all applicable laws, rules and regulations, and all administrative or court decrees, if any, applicable to them, except where failure to be so in compliance could not be expected, individually or in the aggregate, to result in a Material Adverse Change.

(t) **No Material Actions or Proceedings.** Except as otherwise disclosed in the Registration Statement and the Prospectus, there is no action, suit, proceeding, inquiry or investigation brought by or before any legal or governmental entity now pending or, to the knowledge of the Company, threatened, against or affecting the Company or any of its subsidiaries, which could be expected, individually or in the aggregate, to result in a Material Adverse Change or materially and adversely affect the consummation of the transactions contemplated by this Agreement or the performance by the Company of its obligations hereunder; and the aggregate of all pending legal or governmental proceedings to which the Company or any such subsidiary is a party or of which any of their respective properties or assets is the subject, including ordinary routine litigation incidental to the business, if determined adversely to the Company, could not be expected to result in a Material Adverse Change. No material labor dispute with the employees of the Company or any of its subsidiaries, nor, to the Company's knowledge, with the employees of any principal supplier, manufacturer, customer or contractor of the Company, exists or, to the knowledge of the Company, is threatened or imminent.

(u) **Intellectual Property Rights.** The Company and its subsidiaries own, or have obtained valid and enforceable licenses for, the inventions, patent applications, patents, trademarks, trade names, service names, copyrights, trade secrets and other intellectual property described in the Registration Statement and the Prospectus as being owned or licensed by them or which are necessary for the conduct of their respective businesses as currently conducted or as currently proposed to be conducted (collectively, "**Intellectual Property**"). To the Company's knowledge: (i) there are no third parties who have rights to any Intellectual Property, except for customary reversionary rights of third-party licensors with respect to Intellectual Property that is disclosed in the Registration Statement and the Prospectus as licensed to the Company or one or more of its subsidiaries; and (ii) there is no infringement by third parties of any Intellectual Property. There is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others: (A) challenging the Company's rights in or to any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; (B) challenging the validity, enforceability or scope of any Intellectual Property, and the Company is unaware of any facts which would form a reasonable basis for any such action, suit, proceeding or claim; or (C) asserting that the Company or any of its subsidiaries infringes or otherwise violates, or would, upon the commercialization of any product or service as currently contemplated by the Company described in the Registration Statement or the Prospectus as under development, infringe or violate, any patent, trademark, trade name, service name, copyright, trade secret or other proprietary rights of others, and the Company is unaware of any facts which would form a reasonable basis for any such finding of infringement or violation of intellectual property rights. The Company and its subsidiaries have complied in all material respects with the terms of each material agreement pursuant to which Intellectual Property has been licensed to the Company or any subsidiary, and all such material agreements are in full force and effect. The product candidates described in the Registration Statement and the Prospectus as under development by the Company or any subsidiary fall within the scope of the claims of one or more patents or pending patent applications owned by, or exclusively licensed to, the Company or any subsidiary.

(v) **All Necessary Permits, etc.** The Company and its subsidiaries possess such valid and current certificates, authorizations or permits required by state, federal or foreign regulatory agencies or bodies to conduct their respective businesses as currently conducted and as described in the Registration Statement or the Prospectus ("**Permits**"), except for such certificates,

authorizations or permits whose failure to obtain could not be expected, individually or in the aggregate, to result in a Material Adverse Change. Neither the Company nor any of its subsidiaries (x) is in violation of, or in default under, any of the Permits (except for such violations or defaults that could not be expected, individually or in the aggregate, to result in a Material Adverse Change) or (y) has received any notice of proceedings relating to the revocation or modification of, or non-compliance with, any such certificate, authorization or permit, which, if the subject of an unfavorable decision, ruling or finding, could be expected, individually or in the aggregate, to result in a Material Change.

(w) Title to Properties. The Company and its subsidiaries have good and marketable title to all of the real and personal property and other assets reflected as owned in the financial statements referred to in Section 2(k) above (or elsewhere in the Registration Statement or the Prospectus), in each case free and clear of any security interests, mortgages, liens, encumbrances, equities, adverse claims and other defects, except such as do not materially and adversely affect the value of such property and do not materially interfere with the use made or proposed to be made of such property by the Company or any of its subsidiaries. The real property, improvements, equipment and personal property held under lease by the Company or any of its subsidiaries are held under valid and enforceable leases, with such exceptions as are not material and do not materially interfere with the use made or proposed to be made of such real property, improvements, equipment or personal property by the Company or such subsidiary.

(x) Tax Law Compliance. The Company and its subsidiaries have filed all necessary federal, state and foreign income and franchise tax returns or have properly requested extensions thereof and have paid all taxes required to be paid by any of them and, if due and payable, any related or similar assessment, fine or penalty levied against any of them except as may be being contested in good faith and by appropriate proceedings, and except for such exceptions as could not be expected, individually or in the aggregate, to result in a Material Adverse Change. The Company has made adequate charges, accruals and reserves in the applicable financial statements referred to in Section 2(k) above in respect of all federal, state and foreign income and franchise taxes for all periods as to which the tax liability of the Company or any of its subsidiaries has not been finally determined.

(y) Insurance. Except as otherwise disclosed in the Prospectus, each of the Company and its subsidiaries is insured by recognized, financially sound and reputable institutions with policies in such amounts and with such deductibles and covering such risks as, in the reasonable judgment of the Company, are generally deemed adequate and customary for their businesses including, but not limited to, policies covering real and personal property owned or leased by the Company and its subsidiaries against theft, damage, destruction and acts of vandalism and policies covering the Company and its subsidiaries for product liability claims and clinical trial liability claims. The Company has no reason to believe that it or any of its subsidiaries will not be able (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that could not be expected to result in a Material Adverse Change. During the last three (3) years, neither the Company nor any of its subsidiaries has been denied any insurance coverage which it has sought or for which it has applied.

(z) **Compliance with Environmental Laws.** Except as described in the Prospectus and except as could not be expected, individually or in the aggregate, to result in a Material Adverse Change: (i) neither the Company nor any of its subsidiaries is in violation of any federal, state, local or foreign statute, law, rule, regulation, ordinance, code, policy or rule of common law or any judicial or administrative interpretation thereof, including any judicial or administrative order, consent, decree or judgment, relating to pollution or protection of human health, the environment (including, without limitation, ambient air, surface water, groundwater, land surface or subsurface strata) or wildlife, including, without limitation, laws and regulations relating to the release or threatened release of chemicals, pollutants, contaminants, wastes, toxic substances, hazardous substances, petroleum or petroleum products (collectively, “**Hazardous Materials**”) or to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Hazardous Materials (collectively, “**Environmental Laws**”); (ii) the Company and its subsidiaries have all permits, authorizations and approvals required under any applicable Environmental Laws and are each in compliance with their requirements; (iii) there are no pending or threatened administrative, regulatory or judicial actions, suits, demands, demand letters, claims, liens, notices of noncompliance or violation, investigation or proceedings relating to any Environmental Law against the Company or any of its subsidiaries; and (iv) there are no events or circumstances that might reasonably be expected to form the basis of an order for clean-up or remediation, or an action, suit or proceeding by any private party or governmental body or agency, against or affecting the Company or any of its subsidiaries relating to Hazardous Materials or any Environmental Laws.

(aa) **Periodic Review of Costs of Environmental Compliance.** In the ordinary course of its business, the Company conducts a periodic review of the effect of Environmental Laws on the business, operations and properties of the Company and its subsidiaries, in the course of which it identifies and evaluates associated costs and liabilities (including, without limitation, any capital or operating expenditures required for clean-up, closure of properties or compliance with Environmental Laws or any permit, license or approval, any related constraints on operating activities and any potential liabilities to third parties). No facts or circumstances have come to the Company’s attention that could result in costs or liabilities that could be expected, individually or in the aggregate, to result in a Material Adverse Change.

(bb) **ERISA Compliance.** Except as otherwise disclosed in the Prospectus, the Company and its subsidiaries and any “employee benefit plan” (as defined under the Employee Retirement Income Security Act of 1974, as amended, and the regulations and published interpretations thereunder (collectively, “**ERISA**”)) established or maintained by the Company, its subsidiaries or their “ERISA Affiliates” (as defined below) are in compliance in all material respects with ERISA. “**ERISA Affiliate**” means, with respect to the Company or any of its subsidiaries, any member of any group of organizations described in Sections 414(b), (c), (m) or (o) of the Internal Revenue Code of 1986, as amended, and the regulations and published interpretations thereunder (the “**Code**”) of which the Company or such subsidiary is a member. No “reportable event” (as defined under ERISA) has occurred or is reasonably expected to occur with respect to any “employee benefit plan” established or maintained by the Company, its subsidiaries or any of their ERISA Affiliates. No “employee benefit plan” established or maintained by the Company, its subsidiaries or any of their ERISA Affiliates, if such “employee benefit plan” were terminated, would have any “amount of unfunded benefit liabilities” (as defined under ERISA). Neither the Company, its subsidiaries nor any of their ERISA Affiliates has incurred or reasonably expects to

incur any liability under (i) Title IV of ERISA with respect to termination of, or withdrawal from, any “employee benefit plan” or (ii) Sections 412, 4971, 4975 or 4980B of the Code. Each “employee benefit plan” established or maintained by the Company, its subsidiaries or any of their ERISA Affiliates that is intended to be qualified under Section 401(a) of the Code is so qualified and nothing has occurred, whether by action or failure to act, which would cause the loss of such qualification.

(cc) Company Not an “Investment Company.” The Company is not, and will not be, either after receipt of payment for the Shares or after the application of the proceeds therefrom as described under “Use of Proceeds” in the Registration Statement or the Prospectus, required to register as an “investment company” under the Investment Company Act of 1940, as amended (the “**Investment Company Act**”).

(dd) No Price Stabilization or Manipulation; Compliance with Regulation M. Neither the Company nor any of its subsidiaries has taken, directly or indirectly, any action designed to or that might reasonably be expected to cause or result in stabilization or manipulation of the price of the Common Shares or of any “reference security” (as defined in Rule 100 of Regulation M under the Exchange Act (“**Regulation M**”)) with respect to the Common Shares, whether to facilitate the sale or resale of the Shares or otherwise, and has taken no action which would directly or indirectly violate Regulation M.

(ee) Related-Party Transactions. There are no business relationships or related-party transactions involving the Company or any of its subsidiaries or any other person required to be described in the Registration Statement or the Prospectus that have not been described as required.

(ff) FINRA Matters. All of the information provided to the Agent or to counsel for the Agent by the Company, its counsel, its officers and directors and the holders of any securities (debt or equity) or options to acquire any securities of the Company in connection with the offering of the Shares is true, complete, correct and compliant with FINRA’s rules and any letters, filings or other supplemental information provided to FINRA pursuant to FINRA Rules is true, complete and correct.

(gg) Statistical and Market-Related Data. All statistical, demographic and market-related data included in the Registration Statement or the Prospectus are based on or derived from sources that the Company believes, after reasonable inquiry, to be reliable and accurate. To the extent required, the Company has obtained the written consent to the use of such data from such sources.

(hh) Sarbanes-Oxley Act. There is, and has been, no failure on the part of the Company or any of the Company’s directors or officers, in their capacities as such, to comply with any applicable provision of the Sarbanes-Oxley Act of 2002, as amended and the rules and regulations promulgated in connection therewith, including Section 402 related to loans and Sections 302 and 906 related to certifications.

(ii) No Unlawful Contributions or Other Payments. Except as otherwise disclosed in the Prospectus, neither the Company nor any of its subsidiaries nor, to the best of the Company’s knowledge, any employee or agent of the Company or any subsidiary, has made any contribution or other payment to any official of, or candidate for, any federal, state or foreign office in violation of any law or of the character required to be disclosed in the Registration Statement or the Prospectus.

(jj) Anti-Corruption and Anti-Bribery Laws. Neither the Company nor any of its subsidiaries nor to the knowledge of the Company, any director, officer, employee, agent, Affiliate or other person acting on behalf of the Company or any of its subsidiaries has, in the course of its actions for, or on behalf of, the Company or any of its subsidiaries (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expenses relating to political activity; (ii) made or taken any act in furtherance of an offer, promise, or authorization of any direct or indirect unlawful payment or benefit to any foreign or domestic government official or employee, including of any government-owned or controlled entity or public international organization, or any political party, party official, or candidate for political office; (iii) violated or is in violation of any provision of the U.S. Foreign Corrupt Practices Act of 1977, as amended (the “**FCPA**”), the UK Bribery Act 2010, or any other applicable anti-bribery or anti-corruption law; or (iv) made, offered, authorized, requested, or taken an act in furtherance of any unlawful bribe, rebate, payoff, influence payment, kickback or other unlawful payment or benefit. The Company and its subsidiaries and, to the knowledge of the Company, the Company’s Affiliates have conducted their respective businesses in compliance with the FCPA and have instituted and maintain policies and procedures designed to ensure, and which are reasonably expected to continue to ensure, continued compliance therewith.

(kk) Money Laundering Laws. The operations of the Company and its subsidiaries are and have been conducted at all times in compliance with applicable financial recordkeeping and reporting requirements, including those of the Currency and Foreign Transactions Reporting Act of 1970, as amended, the money laundering statutes of all applicable jurisdictions, the rules and regulations thereunder and any related or similar applicable rules, regulations or guidelines, issued, administered or enforced by any governmental agency (collectively, the “**Anti-Money Laundering Laws**”), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any of its subsidiaries with respect to the Anti-Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(ll) Compliance with Sanctions Laws. Neither the Company nor any of its subsidiaries, nor, to the knowledge of the Company, any director, officer, employee, agent, Affiliate or other person acting on behalf of the Company or any of its subsidiaries is currently the subject or the target of any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury or the U.S. Department of State, the United Nations Security Council, the European Union, Her Majesty’s Treasury of the United Kingdom, or other relevant sanctions authority (collectively, “**Sanctions**”); nor is the Company or any of its subsidiaries located, organized or resident in a country or territory that is the subject or the target of Sanctions, including, without limitation, Crimea, Cuba, Iran, North Korea, and Syria (collectively, “**Sanctioned Countries**”); and the Company will not directly or indirectly use the proceeds of this offering, or lend, contribute or otherwise make available such proceeds to any subsidiary, or any joint venture partner or other person or entity, for the purpose of financing the activities of or business with any person, or in any country or territory, that at the time of such financing, is the subject or the target of Sanctions or in any other manner that will result in a violation by any person

(including any person participating in the transaction whether as underwriter, advisor, investor or otherwise) of applicable Sanctions. For the past five years, the Company and its subsidiaries have not knowingly engaged in and are not now knowingly engaged in any dealings or transactions with any person that at the time of the dealing or transaction is or was the subject or the target of Sanctions or with any Sanctioned Country.

(mm) Brokers. Except pursuant to this Agreement, there is no broker, finder or other party that is entitled to receive from the Company any brokerage or finder's fee or other fee or commission as a result of any transactions contemplated by this Agreement.

(nn) Forward-Looking Statements. Each financial or operational projection or other "forward-looking statement" (as defined by Section 27A of the Securities Act or Section 21E of the Exchange Act) contained in the Registration Statement or the Prospectus (i) was so included by the Company in good faith and with reasonable basis after due consideration by the Company of the underlying assumptions, estimates and other applicable facts and circumstances and (ii) is accompanied by meaningful cautionary statements identifying those factors that could cause actual results to differ materially from those in such forward-looking statement. No such statement was made with the knowledge of an executive officer or director of the Company that is was false or misleading.

(oo) Cybersecurity. The Company and its subsidiaries' information technology assets and equipment, computers, systems, networks, hardware, software, websites, applications, and databases (collectively, "**IT Systems**") are adequate for, and operate and perform in all material respects as required in connection with the operation of the business of the Company and its subsidiaries as currently conducted, and to the Company's knowledge, free and clear of all material bugs, errors, defects, Trojan horses, time bombs, malware and other corruptants (collectively, "**IT Threats**"). The Company and its subsidiaries have implemented and maintained commercially reasonable physical, technical and administrative controls, policies, procedures, and safeguards to maintain and protect their material confidential information and the integrity, continuous operation, redundancy and security of all IT Systems and data, including "Personal Data," used in connection with their businesses and identify IT Threats. "**Personal Data**" means (i) a natural person's name, street address, telephone number, e-mail address, photograph, social security number or tax identification number, driver's license number, passport number, credit card number, bank information, or customer or account number; (ii) any information which would qualify as "personally identifying information" under the Federal Trade Commission Act, as amended; (iii) "personal data" as defined by the European Union General Data Protection Regulation ("**GDPR**") (EU 2016/679); (iv) any information which would qualify as "protected health information" under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act (collectively, "**HIPAA**"); and (v) any other piece of information that allows the identification of such natural person, or his or her family, or permits the collection or analysis of any data related to an identified person's health or sexual orientation. To the Company's knowledge, there have been no breaches, violations, outages or unauthorized uses of or accesses to same, except for those that have been remedied without material cost or liability or the duty to notify any other person, nor any incidents under internal review or investigations relating to the same. The Company and its subsidiaries are presently in material compliance with all applicable laws or statutes and all judgments, orders, rules and regulations of any court or arbitrator or governmental or regulatory authority, internal policies and contractual obligations relating to the privacy and security of IT Systems and Personal Data and to the protection of such IT Systems and Personal Data from unauthorized use, access, misappropriation or modification.

(pp) Compliance with Data Privacy Laws. The Company and its subsidiaries are, and at all prior times were, in material compliance with all applicable state and federal data privacy and security laws and regulations, including without limitation HIPAA, and the Company and its subsidiaries have taken commercially reasonable actions to prepare to comply with, and since May 25, 2018, have been and currently are in material compliance with, GDPR (collectively, the “**Privacy Laws**”). The Company and its subsidiaries have in place, comply with, and take appropriate steps reasonably designed to ensure compliance in all material respects with their policies and procedures relating to data privacy and security and the collection, storage, use, disclosure, handling, and analysis of Personal Data (the “**Policies**”). The Company and its subsidiaries have at all times made all disclosures to users or customers required by applicable laws and regulatory rules or requirements, and none of such disclosures made or contained in any Policy have, to the knowledge of the Company, been inaccurate or in violation of any applicable laws and regulatory rules or requirements in any material respect. Neither the Company nor any subsidiary: (i) has received notice of any actual or potential liability under or relating to, or actual or potential violation of, any of the Privacy Laws, and has no knowledge of any event or condition that would reasonably be expected to result in any such notice; (ii) is currently conducting or paying for, in whole or in part, any investigation, remediation, or other corrective action pursuant to any Privacy Law; or (iii) is a party to any order, decree, or agreement that imposes any obligation or liability under any Privacy Law.

(qq) Clinical Data and Regulatory Compliance. The preclinical tests and clinical trials, and other studies (collectively, “**studies**”) that are described in, or the results of which are referred to in, the Registration Statement or the Prospectus were and, if still pending, are being conducted in all material respects in accordance with the protocols, procedures and controls designed and approved for such studies and with standard medical and scientific research procedures; each description of the results of such studies is accurate and complete in all material respects and fairly presents the data derived from such studies, and the Company and its subsidiaries have no knowledge of any other studies the results of which are inconsistent with, or otherwise call into question, the results described or referred to in the Registration Statement or the Prospectus; the Company and its subsidiaries have made all such filings and obtained all such approvals as may be required by the Food and Drug Administration of the U.S. Department of Health and Human Services or any committee thereof or from any other U.S. or foreign government or drug or medical device regulatory agency, or health care facility Institutional Review Board (collectively, the “**Regulatory Agencies**”); neither the Company nor any of its subsidiaries has received any notice of, or correspondence from, any Regulatory Agency requiring the termination, suspension or modification of any clinical trials that are described or referred to in the Registration Statement or the Prospectus; and the Company and its subsidiaries have each operated and currently are in compliance in all material respects with all applicable rules, regulations and policies of the Regulatory Agencies.



(rr) Compliance with Health Care Laws. The Company and its subsidiaries are, and at all times have been, in material compliance with all Health Care Laws. For purposes of this Agreement, “**Health Care Laws**” means: (i) the Federal Food, Drug, and Cosmetic Act (21 U.S.C. Section 301 et seq.), the Public Health Service Act (42 U.S.C. Section 201 et seq.), and the regulations promulgated thereunder; (ii) all applicable federal, state, local and foreign health care fraud and abuse laws, including, without limitation, the Anti-Kickback Statute (42 U.S.C. Section 1320a-7b(b)), the Civil False Claims Act (31 U.S.C. Section 3729 et seq.), the criminal false statements law (42 U.S.C. Section 1320a-7b(a)), 18 U.S.C. Sections 286 and 287, the health care fraud criminal provisions under the HIPAA, the Stark Law (42 U.S.C. Section 1395nn), the civil monetary penalties law (42 U.S.C. Section 1320a-7a), the exclusion law (42 U.S.C. Section 1320a-7), the Physician Payments Sunshine Act (42 U.S.C. Section 1320-7h), and applicable laws governing government funded or sponsored healthcare programs; (iii) HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (42 U.S.C. Section 17921 et seq.); (iv) the Patient Protection and Affordable Care Act of 2010, as amended by the Health Care and Education Reconciliation Act of 2010; (v) licensure, quality, safety and accreditation requirements under applicable federal, state, local or foreign laws or regulatory bodies; and (vi) all other local, state, federal, national, supranational and foreign laws, relating to the regulation of the Company or its subsidiaries, and (vii) the directives and regulations promulgated pursuant to such statutes and any state or non-U.S. counterpart thereof to which the Company or its subsidiaries are subject. Neither the Company nor any of its subsidiaries has received written notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from any court or arbitrator or governmental or regulatory authority or third party alleging that any product operation or activity is in material violation of any Health Care Laws nor, to the Company’s knowledge, is any such claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action threatened. The Company and its subsidiaries have filed, maintained or submitted all material reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Health Care Laws, and all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were complete and accurate on the date filed in all material respects (or were corrected or supplemented by a subsequent submission). Neither the Company nor any of its subsidiaries is a party to any corporate integrity agreements, monitoring agreements, consent decrees, settlement orders, or similar agreements with or imposed by any governmental or regulatory authority. Additionally, neither the Company, any of its subsidiaries, nor any of their respective employees, officers, directors, or to the knowledge of the Company, agents has been excluded, suspended or debarred from participation in any U.S. federal health care program or human clinical research or, to the knowledge of the Company, is subject to a governmental inquiry, investigation, proceeding, or other similar action that could reasonably be expected to result in debarment, suspension, or exclusion.

(ss) No Contract Terminations. Except as otherwise disclosed in the Registration Statement or the Prospectus, neither the Company nor any of its subsidiaries has sent or received any communication regarding termination of, or intent not to renew, any of the contracts or agreements referred to or described in the Prospectus or any free writing prospectus, or referred to or described in, or filed as an exhibit to, the Registration Statement, or any document incorporated by reference therein, and no such termination or non-renewal has been threatened by the Company or any of its subsidiaries or, to the Company’s knowledge, any other party to any such contract or agreement, which threat of termination or non-renewal has not been rescinded as of the date hereof.

(tt) Dividend Restrictions. Except as disclosed in the Prospectus, no subsidiary of the Company is prohibited or restricted from paying dividends to the Company, or from making any other distribution with respect to such subsidiary’s equity securities or from repaying to the Company or any other subsidiary of the Company any amounts that may from time to time become due under any loans or advances to such subsidiary from the Company or from transferring any property or assets to the Company or to any other subsidiary.

(uu) Duties, Transfer Taxes, Etc. To the Company's knowledge, no stamp or other issuance or transfer taxes or duties and no capital gains, income, withholding or other taxes are payable by the Agent in the United States or any political subdivision or taxing authority thereof or therein in connection with the execution, delivery or performance of this Agreement by the Company or the sale and delivery by the Company of the Shares.

(vv) Other Underwriting Agreements. The Company is not a party to any agreement with an agent or underwriter for any other "at the market" or continuous equity transaction. Any certificate signed by any officer or representative of the Company or any of its subsidiaries and delivered to the Agent or counsel for the Agent in connection with an issuance of Shares shall be deemed a representation and warranty by the Company to the Agent as to the matters covered thereby on the date of such certificate.

The Company acknowledges that the Agent and, for purposes of the opinions to be delivered pursuant to Section 4(o) hereof, counsel to the Company and counsel to the Agent, will rely upon the accuracy and truthfulness of the foregoing representations and hereby consents to such reliance.

### **Section 3. ISSUANCE AND SALE OF COMMON SHARES**

(a) Sale of Securities. On the basis of the representations, warranties and agreements herein contained, but subject to the terms and conditions herein set forth, the Company and the Agent agree that the Company may from time to time seek to sell Shares through the Agent, acting as sales agent, or directly to the Agent, acting as principal, as follows, with an aggregate Sales Price of up to the Maximum Program Amount, based on and in accordance with Issuance Notices as the Company may deliver, during the Agency Period.

(b) Mechanics of Issuances.

(i) Issuance Notice. Upon the terms and subject to the conditions set forth herein, on any Trading Day during the Agency Period on which the conditions set forth in Section 5(a) and Section 5(b) shall have been satisfied, the Company may exercise its right to request an issuance of Shares by delivering to the Agent an Issuance Notice; *provided, however*, that (A) in no event may the Company deliver an Issuance Notice to the extent that (I) the sum of (x) the aggregate Sales Price of the requested Issuance Amount, plus (y) the aggregate Sales Price of all Shares issued under all previous Issuance Notices effected pursuant to this Agreement, would exceed the Maximum Program Amount; and (B) prior to delivery of any Issuance Notice, the period set forth for any previous Issuance Notice shall have expired or been terminated. An Issuance Notice shall be considered delivered on the Trading Day that it is received by e-mail to the persons set forth in Schedule A hereto and confirmed by the Company by telephone (including a voicemail message to the persons so identified), with the understanding that, with adequate prior written notice, the Agent may modify the list of such persons from time to time.

(ii) Agent Efforts. Upon the terms and subject to the conditions set forth in this Agreement, upon the receipt of an Issuance Notice, the Agent will use its commercially reasonable efforts consistent with its normal sales and trading practices to place the Shares with respect to which the Agent has agreed to act as sales agent, subject to, and in accordance with the information specified in, the Issuance Notice, unless the sale of the Shares described therein has been suspended, cancelled or otherwise terminated in accordance with the terms of this Agreement. For the avoidance of doubt, the parties to this Agreement may modify an Issuance Notice at any time provided they both agree in writing to any such modification.

(iii) Method of Offer and Sale. The Shares may be offered and sold (A) in privately negotiated transactions with the consent of the Company; (B) as block transactions; or (C) by any other method permitted by law deemed to be an “at the market offering” as defined in Rule 415(a)(4) under the Securities Act, including sales made directly on the Principal Market or sales made into any other existing trading market of the Common Shares. Nothing in this Agreement shall be deemed to require either party to agree to the method of offer and sale specified in the preceding sentence, and (except as specified in clauses (A) and (B) above) the method of placement of any Shares by the Agent shall be at the Agent’s discretion.

(iv) Confirmation to the Company. If acting as sales agent hereunder, the Agent will provide written confirmation to the Company no later than the opening of the Trading Day next following the Trading Day on which it has placed Shares hereunder setting forth the number of shares sold on such Trading Day, the corresponding Sales Price and the Issuance Price payable to the Company in respect thereof.

(v) Settlement. Each issuance of Shares will be settled on the applicable Settlement Date for such issuance of Shares and, subject to the provisions of Section 5, on or before each Settlement Date, the Company will, or will cause its transfer agent to, electronically transfer the Shares being sold by crediting the Agent or its designee’s account at The Depository Trust Company through its Deposit/Withdrawal At Custodian (DWAC) System, or by such other means of delivery as may be mutually agreed upon by the parties hereto and, upon receipt of such Shares, which in all cases shall be freely tradable, transferable, registered shares in good deliverable form, the Agent will deliver, by wire transfer of immediately available funds, the related Issuance Price in same day funds delivered to an account designated by the Company prior to the Settlement Date. The Company may sell Shares to the Agent as principal at a price agreed upon at each relevant time Shares are sold pursuant to this Agreement (each, a “**Time of Sale**”).

(vi) Suspension or Termination of Sales. Consistent with standard market settlement practices, the Company or the Agent may, upon notice to the other party hereto in writing or by telephone (confirmed immediately by verifiable email), suspend any sale of Shares, and the period set forth in an Issuance Notice shall immediately terminate; *provided, however*, that (A) such suspension and termination shall not affect or impair either party’s obligations with respect to any Shares placed or sold hereunder prior to the receipt of such notice; (B) if the Company suspends or terminates any sale of Shares after the Agent confirms such sale to the Company, the Company shall still be obligated to comply with Section 3(b)(v) with respect to such Shares; and (C) if the Company defaults in its obligation to deliver Shares on a Settlement Date, the Company agrees that it will hold the Agent harmless against any loss, claim, damage or expense (including, without limitation, penalties, interest and reasonable legal fees and expenses), as incurred, arising out of or in connection with such default by the Company. The parties hereto acknowledge and agree that, in performing its obligations under this Agreement, the Agent may borrow Common Shares from

stock lenders in the event that the Company has not delivered Shares to settle sales as required by subsection (v) above, and may use the Shares to settle or close out such borrowings. The Company agrees that no such notice shall be effective against the Agent unless it is made to the persons identified in writing by the Agent pursuant to Section 3(b)(i).

(vii) No Guarantee of Placement, Etc. The Company acknowledges and agrees that (A) there can be no assurance that the Agent will be successful in placing Shares; (B) the Agent will incur no liability or obligation to the Company or any other Person if it does not sell Shares; and (C) the Agent shall be under no obligation to purchase Shares on a principal basis pursuant to this Agreement, except as otherwise specifically agreed by the Agent and the Company.

(viii) Material Non-Public Information. Notwithstanding any other provision of this Agreement, the Company and the Agent agree that the Company shall not deliver any Issuance Notice to the Agent, and the Agent shall not be obligated to place any Shares, during any period in which the Company is in possession of material non-public information.

(c) Fees. As compensation for services rendered, the Company shall pay to the Agent, on the applicable Settlement Date, the Selling Commission for the applicable Issuance Amount (including with respect to any suspended or terminated sale pursuant to Section 3(b)(vi)), by the Agent deducting the Selling Commission from the applicable Issuance Amount.

(d) Expenses. The Company agrees to pay all costs, fees and expenses incurred in connection with the performance of its obligations hereunder and in connection with the transactions contemplated hereby, including without limitation (i) all expenses incident to the issuance and delivery of the Shares (including all printing and engraving costs); (ii) all fees and expenses of the registrar and transfer agent of the Shares; (iii) all necessary issue, transfer and other stamp taxes in connection with the issuance and sale of the Shares; (iv) all fees and expenses of the Company's counsel, independent public or certified public accountants and other advisors; (v) all costs and expenses incurred in connection with the preparation, printing, filing, shipping and distribution of the Registration Statement (including financial statements, exhibits, schedules, consents and certificates of experts), the Prospectus, any Free Writing Prospectus prepared by or on behalf of, used by, or referred to by the Company, and all amendments and supplements thereto, and this Agreement; (vi) all filing fees, attorneys' fees and expenses incurred by the Company or the Agent in connection with qualifying or registering (or obtaining exemptions from the qualification or registration of) all or any part of the Shares for offer and sale under the state securities or blue sky laws or the provincial securities laws of Canada, and, if requested by the Agent, preparing and printing a "Blue Sky Survey" or memorandum and a "Canadian wrapper," and any supplements thereto, advising the Agent of such qualifications, registrations, determinations and exemptions; (vii) the reasonable fees and disbursements of the Agent's counsel, including the reasonable fees and expenses of counsel for the Agent in connection with, FINRA review, if any, and approval of the Agent's participation in the offering and distribution of the Shares; (viii) the filing fees incident to FINRA review, if any; (ix) the costs and expenses of the Company relating to investor presentations on any "road show" undertaken in connection with the marketing of the offering of the Shares, including, without limitation, expenses associated with the preparation or dissemination of any electronic road show, expenses associated with the production of road show slides and graphics, fees and expenses of any consultants engaged in connection with the road show presentations with the prior approval of the Company and travel and lodging expenses of the representatives, employees and officers of the Company and of the Agent and any such consultants; and (x) the fees and expenses associated with listing the Shares on the Principal Market. The fees and disbursements of Agent's counsel pursuant to subsections (vi) and (vii) above shall not exceed (A) \$75,000 in connection with the execution of the Agreement; (B) \$25,000 in connection with each Triggering Event Date (as defined below) on which the Company is required to provide a certificate pursuant to Section 4(o)(B) and (C) \$15,000 in connection with each Triggering Event Date on which the Company is required to provide a certificate pursuant to Sections 4(o)(A), (C) and (D).

#### Section 4. ADDITIONAL COVENANTS

The Company covenants and agrees with the Agent as follows, in addition to any other covenants and agreements made elsewhere in this Agreement:

(a) Exchange Act Compliance. During the Agency Period, the Company shall (i) file, on a timely basis, with the Commission all reports and documents required to be filed under Section 13, 14 or 15 of the Exchange Act in the manner and within the time periods required by the Exchange Act (taking into account any extension available under the Exchange Act); and (ii) either (A) include in its quarterly reports on Form 10-Q and its annual reports on Form 10-K, a summary detailing, for the relevant reporting period, (1) the number of Shares sold through the Agent pursuant to this Agreement and (2) the net proceeds received by the Company from such sales or (B) prepare a prospectus supplement containing, or include in such other filing permitted by the Securities Act or Exchange Act (each an “**Interim Prospectus Supplement**”), such summary information and, at least once a quarter and subject to this Section 4, file such Interim Prospectus Supplement pursuant to Rule 424(b) under the Securities Act (and within the time periods required by Rule 424(b) and Rule 430B under the Securities Act).

(b) Securities Act Compliance. After the date of this Agreement, the Company shall promptly advise the Agent in writing (i) of the receipt of any comments of, or requests for additional or supplemental information from, the Commission; (ii) of the time and date of any filing of any post-effective amendment to the Registration Statement, any Rule 462(b) Registration Statement or any amendment or supplement to the Prospectus, or any Free Writing Prospectus; (iii) of the time and date that any post-effective amendment to the Registration Statement or any Rule 462(b) Registration Statement becomes effective; and (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto, any Rule 462(b) Registration Statement or any amendment or supplement to the Prospectus or of any order preventing or suspending the use of any Free Writing Prospectus or the Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Shares from any securities exchange upon which they are listed for trading or included or designated for quotation, or of the threatening or initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time, the Company will use its best efforts to obtain the lifting of such order as soon as reasonably practicable. Additionally, the Company agrees that it shall comply with the provisions of Rule 424(b) and Rule 433, as applicable, under the Securities Act and will use its reasonable efforts to confirm that any filings made by the Company under such Rule 424(b) or Rule 433 were received in a timely manner by the Commission.

(c) Amendments and Supplements to the Prospectus and Other Securities Act Matters. If any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Prospectus so that the Prospectus does not include an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, not misleading, or if in the opinion of the Agent or counsel for the Agent it is otherwise necessary to amend or supplement

the Prospectus to comply with applicable law, including the Securities Act, the Company agrees (subject to Section 4(d) and 4(f)) to promptly prepare, file with the Commission and furnish at its own expense to the Agent, amendments or supplements to the Prospectus so that the statements in the Prospectus as so amended or supplemented will not include an untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, not misleading or so that the Prospectus, as amended or supplemented, will comply with applicable law including the Securities Act. Neither the Agent's consent to, or delivery of, any such amendment or supplement shall constitute a waiver of any of the Company's obligations under Sections 4(d) and 4(f).

(d) Agent's Review of Proposed Amendments and Supplements. Prior to amending or supplementing the Registration Statement (including any registration statement filed under Rule 462(b) under the Securities Act) or the Prospectus (excluding any amendment or supplement through incorporation of any report filed under the Exchange Act), the Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of each such proposed amendment or supplement, and the Company shall not file or use any such proposed amendment or supplement without the Agent's prior consent, which shall not be unreasonably withheld, conditioned or delayed, and to file with the Commission within the applicable period specified in Rule 424(b) under the Securities Act any prospectus required to be filed pursuant to such Rule.

(e) Use of Free Writing Prospectus. Neither the Company nor the Agent has prepared, used, referred to or distributed, or will prepare, use, refer to or distribute, without the other party's prior written consent, any "written communication" that constitutes a "free writing prospectus" as such terms are defined in Rule 405 under the Securities Act with respect to the offering contemplated by this Agreement (any such free writing prospectus being referred to herein as a "**Free Writing Prospectus**").

(f) Free Writing Prospectuses. The Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of each proposed free writing prospectus or any amendment or supplement thereto to be prepared by or on behalf of, used by, or referred to by the Company and the Company shall not file, use or refer to any proposed free writing prospectus or any amendment or supplement thereto without the Agent's consent, which shall not be unreasonably withheld, conditioned or delayed. The Company shall furnish to the Agent, without charge, as many copies of any free writing prospectus prepared by or on behalf of, or used by the Company, as the Agent may reasonably request. If at any time when a prospectus is required by the Securities Act (including, without limitation, pursuant to Rule 173(d)) to be delivered in connection with sales of the Shares (but in any event if at any time through and including the date of this Agreement) there occurred or occurs an event or development as a result of which any free writing prospectus prepared by or on behalf of, used by, or referred to by the Company conflicted or would conflict with the information contained in the Registration Statement or included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances prevailing at that subsequent time, not misleading, the Company shall promptly amend or supplement such free writing prospectus to eliminate or correct such conflict or so that the statements in such free writing prospectus as so amended or supplemented will not include an untrue statement of a material fact or omit to state a material fact necessary in

order to make the statements therein, in the light of the circumstances prevailing at such subsequent time, not misleading, as the case may be; *provided, however*, that prior to amending or supplementing any such free writing prospectus, the Company shall furnish to the Agent for review, a reasonable amount of time prior to the proposed time of filing or use thereof, a copy of such proposed amended or supplemented free writing prospectus and the Company shall not file, use or refer to any such amended or supplemented free writing prospectus without the Agent's consent, which shall not be unreasonably withheld, conditioned or delayed.

(g) Filing of Agent Free Writing Prospectuses. The Company shall not take any action that would result in the Agent or the Company being required to file with the Commission pursuant to Rule 433(d) under the Securities Act a free writing prospectus prepared by or on behalf of the Agent that the Agent otherwise would not have been required to file thereunder.

(h) Copies of Registration Statement and Prospectus. After the date of this Agreement through the last time that a prospectus is required by the Securities Act (including, without limitation, pursuant to Rule 173(d)) to be delivered in connection with sales of the Shares, the Company agrees to furnish the Agent with copies (which may be electronic copies) of the Registration Statement and each amendment thereto, and with copies of the Prospectus and each amendment or supplement thereto in the form in which it is filed with the Commission pursuant to the Securities Act or Rule 424(b) under the Securities Act, both in such quantities as the Agent may reasonably request from time to time; and, if the delivery of a prospectus is required under the Securities Act or under the blue sky or securities laws of any jurisdiction at any time on or prior to the applicable Settlement Date for any period set forth in an Issuance Notice in connection with the offering or sale of the Shares and if at such time any event has occurred as a result of which the Prospectus as then amended or supplemented would include an untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made when such Prospectus is delivered, not misleading, or, if for any other reason it is necessary during such same period to amend or supplement the Prospectus or to file under the Exchange Act any document incorporated by reference in the Prospectus in order to comply with the Securities Act or the Exchange Act, to notify the Agent and to request that the Agent suspend offers to sell Shares (and, if so notified, the Agent shall cease such offers as soon as practicable); and if the Company decides to amend or supplement the Registration Statement or the Prospectus as then amended or supplemented, to advise the Agent promptly by telephone (with confirmation in writing) and to prepare and cause to be filed promptly with the Commission an amendment or supplement to the Registration Statement or the Prospectus as then amended or supplemented that will correct such statement or omission or effect such compliance; provided, however, that if during such same period the Agent is required to deliver a prospectus in respect of transactions in the Shares, the Company shall promptly prepare and file with the Commission such an amendment or supplement.

(i) Blue Sky Compliance. The Company shall cooperate with the Agent and counsel for the Agent to qualify or register the Shares for sale under (or obtain exemptions from the application of) the state securities or blue sky laws or Canadian provincial securities laws of those jurisdictions designated by the Agent, shall comply with such laws and shall continue such qualifications, registrations and exemptions in effect so long as required for the distribution of the Shares. The Company shall not be required to qualify as a foreign corporation or to take any action that would subject it to general service of process in any such jurisdiction where it is not presently

qualified or where it would be subject to taxation as a foreign corporation. The Company will advise the Agent promptly of the suspension of the qualification or registration of (or any such exemption relating to) the Shares for offering, sale or trading in any jurisdiction or any initiation or threat of any proceeding for any such purpose, and in the event of the issuance of any order suspending such qualification, registration or exemption, the Company shall use its best efforts to obtain the withdrawal thereof as soon as reasonably practicable.

(j) Earnings Statement. As soon as practicable, the Company will make generally available to its security holders and to the Agent an earnings statement (which need not be audited) covering a period of at least twelve months beginning with the first fiscal quarter of the Company occurring after the date of this Agreement which shall satisfy the provisions of Section 11(a) of the Securities Act and Rule 158 under the Securities Act.

(k) Listing; Reservation of Shares. (a) The Company will maintain the listing of the Shares on the Principal Market; and (b) the Company will reserve and keep available at all times, free of preemptive rights, Shares for the purpose of enabling the Company to satisfy its obligations under this Agreement.

(l) Transfer Agent. The Company shall engage and maintain, at its expense, a registrar and transfer agent for the Shares.

(m) Due Diligence. During the term of this Agreement, the Company will reasonably cooperate with any reasonable due diligence review conducted by the Agent in connection with the transactions contemplated hereby, including, without limitation, providing information and making available documents and senior corporate officers, during normal business hours and at the Company's principal offices, as the Agent may reasonably request from time to time.

(n) Representations and Warranties. The Company acknowledges that each delivery of an Issuance Notice and each delivery of Shares on a Settlement Date shall be deemed to be (i) an affirmation to the Agent that the representations and warranties of the Company contained in or made pursuant to this Agreement are true and correct as of the date of such Issuance Notice or of such Settlement Date, as the case may be, as though made at and as of each such date, except as may be disclosed in the Prospectus (including any documents incorporated by reference therein and any supplements thereto); and (ii) an undertaking that the Company will advise the Agent if any of such representations and warranties will not be true and correct as of the Settlement Date for the Shares relating to such Issuance Notice, as though made at and as of each such date (except that such representations and warranties shall be deemed to relate to the Registration Statement and the Prospectus as amended and supplemented relating to such Shares).

(o) Deliverables at Triggering Event Dates; Certificates. The Company agrees that on or prior to the date of the first Issuance Notice and, during the term of this Agreement after the date of the first Issuance Notice, upon:

(A) the filing of the Prospectus or the amendment or supplement of any Registration Statement or Prospectus (other than a prospectus supplement relating solely to an offering of securities other than the Shares or a prospectus filed pursuant to Section 4(a)(ii)(B)), by means of a post-effective amendment, sticker or supplement, but not by means of incorporation of documents by reference into the Registration Statement or Prospectus;



(B) the filing with the Commission of an annual report on Form 10-K (including any Form 10-K/A containing amended financial information or a material amendment to the previously filed annual report on Form 10-K) of the Company;

(C) the filing with the Commission of a quarterly report on Form 10-Q (including any Form 10-Q/A containing amended financial information or a material amendment to the previously filed quarterly report on Form 10-Q) of the Company; or

(D) the filing with the Commission of a current report on Form 8-K of the Company containing amended financial information (other than information “furnished” pursuant to Item 2.02 or 7.01 of Form 8-K or to provide disclosure pursuant to Item 8.01 of Form 8-K relating to reclassification of certain properties as discontinued operations in accordance with Statement of Financial Accounting Standards No. 144) that is material to the offering of securities of the Company in the Agent’s reasonable discretion;

(any such event, a “**Triggering Event Date**”), the Company shall furnish the Agent (but in the case of clause (C) above only if the Agent reasonably determines that the information contained in such current report on Form 8-K of the Company is material) with a certificate as of the Triggering Event Date, in the form and substance satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as amended or supplemented, (A) confirming that the representations and warranties of the Company contained in this Agreement are true and correct on the date of such certificate as if made on such date, (B) confirming that the Company has performed all of its obligations hereunder to be performed on or prior to the date of such certificate and as to the matters set forth in Section 5(a)(iii) hereof, and (C) containing any other certification that the Agent shall reasonably request. The requirement to provide a certificate under this Section 4(o) shall be waived for any Triggering Event Date occurring at a time when no Issuance Notice is pending or a suspension is in effect, which waiver shall continue until the earlier to occur of the date the Company delivers instructions for the sale of Shares hereunder (which for such calendar quarter shall be considered a Triggering Event Date) and the next occurring Triggering Event Date. Notwithstanding the foregoing, if the Company subsequently decides to sell Shares following a Triggering Event Date when a suspension was in effect and did not provide the Agent with a certificate under this Section 4(o), then before the Company delivers the instructions for the sale of Shares or the Agent sells any Shares pursuant to such instructions, the Company shall provide the Agent with a certificate in conformity with this Section 4(o) dated as of the date that the instructions for the sale of Shares are issued.

(p) Legal Opinions. On or prior to the date of the first Issuance Notice and on or prior to each Triggering Event Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 4(o) for which no waiver is applicable and excluding the date of this Agreement, a negative assurances letter and a written legal opinion of Gibson, Dunn & Crutcher LLP, counsel to the Company, a negative assurances letter of Latham & Watkins LLP, counsel to the Agent, and a written legal opinion of Honigman LLC, intellectual property counsel to the Company, with respect to certain intellectual property matters, each dated the date of delivery, shall be delivered to the Agent, each in form and substance reasonably satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel, modified, as necessary, to relate to the Registration Statement and the Prospectus as then amended

or supplemented. In lieu of such opinions for subsequent periodic filings, in the discretion of the Agent, the Company may furnish a reliance letter from such counsel to the Agent, permitting the Agent to rely on a previously delivered opinion letter, modified as appropriate for any passage of time or Triggering Event Date (except that statements in such prior opinion shall be deemed to relate to the Registration Statement and the Prospectus as amended or supplemented as of such Triggering Event Date).

(q) Comfort Letter. On or prior to the date of the first Issuance Notice and on or prior to each Triggering Event Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 4(o) for which no waiver is applicable and excluding the date of this Agreement, the Company shall cause Rose, Snyder & Jacobs, LLP, the independent registered public accounting firm who has audited the financial statements included or incorporated by reference in the Registration Statement, to furnish the Agent a comfort letter, dated the date of delivery, in form and substance reasonably satisfactory to the Agent and its counsel, substantially similar to the form previously provided to the Agent and its counsel; provided, however, that any such comfort letter will only be required on the Triggering Event Date specified to the extent that it contains financial statements filed with the Commission under the Exchange Act and incorporated or deemed to be incorporated by reference into a Prospectus. If requested by the Agent, the Company shall also cause a comfort letter to be furnished to the Agent within five (5) Trading Days of the date of occurrence of any material transaction or event requiring the filing of a current report on Form 8-K containing material amended financial information of the Company, including the restatement of the Company's financial statements. The Company shall be required to furnish no more than one comfort letter hereunder per calendar quarter.

(r) Secretary's Certificate. On or prior to the date of the first Issuance Notice and on or prior to each Triggering Event Date with respect to which the Company is obligated to deliver a certificate pursuant to Section 4(o) for which no waiver is applicable, the Company shall furnish the Agent a certificate executed by the Secretary of the Company, signing in such capacity, dated the date of delivery (i) certifying that attached thereto are true and complete copies of the resolutions duly adopted by the Board of Directors of the Company authorizing the execution and delivery of this Agreement and the consummation of the transactions contemplated hereby (including, without limitation, the issuance of the Shares pursuant to this Agreement), which authorization shall be in full force and effect on and as of the date of such certificate, (ii) certifying and attesting to the office, incumbency, due authority and specimen signatures of each Person who executed this Agreement for or on behalf of the Company, and (iii) containing any other certification that the Agent shall reasonably request.

(s) Agent's Own Account; Clients' Account. The Company consents to the Agent trading, in compliance with applicable law, in the Common Shares for the Agent's own account and for the account of its clients at the same time as sales of the Shares occur pursuant to this Agreement.

(t) Investment Limitation. The Company shall not invest, or otherwise use the proceeds received by the Company from its sale of the Shares in such a manner as would require the Company or any of its subsidiaries to register as an investment company under the Investment Company Act.

(u) Market Activities. The Company will not take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Shares or any other reference security, whether to facilitate the sale or resale of the Shares or otherwise, and the Company will, and shall cause each of its Affiliates to, comply with all applicable provisions of Regulation M. If the limitations of Rule 102 of Regulation M (“**Rule 102**”) do not apply with respect to the Shares or any other reference security pursuant to any exception set forth in Section (d) of Rule 102, then promptly upon notice from the Agent (or, if later, at the time stated in the notice), the Company will, and shall cause each of its Affiliates to, comply with Rule 102 as though such exception were not available but the other provisions of Rule 102 (as interpreted by the Commission) did apply. The Company shall promptly notify the Agent if it no longer meets the requirements set forth in Section (d) of Rule 102.

(v) Notice of Other Sale. Without the written consent of the Agent, the Company will not, directly or indirectly, (i) offer to sell, sell, contract to sell, grant any option to sell or otherwise dispose of any Common Shares or securities convertible into or exchangeable for Common Shares (other than Shares hereunder), warrants or any rights to purchase or acquire Common Shares, during the period beginning on the third Trading Day immediately prior to the date on which any Issuance Notice is delivered to the Agent hereunder and ending on the earlier of (A) the third Trading Day immediately following the Settlement Date with respect to Shares sold pursuant to such Issuance Notice and (B) the date an Issuance Notice is cancelled if no Shares have been sold pursuant to such Issuance Notice; (ii) effect a reverse stock split, recapitalization, share consolidation, reclassification or similar transaction affecting the outstanding Common Shares; or (iii) enter into any other “at the market” or continuous equity transaction offer to sell, sell, contract to sell, grant any option to sell or otherwise dispose of any Common Shares (other than the Shares offered pursuant to this Agreement) or securities convertible into or exchangeable for Common Shares, warrants or any rights to purchase or acquire, Common Shares prior to the termination of this Agreement; provided, however, that such restrictions will not be required in connection with the Company’s (w) issuance or sale of Common Shares, options to purchase Common Shares or Common Shares issuable upon the exercise of options or other equity awards pursuant to any employee or director share option, incentive or benefit plan, share purchase or ownership plan, long-term incentive plan, dividend reinvestment plan, inducement award under Principal Market rules or other compensation plan of the Company or its subsidiaries, as in effect on the date of this Agreement, (x) issuance or sale of Common Shares issuable upon exchange, conversion or redemption of securities or the exercise or vesting of warrants, options or other equity awards outstanding at the date of this Agreement or subsequently disclosed in filings by the Company available on EDGAR or otherwise in writing to the Agent, (y) issuance or sale of Common Shares or securities convertible into or exchangeable for Common Shares as consideration for mergers, acquisitions, other business combinations, joint ventures or strategic alliances occurring after the date of this Agreement which are not used for capital raising purposes, provided that the aggregate number of Common Shares issued or underlying such securities convertible into or exchangeable for Common Shares issued in connection with all such acquisitions and other transactions does not exceed 5% of the aggregate number of Common Shares outstanding as of the date of such issuance, and (z) modification of any outstanding options, warrants of any rights to purchase or acquire Common Shares.

## Section 5. CONDITIONS TO DELIVERY OF ISSUANCE NOTICES AND TO SETTLEMENT

(a) Conditions Precedent to the Right of the Company to Deliver an Issuance Notice and the Obligation of the Agent to Sell Shares. The right of the Company to deliver an Issuance Notice hereunder is subject to the satisfaction, on the date of delivery of such Issuance Notice, and the obligation of the Agent to use its commercially reasonable efforts to place Shares during the applicable period set forth in the Issuance Notice is subject to the satisfaction, on each Trading Day during the applicable period set forth in the Issuance Notice, of each of the following conditions:

- (i) Accuracy of the Company's Representations and Warranties; Performance by the Company. The Company shall have delivered the certificate required to be delivered pursuant to Section 4(o) on or before the date on which delivery of such certificate is required pursuant to Section 4(o). The Company shall have performed, satisfied and complied with all covenants, agreements and conditions required by this Agreement to be performed, satisfied or complied with by the Company at or prior to such date, including, but not limited to, the covenants contained in Section 4(p), Section 4(q) and Section 4(r).
- (ii) No Injunction. No statute, rule, regulation, executive order, decree, ruling or injunction shall have been enacted, entered, promulgated or endorsed by any court or governmental authority of competent jurisdiction or any self-regulatory organization having authority over the matters contemplated hereby that prohibits or directly and materially adversely affects any of the transactions contemplated by this Agreement, and no proceeding shall have been commenced that may have the effect of prohibiting or materially adversely affecting any of the transactions contemplated by this Agreement.
- (iii) Material Adverse Changes. Except as disclosed in the Prospectus and the Time of Sale Information, (a) in the judgment of the Agent there shall not have occurred any Material Adverse Change; and (b) there shall not have occurred any downgrading, nor shall any notice have been received by the Company of any intended or potential downgrading or of any review for a possible change that does not indicate the direction of the possible change, in the rating accorded any securities of the Company or any of its subsidiaries by any "nationally recognized statistical rating organization" as such term is defined for purposes of Section 3(a)(62) of the Exchange Act.
- (iv) No Suspension of Trading in or Delisting of Common Shares; Other Events. The trading of the Common Shares (including without limitation the Shares) shall not have been suspended by the Commission, the Principal Market or FINRA and the Common Shares (including without limitation the Shares) shall have been approved for listing or quotation on and shall not have been delisted from the Nasdaq Stock Market, the New York Stock Exchange or any of their constituent markets. There shall not have occurred (and be continuing in the case of occurrences under clauses (i) and (ii) below) any of the following: (i) trading or quotation in any of

the Company's securities shall have been suspended or limited by the Commission or by the Principal Market or trading in securities generally on the Principal Market shall have been suspended or limited, or minimum or maximum prices shall have been generally established on any of such stock exchanges by the Commission or the FINRA; (ii) a general banking moratorium shall have been declared by any of federal or New York, authorities; or (iii) there shall have occurred any outbreak or escalation of national or international hostilities or any crisis or calamity, or any change in the United States or international financial markets, or any substantial change or development involving a prospective substantial change in United States' or international political, financial or economic conditions, as in the judgment of the Agent is material and adverse and makes it impracticable to market the Shares in the manner and on the terms described in the Prospectus or to enforce contracts for the sale of securities.

(b) Documents Required to be Delivered on each Issuance Notice Date. The Agent's obligation to use its commercially reasonable efforts to place Shares hereunder shall additionally be conditioned upon the delivery to the Agent on or before the Issuance Notice Date of a certificate in form and substance reasonably satisfactory to the Agent, executed by the Chief Executive Officer, President, Chief Financial Officer or Chief Operating Officer of the Company, to the effect that all conditions to the delivery of such Issuance Notice shall have been satisfied as at the date of such certificate (which certificate shall not be required if the foregoing representations shall be set forth in the Issuance Notice).

(c) No Misstatement or Material Omission. The Agent shall not have advised the Company that the Registration Statement, the Prospectus or the Time of Sale Information, or any amendment or supplement thereto, contains an untrue statement of fact that in the Agent's reasonable opinion is material, or omits to state a fact that in the Agent's reasonable opinion is material and is required to be stated therein or is necessary to make the statements therein not misleading.

## **Section 6. INDEMNIFICATION AND CONTRIBUTION**

(a) Indemnification of the Agent. The Company agrees to indemnify and hold harmless the Agent, its officers and employees, and each person, if any, who controls the Agent within the meaning of the Securities Act or the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which the Agent or such officer, employee or controlling person may become subject, under the Securities Act, the Exchange Act, other federal or state statutory law or regulation, or the laws or regulations of foreign jurisdictions where Shares have been offered or sold or at common law or otherwise (including in settlement of any litigation), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon: (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430B under the Securities Act, or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading; (ii) any untrue statement or alleged untrue statement of a material fact contained in any Free Writing Prospectus that the Company has used, referred to or filed, or is required to file, pursuant to Rule 433(d) of the Securities Act or the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; or (iii)

any act or failure to act or any alleged act or failure to act by the Agent in connection with, or relating in any manner to, the Common Shares or the offering contemplated hereby, and which is included as part of or referred to in any loss, claim, damage, liability or action arising out of or based upon any matter covered by clause (i) or (ii) above, provided that the Company shall not be liable under this clause (iii) to the extent that a court of competent jurisdiction shall have determined by a final judgment that such loss, claim, damage, liability or action resulted directly from any such acts or failures to act undertaken or omitted to be taken by the Agent through its bad faith or willful misconduct, and to reimburse the Agent and each such officer, employee and controlling person for any and all documented expenses (including the reasonable fees and disbursements of counsel chosen by the Agent) as such expenses are reasonably incurred by the Agent or such officer, employee or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action; provided, however, that the foregoing indemnity agreement shall not apply to any loss, claim, damage, liability or expense to the extent, but only to the extent, arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Agent expressly for use in the Registration Statement, any such Free Writing Prospectus or the Prospectus (or any amendment or supplement thereto), it being understood and agreed that the only such information furnished by the Agent to the Company consists of the information set forth in the first sentence of the ninth paragraph under the caption "Plan of Distribution" in the Prospectus (the "**Agent Information**"). The indemnity agreement set forth in this Section 6(a) shall be in addition to any liabilities that the Company may otherwise have.

(b) Indemnification of the Company and Company Officers and Directors. The Agent agrees to indemnify and hold harmless the Company, each of its directors, each of its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of the Securities Act or the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which the Company or any such director, officer or controlling person may become subject, under the Securities Act, the Exchange Act, other federal or state statutory law or regulation, or the laws or regulations of foreign jurisdictions where Shares have been offered or sold or at common law or otherwise (including in settlement of any litigation), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon (i) any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430B under the Securities Act, or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading; or (ii) any untrue statement or alleged untrue statement of a material fact contained in any Free Writing Prospectus that the Company has used, referred to or filed, or is required to file, pursuant to Rule 433(d) of the Securities Act or the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; but, for each of (i) and (ii) above, only to the extent arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Agent expressly for use in the Registration Statement, any such Free Writing Prospectus or the Prospectus (or any amendment or supplement thereto), it being understood and agreed that the only such information furnished by the Agent to the Company consists of the Agent Information, and to reimburse the Company and each such director, officer and controlling person for any and all documented expenses (including the reasonable and documented fees and

disbursements of counsel chosen by the Company) as such expenses are reasonably incurred by the Company or such officer, director or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action. The indemnity agreement set forth in this Section 6(b) shall be in addition to any liabilities that the Agent or the Company may otherwise have.

(c) Notifications and Other Indemnification Procedures. Promptly after receipt by an indemnified party under this Section 6 of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against an indemnifying party under this Section 6, notify the indemnifying party in writing of the commencement thereof, but the omission so to notify the indemnifying party will not relieve it from any liability which it may have to any indemnified party for contribution or otherwise than under the indemnity agreement contained in this Section 6 or to the extent it is not prejudiced as a proximate result of such failure. In case any such action is brought against any indemnified party and such indemnified party seeks or intends to seek indemnity from an indemnifying party, the indemnifying party will be entitled to participate in, and, to the extent that it shall elect, jointly with all other indemnifying parties similarly notified, by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel reasonably satisfactory to such indemnified party; provided, however, if the defendants in any such action include both the indemnified party and the indemnifying party and the indemnified party shall have reasonably concluded that a conflict may arise between the positions of the indemnifying party and the indemnified party in conducting the defense of any such action or that there may be legal defenses available to it and/or other indemnified parties which are different from or additional to those available to the indemnifying party, the indemnified party or parties shall have the right to select separate counsel to assume such legal defenses and to otherwise participate in the defense of such action on behalf of such indemnified party or parties. Upon receipt of notice from the indemnifying party to such indemnified party of such indemnifying party's election to so assume the defense of such action and approval by the indemnified party of counsel, the indemnifying party will not be liable to such indemnified party under this Section 6 for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof unless (i) the indemnified party shall have employed separate counsel in accordance with the proviso to the preceding sentence (it being understood, however, that the indemnifying party shall not be liable for the fees and expenses of more than one separate counsel (together with local counsel), representing the indemnified parties who are parties to such action), which counsel (together with any local counsel) for the indemnified parties shall be selected by the indemnified party (in the case of counsel for the indemnified parties referred to in Section 6(a) or Section 6(b) above), (ii) the indemnifying party shall not have employed counsel reasonably satisfactory to the indemnified party to represent the indemnified party within a reasonable time after notice of commencement of the action or (iii) the indemnifying party has authorized in writing the employment of counsel for the indemnified party at the expense of the indemnifying party, in each of which cases the fees and expenses of counsel shall be at the expense of the indemnifying party and shall be paid as they are incurred.

(d) Settlements. The indemnifying party under this Section 6 shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party against any loss, claim, damage, liability or expense by reason of such settlement

or judgment. Notwithstanding the foregoing sentence, if at any time an indemnified party shall have requested an indemnifying party to reimburse the indemnified party for fees and expenses of counsel as contemplated by Section 6(b) hereof, the indemnifying party agrees that it shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 60 days after receipt by such indemnifying party of the aforesaid request; and (ii) such indemnifying party shall not have reimbursed the indemnified party in accordance with such request prior to the date of such settlement. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement, compromise or consent to the entry of judgment in any pending or threatened action, suit or proceeding in respect of which any indemnified party is or could have been a party and indemnity was or could have been sought hereunder by such indemnified party, unless such settlement, compromise or consent includes an unconditional release of such indemnified party from all liability on claims that are the subject matter of such action, suit or proceeding.

(e) Contribution. If the indemnification provided for in this Section 6 is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party in respect of any losses, claims, damages, liabilities or expenses referred to therein, then each indemnifying party shall contribute to the aggregate amount paid or payable by such indemnified party, as incurred, as a result of any losses, claims, damages, liabilities or expenses referred to therein (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Agent, on the other hand, from the offering of the Shares pursuant to this Agreement; or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company, on the one hand, and the Agent, on the other hand, in connection with the statements or omissions which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Agent, on the other hand, in connection with the offering of the Shares pursuant to this Agreement shall be deemed to be in the same respective proportions as the total gross proceeds from the offering of the Shares (before deducting expenses) received by the Company bear to the total commissions received by the Agent. The relative fault of the Company, on the one hand, and the Agent, on the other hand, shall be determined by reference to, among other things, whether any such untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact relates to information supplied by the Company, on the one hand, or the Agent, on the other hand, and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in Section 6(c), any reasonable and documented legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 6(c) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 6(e); *provided, however*, that no additional notice shall be required with respect to any action for which notice has been given under Section 6(c) for purposes of indemnification.



The Company and the Agent agree that it would not be just and equitable if contribution pursuant to this Section 6(e) were determined by pro rata allocation or by any other method of allocation which does not take account of the equitable considerations referred to in this Section 6(e).

Notwithstanding the provisions of this Section 6(e), the Agent shall not be required to contribute any amount in excess of the agent fees received by the Agent in connection with the offering contemplated hereby. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. For purposes of this Section 6(e), each officer and employee of the Agent and each person, if any, who controls the Agent within the meaning of the Securities Act or the Exchange Act shall have the same rights to contribution as the Agent, and each director of the Company, each officer of the Company who signed the Registration Statement, and each person, if any, who controls the Company with the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as the Company.

## **Section 7. TERMINATION & SURVIVAL**

(a) Term. Subject to the provisions of this Section 7, the term of this Agreement shall continue from the date of this Agreement until the end of the Agency Period, unless earlier terminated by the parties to this Agreement pursuant to this Section 7.

### **(b) Termination; Survival Following Termination**

- (i) Either party may terminate this Agreement prior to the end of the Agency Period, by giving written notice as required by this Agreement, upon ten (10) Trading Days' notice to the other party; provided that, (A) if the Company terminates this Agreement after the Agent confirms to the Company any sale of Shares, the Company shall remain obligated to comply with Section 3(b)(v) with respect to such Shares and (B) Section 2, Section 6, Section 7 and Section 8 shall survive termination of this Agreement. If termination shall occur prior to the Settlement Date for any sale of Shares, such sale shall nevertheless settle in accordance with the terms of this Agreement.
- (ii) In addition to the survival provision of Section 7(b)(i), the respective indemnities, agreements, representations, warranties and other statements of the Company, of its officers and of the Agent set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation made by or on behalf of the Agent or the Company or any of its or their partners, officers or directors or any controlling person, as the case may be, and, anything herein to the contrary notwithstanding, will survive delivery of and payment for the Shares sold hereunder and any termination of this Agreement.

## Section 8. MISCELLANEOUS

(a) Press Releases and Disclosure. The Company may issue a press release describing the material terms of the transactions contemplated hereby as soon as practicable following the date of this Agreement, and may file with the Commission a Current Report on Form 8-K, with this Agreement attached as an exhibit thereto, describing the material terms of the transactions contemplated hereby, and the Company shall consult with the Agent prior to making such disclosures, and the parties hereto shall use all commercially reasonable efforts, acting in good faith, to agree upon a text for such disclosures that is reasonably satisfactory to all parties hereto. No party hereto shall issue thereafter any press release or like public statement (including, without limitation, any disclosure required in reports filed with the Commission pursuant to the Exchange Act) related to this Agreement or any of the transactions contemplated hereby without the prior written approval of the other party hereto, except as may be necessary or appropriate in the reasonable opinion of the party seeking to make disclosure to comply with the requirements of applicable law or stock exchange rules. If any such press release or like public statement is so required, the party making such disclosure shall consult with the other party prior to making such disclosure, and the parties shall use all commercially reasonable efforts, acting in good faith, to agree upon a text for such disclosure that is reasonably satisfactory to all parties hereto.

(b) No Advisory or Fiduciary Relationship. The Company acknowledges and agrees that (i) the transactions contemplated by this Agreement, including the determination of any fees, are arm's-length commercial transactions between the Company and the Agent, (ii) when acting as a principal under this Agreement, the Agent is and has been acting solely as a principal and is not the agent or fiduciary of the Company, or its stockholders, creditors, employees or any other party, (iii) the Agent has not assumed nor will assume an advisory or fiduciary responsibility in favor of the Company with respect to the transactions contemplated hereby or the process leading thereto (irrespective of whether the Agent has advised or is currently advising the Company on other matters) and the Agent does not have any obligation to the Company with respect to the transactions contemplated hereby except the obligations expressly set forth in this Agreement, (iv) the Agent and its respective Affiliates may be engaged in a broad range of transactions that involve interests that differ from those of the Company, and (v) the Agent has not provided any legal, accounting, regulatory or tax advice with respect to the transactions contemplated hereby and the Company has consulted its own legal, accounting, regulatory and tax advisors to the extent it deemed appropriate.

(c) Research Analyst Independence. The Company acknowledges that the Agent's research analysts and research departments are required to and should be independent from their respective investment banking divisions and are subject to certain regulations and internal policies, and as such the Agent's research analysts may hold views and make statements or investment recommendations and/or publish research reports with respect to the Company or the offering that differ from the views of their respective investment banking divisions. The Company understands that the Agent is a full service securities firm and as such from time to time, subject to applicable securities laws, may effect transactions for its own account or the account of its customers and hold long or short positions in debt or equity securities of the companies that may be the subject of the transactions contemplated by this Agreement.

(d) Notices. All communications hereunder shall be in writing and shall be mailed, hand delivered or telecopied and confirmed to the parties hereto as follows:

If to the Agent:

Jefferies LLC  
520 Madison Avenue  
New York, NY 10022  
Facsimile: (646) 786-5719  
Attention: General Counsel

with a copy (which shall not constitute notice) to:

Latham & Watkins LLP  
12670 High Bluff Drive  
San Diego, CA 92130  
Facsimile: (858) 523-5450  
Attention: Cheston J. Larson

If to the Company:

Arrowhead Pharmaceuticals, Inc.  
177 E. Colorado Blvd., Suite 700  
Pasadena, CA 91105  
Facsimile: (626) 304-3401  
Attention: General Counsel

with a copy (which shall not constitute notice) to:

Gibson, Dunn & Crutcher LLP  
555 Mission Street  
San Francisco, CA 94105  
Facsimile: (415) 374-8430  
Attention: Ryan A. Murr; Branden C. Berns

Any party hereto may change the address for receipt of communications by giving written notice to the others in accordance with this Section 8(d).

(e) Successors. This Agreement will inure to the benefit of and be binding upon the parties hereto, and to the benefit of the employees, officers and directors and controlling persons referred to in Section 6, and in each case their respective successors, and no other person will have any right or obligation hereunder. The term "successors" shall not include any purchaser of the Shares as such from the Agent merely by reason of such purchase.

(f) Partial Unenforceability. The invalidity or unenforceability of any Article, Section, paragraph or provision of this Agreement shall not affect the validity or enforceability of any other Article, Section, paragraph or provision hereof. If any Article, Section, paragraph or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

(g) Governing Law Provisions. This Agreement shall be governed by and construed in accordance with the internal laws of the State of New York applicable to agreements made and to be performed in such state. Any legal suit, action or proceeding arising out of or based upon this Agreement or the transactions contemplated hereby may be instituted in the federal courts of the United States of America located in the Borough of Manhattan in the City of New York or the courts of the State of New York in each case located in the Borough of Manhattan in the City of New York (collectively, the “**Specified Courts**”), and each party irrevocably submits to the exclusive jurisdiction (except for proceedings instituted in regard to the enforcement of a judgment of any such court, as to which such jurisdiction is non-exclusive) of such courts in any such suit, action or proceeding. Service of any process, summons, notice or document by mail to such party’s address set forth above shall be effective service of process for any suit, action or other proceeding brought in any such court. The parties irrevocably and unconditionally waive any objection to the laying of venue of any suit, action or other proceeding in the Specified Courts and irrevocably and unconditionally waive and agree not to plead or claim in any such court that any such suit, action or other proceeding brought in any such court has been brought in an inconvenient forum.

(h) General Provisions. This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may be executed in two or more counterparts, each one of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument, and may be delivered by facsimile transmission or by electronic delivery of a portable document format (PDF) file. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. The Article and Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

*[Signature Page Immediately Follows]*

If the foregoing is in accordance with your understanding of our agreement, kindly sign and return to the Company the enclosed copies hereof, whereupon this instrument, along with all counterparts hereof, shall become a binding agreement in accordance with its terms

Very truly yours,

**ARROWHEAD PHARMACEUTICALS, INC.**

By: /s/ Christopher Anzalone

Name: Christopher Anzalone

Title: Chief Executive Officer

The foregoing Agreement is hereby confirmed and accepted by the Agent in New York, New York as of the date first above written.

**JEFFERIES LLC**

By: /s/ Michael Magarro

Name: Michael Magarro

Title: Managing Director

**EXHIBIT A**  
ISSUANCE NOTICE

[Date]

Jefferies LLC  
520 Madison Avenue  
New York, New York 10022

Attn: [\_\_\_\_\_]

Reference is made to the Open Market Sale Agreement between Arrowhead Pharmaceuticals, Inc. (the “**Company**”) and Jefferies LLC (the “**Agent**”) dated as of December 2, 2022. The Company confirms that all conditions to the delivery of this Issuance Notice are satisfied as of the date hereof.

Date of Delivery of Issuance Notice (determined pursuant to Section 3(b)(i)):

\_\_\_\_\_

Issuance Amount (equal to the total Sales Price for such Shares):

\$ \_\_\_\_\_

Number of days in selling period: \_\_\_\_\_

First date of selling period: \_\_\_\_\_

Last date of selling period: \_\_\_\_\_

Settlement Date(s) if other than standard T+2 settlement:

\_\_\_\_\_

Floor Price Limitation (in no event less than \$1.00 without the prior written consent of the Agent, which consent may be withheld in the Agent’s sole discretion): \$ \_\_\_\_ per share

Comments: \_\_\_\_\_

\_\_\_\_\_  
By: \_\_\_\_\_  
Name:  
Title:

---

**Schedule A**  
**Notice Parties**

The Company

Christopher Anzalone (canzalone@arrowheadpharma.com)

Vince Anzalone (vanzalone@arrowheadpharma.com)

Ken Myszkowski (kmyszkowski@arrowheadpharma.com)

Patrick O'Brien (pobrien@arrowheadpharma.com)

The Agent

Michael Brinkman (mbrinkman@jefferies.com)

Michael Magarro (mmagarro@jefferies.com)

Donald Lynaugh (dlynaugh@jefferies.com)

Jack Fabbri (jfabbri@jefferies.com)

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**ARROWHEAD PHARMACEUTICALS, INC.**

Debt Securities

Indenture

Dated as of [\_\_\_\_\_]

[\_\_\_\_\_],

as Trustee

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**CROSS-REFERENCE TABLE**

This Cross-Reference Table is not a part of the Indenture

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N.A. means Not Applicable.

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**SIGNATURES**

EXHIBIT A – Form of Security

INDENTURE dated as of [ \_\_\_\_\_ ], (the “**Base Indenture**”), by and among **ARROWHEAD PHARMACEUTICALS, INC.**, a Delaware corporation (the “**Company**”) and [ \_\_\_\_\_ ], as trustee (the “**Trustee**”).

Each party agrees as follows for the benefit of the other party and for the equal and ratable benefit of the Holders of the Company’s debt securities issued under this Base Indenture:

**ARTICLE ONE**  
**DEFINITIONS AND INCORPORATION BY REFERENCE**

**Section 1.01**      **Definitions.**

“**Affiliate**” means, when used with reference to a specified person, any Person directly or indirectly controlling or controlled by or under direct or indirect common control with the Person specified.

“**Agent**” means any Registrar, Paying Agent or co-Registrar or agent for service of notices and demands.

“**Authorizing Resolution**” means a resolution adopted by the Board of Directors or by an Officer or committee of Officers pursuant to Board delegation authorizing a Series of Securities.

“**Bankruptcy Law**” means Title 11 of the United States Code, as amended, or any similar federal or state law for the relief of debtors.

“**Board of Directors**” means the Board of Directors of the Company or any duly authorized committee thereof.

“**Capital Stock**” means, with respect to any Person, any and all shares, interests, participations or other equivalents (however designated) of or in such Person’s capital stock or other equity interests.

“**Capitalized Lease Obligations**” of any Person means, at the time any determination thereof is to be made, the obligations of such Person to pay rent or other amounts under a lease that is required to be capitalized for financial reporting purposes in accordance with GAAP, and the amount of such obligations will be the capitalized amount thereof determined in accordance with GAAP.

“**Company**” means the party named as such in this Indenture until a successor replaces it pursuant to the Indenture and thereafter means the successor.

“**control**” means, when used with respect to any Person, the power to direct the management and policies of such Person, directly or indirectly, whether through the ownership of voting securities, by contract or otherwise; and the terms “controlling” and “controlled” have meanings correlative to the foregoing.

“**Currency Agreement**” of any Person means any foreign exchange contract, currency swap agreement or other similar agreement or arrangement designed to protect such Person or any of its Subsidiaries against fluctuations in currency values.

“**Default**” means any event, act or condition that is, or after notice or the passage of time or both would be, an Event of Default.

“**Definitive Security**” means a certificated Security registered in the name of the Securityholder thereof.

“**Depository**” means, with respect to Securities of any Series which the Company shall determine will be issued in whole or in part as a Global Security, DTC, another clearing agency, or any successor registered as a clearing agency under the Exchange Act, and any other applicable U.S. or foreign statute or regulation, which, in each case, shall be designated by the Company pursuant to Section 2.01.

“Dollars” and “\$” mean United States Dollars.

“DTC” means The Depository Trust Company.

“Exchange Act” means the Securities Exchange Act of 1934, as amended.

“Foreign Currency” means any currency, currency unit or composite currency, including, without limitation, the euro, issued by the government of one or more countries other than the United States of America or by any recognized confederation or association of such governments.

“GAAP” means generally accepted accounting principles set forth in the accounting standards codification of the Financial Accounting Standards Board or in such other statements by such or any other entity as may be approved by a significant segment of the accounting profession of the United States, as in effect on the date of this Base Indenture.

“Global Security” means, with respect to any Series of Securities, a Security executed by the Company and delivered by the Trustee to the Depository or pursuant to the Depository’s instruction, all in accordance with the Indenture, which shall be registered in the name of the Depository or its nominee.

“Government Obligations” means securities which are (i) direct obligations of the United States or the other government or governments in the confederation which issued the Foreign Currency in which the principal of or any interest on the Security of the applicable Series shall be payable, in each case for the payment of which its full faith and credit is pledged or (ii) obligations of a Person controlled or supervised by and acting as an agency or instrumentality of the United States or such other government or governments, in each case the payment of which is unconditionally guaranteed as a full faith and credit obligation by the United States or such other government or governments, which, in either case are not callable or redeemable at the option of the issuer or issuers thereof, and shall also include a depositary receipt issued by a bank or trust company as custodian with respect to any such Government Obligations or a specific payment of interest on or principal of any such Government Obligation held by such custodian for the account of the holder of a depositary receipt; *provided* that (except as required by law) such custodian is not authorized to make any deduction from the amount payable to the holder of such depositary receipt from any amount received by the custodian in respect of the Government Obligation or the specific payment of interest on or principal of the Government Obligation evidenced by such depositary receipt.

“Holder” or “Securityholder” means the Person in whose name a Security is registered on the Registrar’s books.

“Indebtedness” means, with respect to any specified Person, any indebtedness of such Person, whether or not contingent:

- (1) in respect of borrowed money;
- (2) evidenced by bonds, notes, debentures or similar instruments;
- (3) in respect of letters of credit (or reimbursement agreements in respect thereof) or banker’s acceptances;
- (4) representing Capitalized Lease Obligations;
- (5) in respect of the balance deferred and unpaid of the purchase price of any property, except (i) any such balance that constitutes an accrued expense or trade payable, or (ii) any obligation to pay a contingent purchase price as long as such obligation remains contingent; or
- (6) in respect of any Interest Protection Agreement or Currency Agreement,

if and to the extent any of the preceding items (other than letters of credit and any Interest Protection Agreement or Currency Agreement) would appear as a liability upon a balance sheet of the specified Person prepared in accordance with GAAP. In addition, the term “Indebtedness” includes all Indebtedness of others secured by a Lien on any asset of the specified Person (whether or not such Indebtedness is assumed by the specified Person) and, to the extent not otherwise included, the guarantee by such Person of any indebtedness of any other Person.

Except as otherwise expressly provided in this Indenture, the amount of any Indebtedness outstanding as of any date shall be:

- (a) with respect to contingent obligations, the maximum liability upon the occurrence of the contingency giving rise to the obligation;
- (b) with respect to any Interest Protection Agreement or Currency Agreement, the net amount payable thereunder if such agreement were terminated at that time due to default by such Person;
- (c) the accreted value thereof, in the case of any Indebtedness issued at a discount to par; or
- (d) except as provided above, the principal amount or liquidation preference thereof, in the case of any other Indebtedness.

“**Indenture**” means this Base Indenture as amended or supplemented from time to time, including pursuant to any Authorizing Resolution or supplemental indenture pertaining to any Series, and including, for all purposes of this instrument and any such Authorizing Resolution or supplemental indenture, the provisions of the TIA that are deemed to be a part of and govern this Base Indenture and any such Authorizing Resolution or supplemental indenture, respectively.

“**Interest Protection Agreement**” of any Person means any interest rate swap agreement, interest rate collar agreement, option or futures contract or other similar agreement or arrangement designed to protect such Person or any of its Subsidiaries against fluctuations in interest rates with respect to Indebtedness.

“**Issue Date**” means, with respect to any Series of Securities, the date on which the Securities of such Series are originally issued under this Indenture.

“**Lien**” means, with respect to any Property, any mortgage, deed of trust, lien, pledge, charge, hypothecation, security interest or encumbrance of any kind in respect of such Property. For purposes of this definition, a Person shall be deemed to own, subject to a Lien, any Property which it has acquired or holds subject to the interest of a vendor or lessor under any conditional sale agreement, capital lease or other title retention agreement relating to such Property.

“**Non-Recourse Indebtedness**” with respect to any Person means Indebtedness of such Person for which (i) the sole legal recourse for collection of principal and interest on such Indebtedness is against the specific Property identified in the instruments evidencing or securing such Indebtedness (and any accessions thereto and proceeds thereof) and such Property was acquired with the proceeds of such Indebtedness or such Indebtedness was incurred within 180 days after the acquisition of such Property and (ii) no other assets of such Person may be realized upon in collection of principal or interest on such Indebtedness. Indebtedness which is otherwise Non-Recourse Indebtedness will not lose its character as Non-Recourse Indebtedness because there is recourse to the borrower, any guarantor or any other Person for (i) environmental or tax warranties and indemnities and such other representations, warranties, covenants and indemnities as are customarily required in such transactions, or (ii) indemnities for and liabilities arising from fraud, misrepresentation, misapplication or non-payment of rents, profits, insurance and condemnation proceeds and other sums actually received by the borrower from secured assets to be paid to the lender, waste and mechanics’ liens.

“**NYUCC**” means the New York Uniform Commercial Code, as in effect from time to time.

“**Officer**” means the Chairman of the Board, the President, any Vice President, the Treasurer, the Controller or the Secretary of the Company.

“**Officers’ Certificate**” means a certificate signed by two Officers or by an Officer and an Assistant Treasurer or an Assistant Secretary of the Company.

“**Opinion of Counsel**” means a written opinion, in form and substance reasonably satisfactory to the Trustee, from legal counsel. The counsel may be an employee of or counsel to the Company. Each such opinion shall include the statements provided for in Section 12.05 if and to the extent required by the provisions of such Section.

“**Person**” means any individual, corporation, partnership, limited liability company, joint venture, incorporated or unincorporated association, joint stock company, trust, unincorporated organization or government or any agency or political subdivision thereof.

“**principal**” of a debt security means the principal of the security *plus*, when appropriate, the premium, if any, on the security.

“**Property**” of any Person means all types of real, personal, tangible, intangible or mixed property owned by such Person, whether or not included in the most recent consolidated balance sheet of such Person and its Subsidiaries under GAAP.

“**Restricted Subsidiary**” means any Subsidiary of the Company which is not an Unrestricted Subsidiary.

“**SEC**” means the Securities and Exchange Commission or any successor agency performing the duties now assigned to it under the TIA.

“**Securities**” means any Securities that are issued under this Base Indenture.

“**Securities Act**” means the Securities Act of 1933, as amended.

“**Series**” means a series of Securities established under this Base Indenture.

“**Significant Subsidiary**” means any Subsidiary of the Company which would constitute a “significant subsidiary” as defined in Rule 1.02 of Regulation S-X under the Securities Act and the Exchange Act.

“**Subsidiary**” of any Person means any corporation or other entity of which a majority of the Capital Stock having ordinary voting power to elect a majority of the board of directors of such entity or other persons performing similar functions is at the time directly or indirectly owned or controlled by such Person.

“**TIA**” means the Trust Indenture Act of 1939, as in effect from time to time, except as otherwise provided herein.

“**Trustee**” means the party named as such in this Base Indenture until a successor replaces it pursuant to this Base Indenture and thereafter means the successor serving hereunder; *provided, however*, that if at any time there is more than one such Person, “Trustee” as used with respect to the Securities of any Series shall mean only the Trustee with respect to Securities of that Series.

“**Trust Officer**” means, when used with respect to the Trustee, any officer within the corporate trust department of the Trustee, including any vice president, assistant vice president, assistant secretary, senior associate, associate, trust officer or any other officer of the Trustee who customarily performs functions similar to those performed by the Persons who at the time shall be such officers, respectively, or to whom any corporate trust matter is referred because of such person’s knowledge of and familiarity with the particular subject and who shall have direct responsibility for the administration of this Indenture.



“United States” means the United States of America.

“Unrestricted Subsidiary” means, with respect to any Series, any Subsidiary of the Company (1) so designated by a resolution adopted by the Board of Directors of the Company as provided below and (2) any Subsidiary of an Unrestricted Subsidiary, subject, in each case, to such conditions as may be stated in the supplemental indenture or specified in the Authorizing Resolution with respect to such Series.

**Section 1.02      Other Definitions.**

<u>Term</u>	<u>Defined in Section</u>
Agent Members	2.15
Base Indenture	Preamble
Business Day	12.07
Covenant Defeasance	8.01
Custodian	6.01
Event of Default	6.01
Legal Defeasance	8.01
Legal Holiday	12.07
Paying Agent	2.03
Payment Default	6.01
Registrar	2.03
Security Register	2.03
Successor	5.01

**Section 1.03      Incorporation by Reference of Trust Indenture Act.**

Whenever this Indenture refers to a provision of the TIA, the provision is incorporated by reference in and made a part of this Indenture. The following TIA terms used in this Indenture have the following meanings:

“Commission” means the SEC.

“indenture securities” means the Securities of a particular Series.

“indenture security holder” means a Securityholder.

“indenture to be qualified” means this Indenture.

“indenture trustee” or “institutional trustee” means the Trustee.

“obligor” on the indenture securities means the Company or any other obligor on the Securities of a Series.

All other TIA terms used in this Indenture that are defined by the TIA, defined by TIA reference to another statute or defined by SEC rule have the meanings so assigned to them.

**Section 1.04      Rules of Construction.**

Unless the context otherwise requires:

- (1) a term has the meaning assigned to it herein;
- (2) an accounting term not otherwise defined has the meaning assigned to it in accordance with GAAP and all accounting determinations shall be made in accordance with GAAP;
- (3) “or” is not exclusive and “including” means “including without limitation”;

- (4) words in the singular include the plural, and in the plural include the singular;
- (5) “herein,” “hereof” and “hereunder,” and other words of similar import, refer to this Indenture as a whole (including any Authorizing Resolution or supplemental indenture relating to the relevant Series) and not to any particular Article, Section or other subdivision;
- (6) all exhibits are incorporated by reference herein and expressly made a part of this Indenture; and
- (7) any transaction or event shall be considered “permitted by” or made “in accordance with” or “in compliance with” this Indenture or any particular provision thereof if such transaction or event is not expressly prohibited by this Indenture or such provision, as the case may be.

## **ARTICLE TWO THE SECURITIES**

### **Section 2.01      Form and Dating.**

The aggregate principal amount of Securities that may be issued under this Base Indenture is unlimited. The Securities may be issued from time to time in one or more Series. Each Series shall be created by an Authorizing Resolution or a supplemental indenture that establishes the terms of the Series, which may include the following:

- (1) the title of the Series;
- (2) the aggregate principal amount (or any limit on the aggregate principal amount) of the Series and, if any Securities of a Series are to be issued at a discount from their face amount, the method of computing the accretion of such discount;
- (3) the interest rate or method of calculation of the interest rate;
- (4) the date from which interest will accrue;
- (5) the record dates for interest payable on Securities of the Series;
- (6) the dates when, places where and manner in which principal and interest are payable;
- (7) the Registrar and Paying Agent;
- (8) the terms of any mandatory (including any sinking fund requirements) or optional redemption by the Company;
- (9) the terms of any redemption at the option of Holders;
- (10) the permissible denominations in which Securities of such Series are issuable, if different from \$2,000 and multiples of \$1,000 in excess thereof;
- (11) whether Securities of such Series will be issued in registered or bearer form and the terms of any such forms of Securities;
- (12) whether the 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 different from those contained in this Base Indenture, upon which such Global Security or Securities may be exchanged in whole or in part for Definitive Securities; the Depositary for such Global Security or Securities; the form of any legend or legends, if any, to be borne by any such Global Security or Securities in addition to or in lieu of the legends referred to in Section 2.15;

- (13) the currency or currencies (including any composite currency) in which principal or interest or both may be paid;
- (14) if payments of principal or interest may be made in a currency other than that in which Securities of such Series are denominated, the manner for determining such payments, including the time and manner of determining the exchange rate between the currency in which such Securities are denominated and the currency in which such Securities or any of them may be paid, and any deletions from or modifications of or additions to the terms of this Indenture to provide for or to facilitate the issuance of Securities denominated or payable, at the election of the Company or a Holder thereof or otherwise, in a Foreign Currency;
- (15) provisions for electronic issuance of Securities or issuance of Securities of such Series in uncertificated form;
- (16) any Events of Default, covenants and/or defined terms in addition to or in lieu of those set forth in this Base Indenture;
- (17) whether and upon what terms Securities of such Series may be defeased or discharged if different from the provisions set forth in this Base Indenture;
- (18) the form of the Securities of such Series, which, unless the Authorizing Resolution or supplemental indenture otherwise provides, shall be in the form of Exhibit A;
- (19) any terms that may be required by or advisable under applicable law;
- (20) the percentage of the principal amount of the Securities of such Series which is payable if the maturity of the Securities of such Series is accelerated in the case of Securities issued at a discount from their face amount;
- (21) whether Securities of such Series will or will not have the benefit of guarantees and the Company's Subsidiaries that will be the initial guarantors of such Series and, if applicable, the terms and conditions upon which such guarantees may be subordinated to other indebtedness of the respective guarantors;
- (22) whether the Securities of such Series are senior or subordinated debt securities, and if subordinated debt securities, the terms of such subordination;
- (23) whether the Securities of the Series will be convertible into or exchangeable for other Securities, common shares or other securities of any kind of the Company or another obligor, and, if so, the terms and conditions upon which such Securities will be so convertible or exchangeable, including the initial conversion or exchange price or rate or the method of calculation, how and when the conversion price or exchange ratio may be adjusted, whether conversion or exchange is mandatory, at the option of the holder or at the Company's option, the conversion or exchange period, and any other provision in relation thereto; and
- (24) any other terms in addition to or different from those contained in this Base Indenture applicable to such Series.

All Securities of one Series need not be issued at the same time and, unless otherwise provided, a Series may be reopened for issuances of additional Securities of such Series pursuant to an Authorizing Resolution, an Officers' Certificate or in any indenture supplemental hereto.

The creation and issuance of a Series and the authentication and delivery thereof are not subject to any conditions precedent.

**Section 2.02**      **Execution and Authentication.**

One Officer shall sign the Securities for the Company by manual or facsimile signature.

If an Officer whose signature is on a Security no longer holds that office at the time the Trustee authenticates the Security, the Security shall nevertheless be valid.

A Security shall not be valid until the Trustee manually signs the certificate of authentication on the Security. The signature shall be conclusive evidence that the Security has been authenticated under this Base Indenture.

At any time and from time to time after the execution and delivery of this Indenture, the Company may deliver Securities of any series executed by the Company to the Trustee for authentication. Each Security shall be dated the date of its authentication. The Trustee shall authenticate Securities for original issue upon receipt of, and shall be fully protected in relying upon:

(a) An order to the Trustee signed by an officer of the Company directing the Trustee to authenticate the Securities;

(b) a copy of the resolution or resolutions of the Board of Directors in or pursuant to which the terms and form of the Securities were established, certified by the Secretary or an Assistant Secretary of the Company to have been duly adopted by the Board of Directors and to be in full force and effect as of the date of such certificate, and if the terms and form of such Securities are established by an Officers' Certificate pursuant to general authorization of the Board of Directors, such Officers' Certificate;

(c) an Officers' Certificate of the Company delivered in accordance with Section 12.04; and

(d) an Opinion of Counsel delivered in accordance with Section 12.04, and that states that such Securities, when authenticated and delivered by Trustee and issued by the Company in the manner and subject to any conditions specified in such Opinion of Counsel, will constitute valid and legally binding obligations of the Company, enforceable in accordance with their terms, subject to bankruptcy, insolvency, reorganization and other laws of general applicability relating to or affecting the enforcement of creditors' rights and to general equity principles.

The Trustee shall have the right to decline to authenticate and deliver any Securities under this Section if the Trustee, being advised by counsel, determines that such action may not lawfully be taken or if the Trustee in good faith shall determine that such action would expose the Trustee to personal liability to existing Holders.

**Section 2.03**      **Registrar and Paying Agent.**

The Company shall maintain an office or agency where Securities may be presented for registration of transfer or where Securities of a Series that are convertible or exchangeable may be surrendered for conversion or exchange ("**Registrar**"), an office or agency where Securities may be presented for payment ("**Paying Agent**") and an office or agency where notices and demands to or upon the Company in respect of the Securities and this Indenture may be served. The Registrar shall keep a register of the Securities and of their transfer and exchange (the "**Security Register**"). The Company may have one or more co-Registrars and one or more additional paying agents. The term "Paying Agent" includes any additional paying agent.

The Company shall enter into an appropriate agency agreement with any Agent not a party to this Base Indenture. The agreement shall implement the provisions of this Indenture that relate to such Agent. The Company shall promptly notify the Trustee in writing of the name and address of any such Agent and the Trustee shall have the right to inspect the Securities Register at all reasonable times to obtain copies thereof, and the Trustee shall have the right to rely upon such register as to the names and addresses of the Holders and the principal amounts and certificate numbers thereof. If the Company fails to maintain a Registrar or Paying Agent or fails to give the foregoing notice, the Trustee shall act as such.

The Company initially appoints the Trustee as Registrar and Paying Agent.

**Section 2.04**      **Paying Agent to Hold Money in Trust.**

Each Paying Agent shall hold in trust for the benefit of Securityholders and the Trustee all money held by the Paying Agent for the payment of principal of or interest on the Securities, and shall notify the Trustee of any default by the Company in making any such payment. If the Company or a Subsidiary acts as Paying Agent, it shall segregate the money and hold it as a separate trust fund. The Company at any time may require a Paying Agent to pay all money held by it to the Trustee. Upon doing so the Paying Agent shall have no further liability for the money.

**Section 2.05**      **Securityholder Lists.**

The Trustee shall preserve in as current a form as is reasonably practicable the most recent list available to it of the names and addresses of Securityholders. If the Trustee is not the Registrar, the Company shall furnish to the Trustee at least five (5) Business Days before each semiannual interest payment date and at such other times as the Trustee may request in writing a list in such form and as of such date as the Trustee may reasonably require of the names and addresses of Securityholders.

**Section 2.06**      **Transfer and Exchange.**

Where a Security is presented to the Registrar or a co-Registrar with a request to register a transfer, the Registrar shall register the transfer as requested if the requirements of Section 8-401(a) of the NYUCC are met and the other provisions of this Section 2.06 are satisfied. Where Securities are presented to the Registrar or a co-Registrar with a request to exchange them for an equal principal amount of Securities of other denominations, the Registrar shall make the exchange as requested if the same requirements are met. To permit transfers and exchanges, the Trustee shall authenticate Securities at the Registrar's request. The Registrar need not transfer or exchange any Security selected for redemption or repurchase, except the unredeemed or repurchased part thereof if the Security is redeemed or repurchased in part, or transfer or exchange any Securities for a period of 15 days before a selection of Securities to be redeemed or repurchased. Any exchange or transfer shall be without charge, except that the Company may require payment of a sum sufficient to cover any tax or other governmental charge that may be imposed in relation thereto except in the case of exchanges pursuant to 2.09, 3.06, or 10.05 not involving any transfer.

Any Holder of a Global Security shall, by acceptance of such Global Security, agree that transfers of beneficial interests in such Global Security may be effected only through a book entry system maintained by the Holder of such Global Security (or its agent), and that ownership of a beneficial interest in the Security shall be required to be reflected in a book entry.

**Section 2.07**      **Replacement Securities.**

If the Holder of a Security claims that the Security has been lost, destroyed, mutilated or wrongfully taken, the Company shall issue and execute a replacement security and, upon written request of any Officer of the Company, the Trustee shall authenticate such replacement Security, *provided*, in the case of a lost, destroyed or wrongfully taken Security, that the requirements of Section 8-405 of the NYUCC are met. If any such lost, destroyed, mutilated or wrongfully taken Security shall have matured or shall be about to mature, the Company may, instead of issuing a substitute Security therefor, pay such Security without requiring (except in the case of a mutilated Security) the surrender thereof. An indemnity bond must be sufficient in the judgment of the Company and the Trustee to protect the Company, the Trustee and any Agent from any loss which any of them may suffer if a Security is replaced, including the acquisition of such Security by a bona fide purchaser. The Company and the Trustee may charge for its expenses in replacing a Security.

**Section 2.08**      **Outstanding Securities.**

Securities outstanding at any time are all Securities authenticated by the Trustee except for those cancelled by it and those described in this Section. A Security does not cease to be outstanding because the Company or one of its Affiliates holds the Security.

If a Security is replaced pursuant to Section 2.07, it ceases to be outstanding unless the Trustee receives proof satisfactory to it that the replaced Security is held by a “protected purchaser” (as such term is defined in the NYUCC).

If the Paying Agent holds on a redemption date, purchase date or maturity date money sufficient to pay Securities payable on that date, then on and after that date such Securities cease to be outstanding and interest on them ceases to accrue.

Subject to the foregoing provisions of this Section, each Security delivered under this Indenture upon registration of transfer of or in exchange for or in lieu of any other Security shall carry the rights to interest accrued and unpaid, and to accrue, which were carried by such other Security.

**Section 2.09**      **Temporary Securities.**

Until definitive Securities are ready for delivery, the Company may prepare and the Trustee shall authenticate temporary Securities. Temporary Securities shall be substantially in the form of definitive Securities but may have variations that the Company considers appropriate for temporary Securities. Without unreasonable delay, the Company shall prepare and, upon surrender for cancellation of the temporary Security, the Company shall execute and the Trustee shall authenticate definitive Securities in exchange for temporary Securities. Until so exchanged, the temporary Securities shall in all respects be entitled to the same benefits under this Indenture as definitive Securities authenticated and delivered hereunder.

**Section 2.10**      **Cancellation.**

The Company at any time may deliver Securities to the Trustee for cancellation. The Registrar and Paying Agent shall forward to the Trustee any Securities surrendered to them for registration of transfer, exchange, redemption, purchase or payment. The Trustee and no one else shall cancel and dispose of such cancelled or tendered securities, or retain in accordance with its standard retention policy, all Securities surrendered for registration of transfer, exchange, redemption, purchase, payment or cancellation. Unless the Authorizing Resolution or supplemental indenture so provides, the Company may not issue new Securities to replace Securities that it has previously paid or delivered to the Trustee for cancellation.

**Section 2.11**      **Defaulted Interest.**

If the Company defaults in a payment of interest on the Securities of any Series, it shall pay the defaulted interest *plus* any interest payable on the defaulted interest to the persons who are Securityholders of such Series on a subsequent special record date. The Company shall fix such special record date and a payment date which shall be reasonably satisfactory to the Trustee. At least 15 days before such special record date, the Company shall send to each Securityholder of the relevant Series a notice that states the record date, the payment date and the amount of defaulted interest to be paid. On or before the date such notice is sent, the Company shall deposit with the Paying Agent money sufficient to pay the amount of defaulted interest to be so paid. The Company may pay defaulted interest in any other lawful manner if, after notice given by the Company to the Trustee of the proposed payment, such manner of payment shall be deemed practicable by the Trustee.

**Section 2.12**      **Treasury Securities.**

In determining whether the Holders of the required principal amount of Securities of a Series have concurred in any direction, waiver, consent or notice, Securities owned by the Company or any of its Affiliates shall be considered as though they are not outstanding, except that for the purposes of determining whether the Trustee shall be protected in relying on any such direction, waiver or consent, only Securities which a Trust Officer of the Trustee actually knows are so owned shall be so considered.

**Section 2.13**      **CUSIP/ISIN Numbers.**

The Company in issuing the Securities of any Series may use a “CUSIP” and/or “ISIN” or other similar number, and if so, the Trustee shall use the CUSIP and/or ISIN or other similar number in notices of redemption or exchange as a convenience to Holders of such Securities; *provided* that no representation is hereby deemed to be made by the Trustee as to the correctness or accuracy of any such CUSIP and/or ISIN or other similar number printed in the notice or on such Securities, and that reliance may be placed only on the other identification numbers printed on such Securities. The Company shall promptly notify the Trustee of any change in any CUSIP and/or ISIN or other similar number.

**Section 2.14**      **Deposit of Moneys.**

Prior to 11:00 a.m. New York City time on each interest payment date and maturity date with respect to each Series of Securities, the Company shall have deposited with the Paying Agent in immediately available funds money in the applicable currency sufficient to make cash payments due on such interest payment date or maturity date, as the case may be, in a timely manner which permits the Paying Agent to remit payment to the Holders of such Series on such interest payment date or maturity date, as the case may be.

**Section 2.15**      **Book-Entry Provisions for Global Security.**

(a) Any Global Security of a Series initially shall (i) be registered in the name of the Depository or the nominee of such Depository, (ii) be delivered to the Trustee as custodian for such Depository and (iii) bear any required legends.

Members of, or participants in, the Depository (“**Agent Members**”) shall have no rights under this Indenture with respect to any Global Security held on their behalf by the Depository, or the Trustee as its custodian, or under the Global Security, and the Depository may be treated by the Company, the Trustee and any agent of the Company or the Trustee as the absolute owner of the Global Security for all purposes whatsoever. Notwithstanding the foregoing, nothing herein shall prevent the Company, the Trustee or any agent of the Company or the Trustee from giving effect to any written certification, proxy or other authorization furnished by the Depository or impair, as between the Depository and its Agent Members, the operation of customary practices governing the exercise of the rights of a Holder of any Security.

(b) Transfers of any Global Security shall be limited to transfers in whole, but not in part, to the Depository, its successors or their respective nominees. Interests of beneficial owners in the Global Security may be transferred or exchanged for Definitive Securities in accordance with the rules and procedures of the Depository. In addition, Definitive Securities shall be transferred to all beneficial owners in exchange for their beneficial interests in a Global Security if (i) the Depository notifies the Company that it is unwilling or unable to continue as Depository for the Global Security and a successor depository is not appointed by the Company within 90 days of such notice or (ii) an Event of Default has occurred and is continuing and the Registrar has received a request from the Depository to issue Definitive Securities.

(c) In connection with any transfer or exchange of a portion of the beneficial interest in any Global Security to beneficial owners pursuant to paragraph (b), the Registrar shall (if one or more Definitive Securities are to be issued) reflect on its books and records the date and a decrease in the principal amount of the Global Security in an amount equal to the principal amount of the beneficial interest in the Global Security to be transferred, and the Company shall execute, and the Trustee shall authenticate and deliver, one or more Definitive Securities of like Series and amount.

(d) In connection with the transfer of an entire Global Security to beneficial owners pursuant to paragraph (b), the Global Security shall be deemed to be surrendered to the Trustee for cancellation, and the Company shall execute, and the Trustee shall authenticate and deliver, to each beneficial owner identified by the Depository in exchange for its beneficial interest in the Global Security, an equal aggregate principal amount of Definitive Securities of the same Series in authorized denominations.

(e) The Holder of any Global Security may grant proxies and otherwise authorize any person, including Agent Members and persons that may hold interests through Agent Members, to take any action which a Holder is entitled to take under this Indenture or the Securities of such Series.

(f) Unless otherwise provided in the Authorizing Resolution or supplemental indenture for a particular Series of Securities, each Global Security of such Series shall bear legends in substantially the following forms:

“THIS GLOBAL SECURITY IS HELD BY THE DEPOSITARY (AS DEFINED IN THE INDENTURE GOVERNING THIS SECURITY) OR ITS NOMINEE IN CUSTODY FOR THE BENEFIT OF THE HOLDERS OF BENEFICIAL INTERESTS HEREIN, AND IS NOT TRANSFERABLE TO ANY PERSON UNDER ANY CIRCUMSTANCES EXCEPT THAT (I) THE TRUSTEE MAY MAKE ANY SUCH NOTATIONS HEREON AS MAY BE REQUIRED PURSUANT TO THE INDENTURE, (II) THIS GLOBAL SECURITY MAY BE EXCHANGED IN WHOLE BUT NOT IN PART PURSUANT TO SECTION 2.06 OF THE INDENTURE, (III) THIS GLOBAL SECURITY MAY BE DELIVERED TO THE TRUSTEE FOR CANCELLATION PURSUANT TO THE INDENTURE AND (IV) THIS GLOBAL SECURITY MAY BE TRANSFERRED TO A SUCCESSOR DEPOSITARY WITH THE PRIOR WRITTEN CONSENT OF THE COMPANY.”

“UNLESS AND UNTIL IT IS EXCHANGED IN WHOLE OR IN PART FOR SECURITIES IN DEFINITIVE FORM, THIS SECURITY MAY NOT BE TRANSFERRED EXCEPT AS A WHOLE BY THE DEPOSITARY TO A NOMINEE OF THE DEPOSITARY OR BY A NOMINEE OF THE DEPOSITARY TO THE DEPOSITARY OR TO ANOTHER NOMINEE OF THE DEPOSITARY OR BY THE DEPOSITARY OR ANY SUCH NOMINEE TO A SUCCESSOR DEPOSITARY OR A NOMINEE OF SUCH SUCCESSOR DEPOSITARY. UNLESS THIS CERTIFICATE IS PRESENTED BY AN AUTHORIZED REPRESENTATIVE OF THE DEPOSITARY TRUST COMPANY, A NEW YORK CORPORATION (“DTC”), TO ISSUER OR ITS AGENT FOR REGISTRATION OF TRANSFER, EXCHANGE, OR PAYMENT, ANY CERTIFICATE ISSUED IS REGISTERED IN THE NAME OF CEDE & CO. OR IN SUCH OTHER NAME AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC (AND ANY PAYMENT IS MADE TO CEDE & CO. OR TO SUCH OTHER ENTITY AS IS REQUESTED BY AN AUTHORIZED REPRESENTATIVE OF DTC), ANY TRANSFER, PLEDGE, OR OTHER USE HEREOF FOR VALUE OR OTHERWISE BY OR TO ANY PERSON IS WRONGFUL INASMUCH AS THE REGISTERED OWNER HEREOF, CEDE & CO., HAS AN INTEREST HEREIN.”

**Section 2.16      No Duty to Monitor.**

The Trustee shall have no obligation or duty to monitor, determine or inquire as to compliance with any restrictions on transfer imposed under this Indenture or under applicable law with respect to any transfer of any interest in any Security (including any transfers between or among Agent Members or beneficial owners of interests in any Global Security) other than to require delivery of such certificates and other documentation or evidence as are expressly required by, and to do so if and when expressly required by the terms of, this Indenture, and to examine the same to determine substantial compliance as to form with the express requirements hereof.

Neither the Trustee nor any Agent shall have any responsibility for any actions taken or not taken by the Depository.



**ARTICLE THREE  
REDEMPTION**

**Section 3.01      Notices to Trustee.**

Securities of a Series that are redeemable prior to maturity shall be redeemable in accordance with their terms and, unless the Authorizing Resolution or supplemental indenture provides otherwise, in accordance with this Article Three.

If the Company wants to redeem Securities pursuant to Paragraph 4 of the Securities, it shall notify the Trustee in writing of the redemption date and the principal amount of Securities to be redeemed. Any such notice may be cancelled at any time prior to notice of such redemption being sent to Holders. Any such cancelled notice shall be void and of no effect.

If the Company wants to credit any Securities previously redeemed, retired or acquired against any redemption pursuant to Paragraph 5 of the Securities, it shall notify the Trustee of the amount of the credit and it shall deliver any Securities not previously delivered to the Trustee for cancellation with such notice.

The Company shall give each notice provided for in this Section 3.01 at least 15 days before the notice of any such redemption is to be delivered to Holders (unless a shorter notice shall be satisfactory to the Trustee).

**Section 3.02      Selection of Securities to be Redeemed.**

If fewer than all of the Securities of a Series are to be redeemed, the Trustee (or depository, as applicable) shall select the Securities to be redeemed pro rata, by lot, or such other method the Trustee (or depository, as applicable) considers fair and appropriate and in a manner that complies with applicable requirements of the Depository. The Trustee (or depository, as applicable) shall make the selection from Securities outstanding not previously called for redemption and shall promptly notify the Company of the serial numbers or other identifying attributes of the Securities so selected. The Trustee (or depository, as applicable) may select for redemption portions of the principal of Securities that have denominations larger than the minimum denomination for the Series. Securities and portions of them it selects shall be in amounts equal to a permissible denomination for the Series. Provisions of this Indenture that apply to Securities called for redemption also apply to portions of Securities called for redemption.

Unless otherwise provided in the Authorizing Resolution or supplemental indenture relating to a Series, if any Security selected for partial redemption is converted into or exchanged for Common Stock or other securities, cash or other property in part before termination of the conversion or exchange right with respect to the portion of the Security so selected, the converted portion of such Security shall be deemed (so far as may be) to be the portion selected for redemption. Securities which have been converted or exchanged during a selection of Securities to be redeemed shall be treated by the Trustee as outstanding for the purpose of such selection.

**Section 3.03      Notice of Redemption.**

At least 30 days but not more than 60 days before a redemption date, the Company shall mail a notice of redemption by first-class mail, postage prepaid (or in the case of Global Securities, deliver electronically in accordance with the applicable procedures of the Depository), to each Holder of Securities to be redeemed.

The notice shall identify the Securities to be redeemed and shall state:

- (1) the redemption date;
- (2) the redemption price or the formula pursuant to which such price will be calculated;
- (3) if any Security is being redeemed in part, the portion of the principal amount of such Security to be redeemed and that, after the redemption date, upon surrender of such Security, a new Security or Securities in principal amount equal to the unredeemed portion shall be issued upon cancellation of the original Security;

- (4) in the case of Securities of a Series that are convertible or exchangeable into shares of the Company's common stock or other securities, cash or other property, the conversion or exchange price or rate, the date or dates on which the right to convert or exchange the principal of the Securities of such Series to be redeemed will commence or terminate and the place or places where such Securities may be surrendered for conversion or exchange;
- (5) the name and address of the Paying Agent;
- (6) that Securities called for redemption must be surrendered to the Paying Agent to collect the redemption price;
- (7) that interest on Securities called for redemption ceases to accrue on and after the redemption date;
- (8) that the Securities are being redeemed pursuant to the mandatory redemption or the optional redemption provisions, as applicable; and
- (9) the CUSIP number and that no representation is hereby deemed to be made by the Trustee as to the correctness or accuracy of any such CUSIP and/or ISIN or other similar number printed in the notice or on such Securities, and that reliance may be placed only on the other identification numbers printed on such Securities.

At the Company's request, the Trustee shall give the notice of redemption in the Company's name and at its expense; *provided, however*, that the Company shall deliver to the Trustee at least 15 days prior to the date on which notice of redemption is to be sent or such shorter period as may be satisfactory to the Trustee, an Officers' Certificate requesting that the Trustee give such notice and setting forth the information to be stated in such notice as provided in the preceding paragraph.

**Section 3.04      Effect of Notice of Redemption.**

Once notice of redemption is sent, Securities called for redemption become due and payable on the redemption date and at the redemption price as set forth in the notice of redemption. Upon surrender to the Paying Agent, such Securities shall be paid at the redemption price, *plus* accrued and unpaid interest to the redemption date. Notices of redemption may be subject to one or more conditions. In the event that any such conditions are not satisfied the Company may amend or revoke such notice of redemption by sending notice to Securityholders (with a copy to the Trustee) in accordance with the applicable procedures of the Depository.

**Section 3.05      Deposit of Redemption Price.**

On or before the redemption date, the Company shall deposit with the Paying Agent immediately available funds in the applicable currency sufficient to pay the redemption price of and accrued interest on all Securities to be redeemed on that date.

**Section 3.06      Securities Redeemed in Part.**

Upon surrender of a Security that is redeemed in part, the Company shall execute and the Trustee shall authenticate for each Holder a new Security of the same Series equal in principal amount to the unredeemed portion of the Security surrendered.

**ARTICLE FOUR  
COVENANTS**

**Section 4.01**      **Payment of Securities.**

The Company shall pay the principal of and interest on a Series on the dates, in the currency and in the manner provided in the Securities of the Series. An installment of principal or interest shall be considered paid on the date it is due if the Paying Agent holds on that date money in the applicable currency designated for and sufficient to pay the installment.

The Company shall pay interest on overdue principal at the rate borne by the Series; it shall pay interest on overdue installments of interest at the same rate.

**Section 4.02**      **Maintenance of Office or Agency.**

The Company shall maintain the office or agency required under Section 2.03. The Company shall give prior written notice to the Trustee of the location, and any change in the location, of such office or agency. If at any time the Company shall fail to maintain any such required office or agency or shall fail to furnish the Trustee with the address thereof, such presentations, surrenders, notices and demands may be made or served at the address of the Trustee.

**Section 4.03**      **Compliance Certificate.**

The Company shall deliver to the Trustee within 120 days after the end of each fiscal year of the Company an Officers' Certificate stating whether or not the signers know of any continuing Default by the Company in performing any of its obligations under this Indenture. If they do know of such a Default, the certificate shall describe the Default. In addition, the Company will notify the Trustee within 5 business days upon the Company's knowledge of a Default.

**Section 4.04**      **Waiver of Stay, Extension or Usury Laws.**

The Company covenants (to the extent that it may lawfully do so) that it will not at any time insist upon, plead, or in any manner whatsoever claim or take the benefit or advantage of, any stay or extension law or any usury law or other law that would prohibit or forgive the Company from paying all or any portion of the principal of or interest on the Securities of any Series as contemplated herein, wherever enacted, now or at any time hereafter in force, or which may affect the covenants or the performance of this Indenture; and (to the extent that it may lawfully do so) the Company expressly waives all benefit or advantage of any such law, and covenants that it will not hinder, delay or impede the execution of any power herein granted to the Trustee, but will suffer and permit the execution of every such power as though no such law had been enacted.

**ARTICLE FIVE  
SUCCESSOR CORPORATION**

**Section 5.01**      **When Company May Merge, etc.**

The Company will not consolidate or merge with or into, or sell, lease, convey or otherwise dispose of all or substantially all of its assets (including by way of liquidation or dissolution) to, any Person (in each case other than in a transaction in which the Company is the survivor of a consolidation or merger, or the transferee in a sale, lease, conveyance or other disposition) unless:

- (1) the Person formed by or surviving such consolidation or merger (if other than the Company), or to which such sale, lease, conveyance or other disposition will be made (collectively, the "**Successor**"), is a corporation or other legal entity organized and existing under the laws of the United States or any state thereof or the District of Columbia, and the Successor assumes by supplemental indenture in a form reasonably satisfactory to the Trustee all of the obligations of the Company under the Securities, as the case may be, and the Indenture, and
- (2) immediately after giving effect to such transaction, no Default or Event of Default has occurred and is continuing.

The foregoing provisions shall not apply to a transaction the purpose of which is to change the state of incorporation of the Company.

Upon any such consolidation, merger, sale, lease, conveyance or other disposition, the Successor will be substituted for the Company under the Indenture. The Successor may then exercise every power and right of the Company under this Indenture, and except in the case of a lease, the Company will be released from all of its liabilities and obligations in respect of the Securities and the Indenture. If the Company leases all or substantially all of its assets the Company will not be released from its obligations to pay the principal of and interest, if any, on the Securities.

## ARTICLE SIX DEFAULTS AND REMEDIES

### Section 6.01 Events of Default.

An “**Event of Default**” on a Series occurs if, voluntarily or involuntarily, whether by operation of law or otherwise, any of the following occurs:

- (1) the failure by the Company to pay interest on any Security of such Series when the same becomes due and payable and the continuance of any such failure for a period of 30 days;
- (2) the failure by the Company to pay the principal of any Security of such Series when the same becomes due and payable at maturity, upon acceleration, redemption or otherwise;
- (3) the failure by the Company or any Restricted Subsidiary to comply with any of its agreements or covenants in, or provisions of, the Securities of such Series or this Indenture (as they relate thereto) and such failure continues for the period and after the notice specified below (except in the case of a default with respect to Article Five (or any other provision specified in the applicable supplemental indenture or Authorizing Resolution), which will constitute Events of Default with notice but without passage of time);
- (4) default under any mortgage, indenture or instrument under which there may be issued or by which there may be secured or evidenced any Indebtedness (other than Non-Recourse Indebtedness) for money borrowed by the Company or any of its Restricted Subsidiaries (or the payment of which is guaranteed by the Company or any of its Restricted Subsidiaries), whether such Indebtedness or guarantee now exists or is created after the Issue Date, if that default:
  - (A) is caused by a failure to pay at final stated maturity the principal amount of such Indebtedness prior to the expiration of the grace period provided in such Indebtedness on the date of such default (a “Payment Default”); or
  - (B) results in the acceleration of such Indebtedness prior to its express maturity without such Indebtedness having been discharged or such acceleration having been cured, waived, rescinded or annulled for the period and after the notice specified below,

and, in each case, the principal amount of any such Indebtedness, together with the principal amount of any other such Indebtedness under which there has been a Payment Default or the maturity of which has been so accelerated, aggregates \$50 million or more;

- (5) the Company or any Restricted Subsidiary that is a Significant Subsidiary pursuant to or within the meaning of any Bankruptcy Law:
  - (A) commences a voluntary case,
  - (B) consents to the entry of an order for relief against it in an involuntary case,
  - (C) consents to the appointment of a Custodian of it or for all or substantially all of its Property, or
  - (D) makes a general assignment for the benefit of its creditors;
- (6) a court of competent jurisdiction enters an order or decree under any Bankruptcy Law that:
  - (A) is for relief against the Company or any Restricted Subsidiary that is a Significant Subsidiary as debtor in an involuntary case,
  - (B) appoints a Custodian of the Company or any Restricted Subsidiary that is a Significant Subsidiary or a Custodian for all or substantially all of the Property of the Company, or
  - (C) orders the liquidation of the Company or any Restricted Subsidiary that is a Significant Subsidiary, and the order or decree remains unstayed and in effect for 60 days.

A Default as described in subclause (3) or (4)(B) above will not be deemed an Event of Default until the Trustee notifies the Company, or the Holders of at least 25 percent in principal amount of the then outstanding Securities of the applicable Series notify the Company and the Trustee, of the Default and (except in the case of a default with respect to Article Five (or any other provision specified in the applicable supplemental indenture or Authorizing Resolution)) the Company does not cure the Default within (a) with respect to in subclause (3), 60 days after receipt of the notice and (b) with respect to in subclause (4)(B), 30 days after receipt of the notice. The notice must specify the Default, demand that it be remedied and state that the notice is a "Notice of Default." If such a Default is cured within such time period, it ceases to exist, without any action by the Trustee or any other Person.

The term "**Custodian**" means any receiver, trustee, assignee, liquidator, custodian or similar official under any Bankruptcy Law.

#### **Section 6.02      Acceleration.**

If an Event of Default (other than an Event of Default with respect to the Company resulting from subclause (5) or (6) above), shall have occurred and be continuing under the Indenture, the Trustee by notice to the Company, or the Holders of at least 25 percent in principal amount of the Securities of the applicable Series then outstanding by notice to the Company and the Trustee, may declare all Securities of such Series to be due and payable immediately. Upon such declaration of acceleration, the amounts due and payable on the Securities of such Series will be due and payable immediately. If an Event of Default with respect to the Company specified in subclauses (5) or (6) above occurs, all amounts due and payable on the Securities of such Series will ipso facto become and be immediately due and payable without any declaration, notice or other act on the part of the Trustee and the Company or any Holder.

Holders of a majority in principal amount of the then outstanding Securities of such Series may rescind an acceleration with respect to such Series and its consequence (except an acceleration due to nonpayment of principal or interest) if the rescission would not conflict with any judgment or decree and if all existing Events of Default (other than the non-payment of accelerated principal) have been cured or waived.

No such rescission shall extend to or shall affect any subsequent Event of Default, or shall impair any right or power consequent thereon.

**Section 6.03**      **Other Remedies.**

If an Event of Default on a Series occurs and is continuing, the Trustee may pursue any available remedy by proceeding at law or in equity to collect the payment of principal of or interest on the Series or to enforce the performance of any provision in the Securities or this Indenture applicable to the Series.

The Trustee may maintain a proceeding even if it does not possess any of the Securities or does not produce any of them in the proceeding. A delay or omission by the Trustee or any Securityholder in exercising any right or remedy accruing upon an Event of Default shall not impair the right or remedy or constitute a waiver of or acquiescence in the Event of Default. No remedy is exclusive of any other remedy. All available remedies are cumulative.

**Section 6.04**      **Waiver of Existing Defaults.**

Subject to [Section 10.02](#), the Holders of a majority in principal amount of the outstanding Securities of a Series on behalf of all the Holders of the Series by notice to the Trustee may waive an existing Default on such Series and its consequences. When a Default is waived, it is cured and stops continuing, and any Event of Default arising therefrom shall be deemed to have been cured; but no such waiver shall extend to any subsequent or other Default or impair any right consequent thereon.

**Section 6.05**      **Control by Majority.**

The Holders of a majority in principal amount of the outstanding Securities of a Series may 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 it with respect to such Series. The Trustee, however, may refuse to follow any direction (i) that conflicts with law or this Indenture, (ii) that, subject to [Section 7.01](#), the Trustee determines is unduly prejudicial to the rights of other Securityholders, (iii) that would involve the Trustee in personal liability, if there shall be reasonable grounds for believing that adequate indemnity against such liability is not reasonably assured to it, or (iv) if the Trustee shall not have been provided with indemnity satisfactory to it.

**Section 6.06**      **Limitation on Suits.**

A Securityholder of a Series may not pursue any remedy with respect to this Indenture or the Series unless:

- (1) the Holder gives to the Trustee written notice of a continuing Event of Default on the Series;
- (2) the Holders of at least a majority in principal amount of the outstanding Securities of the Series make a written request to the Trustee to pursue the remedy;
- (3) such Holder or Holders offer to the Trustee indemnity satisfactory to the Trustee against any loss, liability or expense;
- (4) the Trustee does not comply with the request within 60 days after receipt of the request and the offer of indemnity; and
- (5) no written request inconsistent with such written request shall have been given to the Trustee pursuant to this [Section 6.06](#).

A Securityholder may not use this Indenture to prejudice the rights of another Holder of Securities of the same Series or to obtain a preference or priority over another Holder of Securities of the same Series (it being understood that the Trustee does not have an affirmative duty to ascertain whether or not such actions or forbearances by such Holder are unduly prejudicial to another Holder).

**Section 6.07**      **Rights of Holders to Receive Payment.**

Notwithstanding any other provision of this Indenture, the right of any Holder to receive payment of principal of and interest on any Security, on or after the respective due dates expressed in the Security, or to bring suit for the enforcement of any such payment on or after such respective dates, is absolute and unconditional and shall not be impaired or affected without the consent of the Holder.

**Section 6.08**      **Collection Suit by Trustee.**

If an Event of Default in payment of interest or principal specified in Section 6.01(1) or (2) occurs and is continuing, the Trustee may recover judgment in its own name and as trustee of an express trust against the Company for the whole amount of principal and interest remaining unpaid.

**Section 6.09**      **Trustee May File Proofs of Claim.**

The Trustee may file such proofs of claim and other papers or documents as may be necessary or advisable in order to have the claims of the Trustee (including any claim for the reasonable compensation, expenses, disbursements, and advances of the Trustee, its agents and counsel) and the Securityholders allowed in any judicial proceedings relative to the Company or its creditors or Property, and unless prohibited by applicable law or regulation, may vote on behalf of the Holders in any election of a Custodian, and shall be entitled and empowered to collect and receive any moneys or other Property payable or deliverable on any such claims and to distribute the same and any Custodian in any such judicial proceeding is hereby authorized by each Securityholder to make such payments to the Trustee. Nothing herein shall be deemed to authorize the Trustee to authorize or consent to or vote for or accept or adopt on behalf of any Securityholder any plan of reorganization, arrangement, adjustment or composition affecting the Securities or the rights of any Holder or to authorize the Trustee to vote in respect of the claim of any Securityholder except as aforesaid for the election of the Custodian.

**Section 6.10**      **Priorities.**

If the Trustee collects any money pursuant to this Article with respect to Securities of any Series, it shall pay out the money in the following order:

- First:*      to the Trustee for amounts due under Section 7.07;
- Second:*   to Securityholders of the Series for amounts due and unpaid on the Series for principal and interest, ratably, without preference or priority of any kind, according to the amounts due and payable on the Series for principal and interest, respectively; and
- Third:*     to the Company or as a court of competent jurisdiction shall direct.

The Trustee may fix a record date and payment date for any payment to Securityholders pursuant to this Section 6.10.

**Section 6.11**      **Undertaking for Costs.**

In any suit for the enforcement of any right or remedy under this Indenture or in any suit against the Trustee for any action taken or omitted by it as Trustee, a court in its discretion may require the filing by any party litigant in the suit of an undertaking to pay the costs of the suit, and the court in its discretion may assess reasonable costs, including reasonable attorneys' fees and expenses, against any party litigant in the suit, having the due regard to the merits and good faith of the claims or defenses made by the party litigant. This Section does not apply to a suit by the Trustee, a suit by a Holder pursuant to Section 6.07 or a suit by Holders of more than 10% in principal amount of the Series.

**ARTICLE SEVEN  
TRUSTEE**

**Section 7.01**      **Duties of Trustee.**

(a) If an Event of Default has occurred and is continuing with respect to Securities of any Series, the Trustee shall, prior to the receipt of directions from the Holders of a majority in principal amount of the Securities of the Series, exercise its rights and powers and use the same degree of care and skill in their exercise as a prudent man would exercise or use under the circumstances in the conduct of his own affairs.

(b) Except during the continuance of an Event of Default:

(1) The Trustee need perform only those duties that are specifically set forth in this Indenture and no others and no implied covenants or obligations shall be read into this Indenture against the Trustee.

(2) In the absence of bad faith on its part, the Trustee may conclusively rely, as to the truth of the statements and the correctness of the opinions expressed therein, upon certificates or opinions furnished to the Trustee and conforming to the requirements of this Indenture. The Trustee, however, in the case of certificates or opinions specifically required by any provision hereof to be furnished to it, shall examine the certificates and opinions to determine whether or not they conform to the requirements of this Indenture but need not confirm or investigate the accuracy of mathematical calculations or other facts or matters stated therein.

(c) The Trustee may not be relieved from liability for its own negligent action, its own negligent failure to act or its own willful misconduct, except that:

(1) This paragraph does not limit the effect of paragraph (b) of this Section.

(2) The Trustee shall not be liable for any error of judgment made in good faith by a Trust Officer, unless it is proved that the Trustee was negligent in ascertaining the pertinent facts.

(3) The Trustee shall not be liable with respect to any action it takes or omits to take in good faith in accordance with a direction received by it pursuant to Section 6.05 or any other direction of the Holders permitted hereunder.

(d) Every provision of this Indenture that in any way relates to the Trustee is subject to paragraphs (a), (b) and (c) of this Section.

(e) The Trustee may refuse to perform any duty or exercise any right or power unless it receives indemnity satisfactory to it against any loss, liability or expense.

(f) The Trustee shall not be liable for interest on any money received by it except as the Trustee may agree with the Company. Money held in trust by the Trustee need not be segregated from other funds except to the extent required by law.

(g) None of the provisions contained in this Indenture shall require the Trustee to expend or risk its own funds or otherwise incur financial liability in the performance of any of its duties or in the exercise of any of its rights or powers, if there shall be reasonable grounds for believing that the repayment of such funds or adequate indemnity against such liability is not reasonably assured to it.

**Section 7.02**      **Rights of Trustee.**

Subject to Section 7.01:

(a) The Trustee may conclusively rely and shall be fully protected in acting or refraining from acting on any document, resolution, certificate, instrument, report, or direction believed by it to be genuine and to have been signed or presented by the proper person. The Trustee need not investigate any fact or matter stated in the document, resolution, certificate, instrument, report, or direction.



(b) Before the Trustee acts or refrains from acting, it may require an Officers' Certificate or an Opinion of Counsel or both, which shall conform to Sections 12.04 and 12.05 hereof and containing such other statements as the Trustee reasonably deems necessary to perform its duties hereunder. The Trustee shall not be liable for any action it takes or omits to take in good faith in reliance on the Officers' Certificate, Opinion of Counsel or any other direction of the Company permitted hereunder.

(c) The Trustee may act through agents and shall not be responsible for the misconduct or negligence of any agent appointed with due care.

(d) The Trustee shall not be liable for any action taken, suffered or omitted by it in good faith and believed by it to be authorized or within the discretion or rights or powers conferred upon it by this Indenture.

(e) The Trustee may consult with counsel of its selection, and the advice of such counsel or any Opinion of Counsel as to matters of law shall be full and complete authorization and protection in respect of any action taken, omitted or suffered by it hereunder in good faith and in accordance with the advice or opinion of such counsel.

(f) Unless otherwise specifically provided in the Indenture, any demand, request, direction or notice from the Company shall be sufficient if signed by an Officer of the Company.

(g) For all purposes under this Indenture, the Trustee shall not be deemed to have notice or knowledge of any Event of Default unless written notice of any Event of Default is received by the Trustee at its address specified in Section 12.02 hereof and such notice references the Securities generally, the Company and this Indenture.

(h) The Trustee shall be under no obligation to exercise any of the rights or powers vested in it by this Indenture at the request or direction of any of the Holders pursuant to this Indenture, unless such Holders shall have offered to the Trustee security or indemnity reasonably satisfactory to the Trustee against the costs, expenses and liabilities which might be incurred by it in compliance with such request or direction.

(i) The Trustee shall not be bound to make any investigation into the facts or matters stated in any resolution, certificate, statement, instrument, opinion, report, notice, request, direction, consent, order, bond, debenture, note, other evidence of indebtedness or other paper or document, but the Trustee, in its discretion, may make such further inquiry or investigation into such facts or matters as it may see fit, and, if the Trustee shall determine to make such further inquiry or investigation, it shall be entitled to examine the books, records and premises of the Company, personally or by agent or attorney at the sole cost of the Company and shall incur no liability or additional liability of any kind by reason of such inquiry or investigation.

(j) In no event shall the Trustee be responsible or liable for special, indirect, or consequential loss or damage of any kind whatsoever (including, but not limited to, loss of profit) irrespective of whether the Trustee has been advised of the likelihood of such loss or damage and regardless of the form of action.

(k) The rights, privileges, protections, immunities and benefits given to the Trustee, including, without limitation, its right to be indemnified, are extended to, and shall be enforceable by, the Trustee in each of its capacities hereunder, and each agent, custodian and other Person employed to act hereunder.

(l) The Trustee may request that the Company deliver a certificate setting forth the names of individuals and/or titles of officers authorized at such time to take specified actions pursuant to this Indenture.

(m) In no event shall the Trustee be responsible or liable for any failure or delay in the performance of its obligations hereunder arising out of or caused by, directly or indirectly, forces beyond its control, including, without limitation, strikes, work stoppages, accidents, acts of war or terrorism, civil or military disturbances, nuclear

or natural catastrophes or acts of God, and interruptions, loss or malfunctions of utilities, communications or computer (software and hardware) services; it being understood that the Trustee shall use reasonable efforts which are consistent with accepted practices in the banking industry to resume performance as soon as practicable under the circumstances.

**Section 7.03      Individual Rights of Trustee.**

The Trustee in its individual or any other capacity may become the owner or pledgee of Securities and may otherwise deal with the Company or its affiliates with the same rights it would have if it were not Trustee. Any Agent may do the same with like rights. The Trustee, however, must comply with Sections 7.10 and 7.11.

**Section 7.04      Trustee's Disclaimer.**

The Trustee makes no representation as to the validity or adequacy of this Indenture, the Securities or of any prospectus used to sell the Securities of any Series; it shall not be accountable for the Company's use of the proceeds from the Securities; it shall not be accountable for any money paid to the Company, or upon the Company's direction, if made under and in accordance with any provision of this Indenture; it shall not be responsible for the use or application of any money received by any Paying Agent other than the Trustee; and it shall not be responsible for any statement of the Company in this Indenture or in the Securities other than its certificate of authentication.

**Section 7.05      Notice of Defaults.**

If a Default on a Series occurs and is continuing and if it is known to the Trustee, the Trustee shall deliver to each Securityholder of the Series notice of the Default (which shall specify any uncured Default known to it) within 90 days after the Trustee obtains such knowledge. Except in the case of a default in payment of principal of or interest on a Series, the Trustee may withhold the notice if and so long as the board of directors of the Trustee, the executive or any trust committee of such directors and/or responsible officers of the Trustee in good faith determine(s) that withholding the notice is in the interests of Holders of the Series.

**Section 7.06      Reports by Trustee to Holders.**

Within 60 days after each May 15 beginning with the May 15 following the date of this Base Indenture, the Trustee shall mail to each Securityholder a brief report dated as of such May 15 that complies with TIA § 313(a) (but if no event described in TIA § 313(1) through (8) has occurred within the twelve months preceding the reporting date no report in relation thereto need be transmitted). The Trustee also shall comply with TIA § 313(b).

A copy of each report at the time of its mailing to Securityholders shall be delivered to the Company and filed by the Trustee with the SEC and each national securities exchange on which the Securities are listed. The Company agrees to notify the Trustee of each national securities exchange on which the Securities are listed.

**Section 7.07      Compensation and Indemnity.**

The Company shall pay to the Trustee from time to time reasonable compensation for its services subject to any written agreement between the Trustee and the Company (which compensation shall not be limited by any provision of law in regard to the compensation of a trustee of an express trust). The Company shall reimburse the Trustee upon request for all reasonable out-of-pocket expenses incurred by it. Such expenses shall include the reasonable compensation and expenses of the Trustee's agents and counsel. The Company shall indemnify the Trustee, its officers, directors, employees and agents and hold it harmless against any loss, liability or expense incurred or made by or on behalf of it in connection with the administration of this Indenture or the trust hereunder and its duties hereunder including the costs and expenses of defending itself against or investigating any claim in the premises. The Trustee shall notify the Company promptly of any claim of which it has received written notice and for which it may seek indemnity. The Company need not reimburse any expense or indemnify against any loss or liability incurred by the Trustee through the Trustee's, or its officers', directors', or employees' negligence or willful misconduct.

Unless otherwise provided in any supplemental indenture or Authorizing Resolution relating to any Series, to ensure the Company's payment obligations in this Section, the Trustee shall have a claim prior to the Securities of all Series on all money or Property held or collected by the Trustee, except that held in trust to pay principal of or interest on particular Securities. When the Trustee incurs expenses or renders services in connection with an Event of Default specified in Section 6.01 or in connection with Article Six hereof, the expenses (including the reasonable fees and expenses of its counsel) and the compensation for services in connection therewith are to constitute expenses of administration under any Bankruptcy Law. Section 7.07 shall survive the discharge of the Indenture or resignation of Trustee.

**Section 7.08      Replacement of Trustee.**

The Trustee may resign with respect to Securities of any or all Series by so notifying the Company. The Holders of a majority in principal amount of the outstanding Securities (or of the relevant Series) may remove the Trustee by so notifying the removed Trustee in writing and may appoint a successor trustee with the Company's consent. Such resignation or removal shall not take effect until the appointment by the Securityholders of the relevant Series or the Company as hereinafter provided of a successor trustee and the acceptance of such appointment by such successor trustee. The Company may remove the Trustee and any Securityholder may petition any court of competent jurisdiction for the removal of the Trustee and the appointment of a successor trustee for any or no reason, including if:

- (1) the Trustee fails to comply with Section 7.10 after written request by the Company or any bona fide Securityholder who has been a Securityholder for at least six months;
- (2) the Trustee is adjudged a bankrupt or an insolvent;
- (3) a receiver or other public officer takes charge of the Trustee or its Property; or
- (4) the Trustee becomes incapable of acting.

If the Trustee resigns or is removed or if a vacancy exists in the office of Trustee for any reason, the Company shall promptly appoint a successor trustee with respect to the Securities of the relevant Series. If a successor trustee does not take office within 30 days after the retiring Trustee resigns or is removed, the retiring Trustee at the expense of the Company, the Company or any Holder may petition any court of competent jurisdiction for the appointment of a successor trustee.

A successor trustee shall deliver a written acceptance of its appointment to the retiring Trustee and to the Company. Immediately after that, the retiring Trustee shall, upon payment of its charges hereunder, transfer all Property held by it as Trustee to the successor trustee, the resignation or removal of the retiring Trustee shall become effective, and the successor trustee shall have all the rights, powers and duties of the Trustee under this Indenture. A successor trustee shall mail notice of its succession to each Securityholder.

**Section 7.09      Successor Trustee by Merger, etc.**

If the Trustee consolidates with, merges with or into or converts into, or transfers all or substantially all of its corporate trust business to, another corporation, the successor corporation without any further act shall be the successor trustee.

**Section 7.10      Eligibility; Disqualification.**

This Indenture shall always have a Trustee who satisfies the requirements of TIA § 310(a)(1). The Trustee shall have a combined capital and surplus of at least \$10,000,000 as set forth in its most recent published annual report of condition. The Trustee shall comply with TIA § 310(b).

**Section 7.11 Preferential Collection of Claims Against Company.**

The Trustee shall comply with TIA § 311(a), excluding any creditor relationship listed in TIA § 311(b). A Trustee who has resigned or been removed shall be subject to TIA § 311(a) to the extent indicated therein.

**ARTICLE EIGHT  
DISCHARGE OF INDENTURE**

**Section 8.01 Defeasance upon Deposit of Moneys or Government Obligations.**

(a) The Company may, at its option and at any time, elect to have either paragraph (b) or paragraph (c) below be applied to the outstanding Securities of any Series upon compliance with the applicable conditions set forth in paragraph (d).

(b) Upon the Company's exercise under paragraph (a) of the option applicable to this paragraph (b) with respect to any Series, the Company shall be deemed to have been released and discharged from its obligations with respect to the outstanding Securities of the Series on the date the applicable conditions set forth below are satisfied (hereinafter, "**Legal Defeasance**"). For this purpose, such Legal Defeasance means that the Company shall be deemed to have paid and discharged the entire Indebtedness represented by the outstanding Securities of a Series, which shall thereafter be deemed to be "outstanding" only for the purposes of the Sections and matters under this Indenture referred to in (i) and (ii) below, and the Company shall be deemed to have satisfied all its other obligations under such Securities and this Indenture insofar as such Securities are concerned, except for the following which shall survive until otherwise terminated or discharged hereunder: (i) the rights of Holders of outstanding Securities of a Series to receive solely from the trust fund described in paragraph (d) below and as more fully set forth in such paragraph, payments in respect of the principal of and interest on such Securities when such payments are due and (ii) obligations listed in Section 8.02, subject to compliance with this Section 8.01. The Company may exercise its option under this paragraph (b) with respect to a Series notwithstanding the prior exercise of its option under paragraph (c) below with respect to the Securities of the Series.

(c) Upon the Company's exercise under paragraph (a) of the option applicable to this paragraph (c) with respect to a Series, the Company shall be released and discharged from the obligations under any covenant contained in Article Five and any other covenant contained in or referenced in the Authorizing Resolution or supplemental indenture relating to such Series (to the extent such release and discharge shall not be prohibited thereby), on and after the date the conditions set forth below are satisfied (hereinafter, "**Covenant Defeasance**"), and the Securities of such Series shall thereafter be deemed to be not "outstanding" for the purpose of any direction, waiver, consent or declaration or act of Holders (and the consequences of any thereof) in connection with such covenants, but shall continue to be deemed "outstanding" for all other purposes hereunder. For this purpose, such Covenant Defeasance means that, with respect to the outstanding Securities of a Series, the Company may omit to comply with and shall have no liability in respect of any term, condition or limitation set forth in any such covenant, whether directly or indirectly, by reason of any reference elsewhere herein to any such covenant or by reason of any reference in any such covenant to any other provision herein or in any other document and such omission to comply shall not constitute a Default or an Event of Default under Section 6.01(3) or otherwise, but, except as specified above, the remainder of this Indenture and such Securities shall be unaffected thereby.

(d) The following shall be the conditions to application of either paragraph (b) or paragraph (c) above to the outstanding Securities of the applicable Series:

(1) The Company shall have irrevocably deposited in trust with the Trustee (or another qualifying trustee), pursuant to an irrevocable trust and security agreement in form and substance reasonably satisfactory to the Trustee, money in the currency in which the Securities of such Series are payable or Government Obligations or a combination thereof in such amounts and at such times as are sufficient, in the opinion of a nationally recognized firm of independent public accountants, to pay the principal of and interest on the outstanding Securities of such Series to maturity or redemption; *provided, however*, that the Trustee (or other qualifying trustee) shall have received an irrevocable written order from the Company instructing the Trustee (or other qualifying trustee) to apply such money or the proceeds of such Government Obligations to said payments with respect to the Securities of such Series to maturity or redemption;

(2) No Default or Event of Default (other than a Default or Event of Default resulting from non-compliance with any covenant from which the Company is released upon effectiveness of such Legal Defeasance or Covenant Defeasance pursuant to paragraph (b) or (c) hereof, as applicable) shall have occurred and be continuing on the date of such deposit or result therefrom;

(3) Such deposit will not result in a breach or violation of, or constitute a default under, any other material instrument or agreement to which the Company or any of any of its Restricted Subsidiaries is a party or by which it or any of their Property is bound;

(4) (i) In the event the Company elects paragraph (b) hereof, the Company shall deliver to the Trustee an Opinion of Counsel in the United States, in form and substance reasonably satisfactory to the Trustee, to the effect that (A) the Company has received from, or there has been published by, the Internal Revenue Service a ruling or (B) since the Issue Date pertaining to such Series, there has been a change in the applicable federal income tax law, in either case to the effect that, and based thereon such Opinion of Counsel shall state that, or (ii) in the event the Company elects paragraph (c) hereof, the Company shall deliver to the Trustee an Opinion of Counsel in the United States, in form and substance reasonably satisfactory to the Trustee, to the effect that, in the case of clauses (i) and (ii), and subject to customary assumptions and exclusions, Holders of the Securities of such Series will not recognize income, gain or loss for federal income tax purposes as a result of such deposit and the defeasance contemplated hereby and will be subject to federal income tax in the same amounts and in the same manner and at the same times as would have been the case if such deposit and defeasance had not occurred;

(5) The Company shall have delivered to the Trustee an Officers' Certificate, stating that the deposit under clause (1) was not made by the Company with the intent of preferring the Holders of the Securities of such Series over any other creditors of the Company or with the intent of defeating, hindering, delaying or defrauding any other creditors of the Company or others; and

(6) The Company has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, each stating that all conditions precedent specified herein relating to the defeasance contemplated by this Section 8.01 have been complied with.

In the event all or any portion of the Securities of a Series are to be redeemed through such irrevocable trust, the Company must make arrangements satisfactory to the Trustee, at the time of such deposit, for the giving of the notice of such redemption or redemptions by the Trustee in the name and at the expense of the Company.

(e) In addition to the Company's rights above under this Section 8.01, the Company may terminate all of its obligations under this Indenture with respect to a Series, when:

(1) All Securities of such Series theretofore authenticated and delivered (other than Securities which have been destroyed, lost or stolen and which have been replaced or paid as provided in Section 2.07 and Securities for whose payment money has theretofore been deposited in trust or segregated and held in trust by the Company and thereafter repaid to the Company or discharged from such trust) have been delivered to the Trustee for cancellation or all such Securities not theretofore delivered to the Trustee for cancellation (A) have become due and payable, (B) will become due and payable at maturity within one year or (C) are to be called for redemption within one year under arrangements satisfactory to the Trustee for the giving of notice of redemption by the Trustee in the name, and at the expense, of the Company, and in each such case, the Company has irrevocably deposited or caused to be deposited with the Trustee (or another qualifying trustee) as trust funds in trust solely for that purpose an amount of money in the currency in which the Securities of such Series are payable or Government Obligations or a combination thereof sufficient, in the opinion of a nationally recognized firm of independent public accountants, to pay and discharge the entire Indebtedness on the Securities of such Series not theretofore delivered to the Trustee for cancellation, for principal of and interest on the Securities of such Series, on the date of such deposit or to the maturity or redemption date, as the case may be;

(2) The Company has paid or caused to be paid all other sums payable hereunder by the Company;

(3) The Company has delivered irrevocable instructions to the Trustee (or such other qualifying trustee), to apply the deposited money toward the payment of the Securities of such Series at maturity or redemption, as the case may be; and

(4) The Company has delivered to the Trustee an Officers' Certificate and an Opinion of Counsel, stating that all conditions precedent specified in this Section 8.01(e) relating to the satisfaction and discharge of this Indenture have been complied with.

**Section 8.02**      **Survival of the Company's Obligations.**

Notwithstanding the satisfaction and discharge of this Indenture under Section 8.01, the Company's obligations in Paragraph 8 of the Securities and Sections 2.03 through 2.07, 4.01, 7.07, 7.08, 8.04 and 8.05, however, shall survive until the Securities of an applicable Series are no longer outstanding. Thereafter, the Company's obligations in Paragraph 8 of the Securities of such Series and Sections 7.07, 8.04 and 8.05 shall survive (as they relate to such Series) such satisfaction and discharge.

**Section 8.03**      **Application of Trust Money.**

The Trustee shall hold in trust money or Government Obligations deposited with it pursuant to Section 8.01. It shall apply the deposited money and the money from Government Obligations in accordance with this Indenture to the payment of principal of and interest on the Securities of the defeased Series.

**Section 8.04**      **Repayment to the Company.**

The Trustee and the Paying Agent shall promptly pay to the Company upon request any excess money or securities held by them at any time. The Trustee and the Paying Agent shall pay to the Company upon request any money held by them for the payment of principal or interest that remains unclaimed for two years, *provided, however*, that the Trustee or such Paying Agent, before being required to make any such repayment, may at the expense of the Company cause to be published once in a newspaper of general circulation in the City of New York or send to each such Holder notice that such money remains unclaimed and that, after a date specified therein, which shall not be less than 30 days from the date of such publication or mailing, any unclaimed balance of such money then remaining will be repaid to the Company. After payment to the Company, Securityholders entitled to the money must look to the Company for payment as general creditors unless applicable abandoned property law designates another person and all liability of the Trustee or such Paying Agent with respect to such money shall cease.

**Section 8.05**      **Reinstatement.**

If the Trustee is unable to apply any money or Government Obligations in accordance with Section 8.01 by reason of any legal proceeding or by reason of any order or judgment of any court or governmental authority enjoining, restraining or otherwise prohibiting such application, the Company's obligations under this Indenture and the Securities relating to the Series shall be revived and reinstated as though no deposit had occurred pursuant to Section 8.01 until such time as the Trustee is permitted to apply all such money or Government Obligations in accordance with Section 8.01; *provided, however*, that (a) if the Company has made any payment of interest on or principal of any Securities of the Series because of the reinstatement of its obligations hereunder, the Company shall be subrogated to the rights of the Holders of such Securities to receive such payment from the money or Government Obligations held by the Trustee and (b) unless otherwise required by any legal proceeding or any order or judgment of any court or governmental authority, the Trustee shall return all such money or Government Obligations to the Company promptly after receiving a written request therefor at any time, if such reinstatement of the Company's obligations has occurred and continues to be in effect.

**ARTICLE NINE  
RESERVED**

**ARTICLE TEN  
AMENDMENTS, SUPPLEMENTS AND WAIVERS**

**Section 10.01     Without Consent of Holders.**

The Company and the Trustee may amend or supplement this Indenture or the Securities of a Series without notice to or consent of any Securityholder of such Series:

- (1) to cure any ambiguity, omission, defect or inconsistency;
- (2) to comply with Article Five;
- (3) to provide that specific provisions of this Indenture shall not apply to a Series not previously issued or to make a change to specific provisions of this Indenture that only applies to any Series not previously issued or to additional Securities of a Series not previously issued;
- (4) to create a Series and establish its terms;
- (5) to provide for uncertificated Securities in addition to or in place of certificated Securities;
- (6) to release a guarantor in respect of any Series which, in accordance with the terms of this Indenture applicable to the particular Series, ceases to be liable in respect of its guarantee;
- (7) to add a guarantor in respect of any Series;
- (8) to secure any Series;
- (9) to comply with requirements of the SEC in order to effect or maintain the qualification of this Indenture under the TIA;
- (10) to make any other change that does not adversely affect the rights of Securityholders; and
- (11) to conform the provisions of the Indenture to the final offering memorandum in respect of any Series.

After an amendment under this Section 10.01 becomes effective, the Company shall mail notice of such amendment to the Securityholders.

**Section 10.02     With Consent of Holders.**

The Company and the Trustee may amend or supplement this Indenture or the Securities of a Series without notice to any Securityholder of such Series but with the written consent of the Holders of at least a majority in principal amount of the outstanding Securities of each Series affected by the amendment (including consents obtained in connection with a purchase of, or tender offer or exchange offer for, Securities of such Series). Each such Series shall vote as a separate class. The Holders of a majority in principal amount of the outstanding Securities of any Series may waive compliance by the Company with any provision of the Securities of such Series or of this Indenture relating to such Series without notice to any Securityholder (including any waiver granted in connection with a purchase of, or tender offer or exchange offer for, Securities of such Series). Without the consent of each Holder of a Security affected thereby, however, an amendment, supplement or waiver, including a waiver pursuant to Section 6.04, may not:

- (1) reduce the amount of Securities of the relevant Series whose Holders must consent to an amendment, supplement or waiver;

(2) reduce the rate of or extend the time for payment of interest, including defaulted interest, on any Security;

(3) reduce the principal of or extend the fixed maturity of any Security or alter the provisions (including related definitions) with respect to redemption of any Security pursuant to Article Three hereof or with respect to any obligations on the part of the Company to offer to purchase or to redeem Securities of a Series pursuant to the Authorizing Resolution or supplemental indenture pertaining to such Series (it being understood that only the consent of the Holders of a majority of the principal amount of the applicable Series of Securities will be required in connection with the waiver or modification of any obligation by the Company to make an offer to purchase the Securities of such Series as a result of a change of control prior to the occurrence of a change of control);

(4) make any change that adversely affects any right of a Holder to convert or exchange any Security into or for shares of the Company's common stock or other securities, cash or other property in accordance with the terms of such Security;

(5) modify the ranking or priority of the Securities of the relevant Series or any guarantee thereof;

(6) release any guarantor of any Series from any of its obligations under its guarantee or this Indenture otherwise than in accordance with the terms of this Indenture;

(7) make any change in Sections 6.04, 6.07 or this Section 10.02;

(8) waive a continuing Default or Event of Default in the payment of the principal of or interest on any Security; or

(9) make any Security payable at a place or in money other than that stated in the Security, or impair the right of any Securityholder to bring suit as permitted by Section 6.07.

An amendment of a provision included solely for the benefit of one or more Series does not affect the interests of Securityholders of any other Series.

It shall not be necessary for the consent of the Holders under this Section to approve the particular form of any proposed supplement, but it shall be sufficient if such consent approves the substance thereof.

**Section 10.03 Compliance with Trust Indenture Act.**

Every amendment to or supplement of this Indenture or any Securities shall comply with the TIA as then in effect.

**Section 10.04 Revocation and Effect of Consents.**

A consent to an amendment, supplement or waiver by a Holder shall bind the Holder and every subsequent Holder of a Security or portion of a Security that evidences the same debt as the consenting Holder's Security, even if notation of the consent is not made on any Security. Unless otherwise provided in the consent or the consent solicitation statement or other document describing the terms of the consent, any Holder or subsequent Holder may revoke the consent as to its Security or portion of a Security. Any revocation of a consent by the Holder of a Security or any such subsequent Holder shall be effective only if the Trustee receives the notice of revocation before the date on which the Trustee receives an Officers' Certificate from the Company certifying that the requisite number of consents have been received.

The Company may, but shall not be obligated to, fix a record date for the purpose of determining the Holders of Securities of any Series entitled to consent to any amendment, supplement or waiver, which record date shall be at least 10 days prior to the first solicitation of such consent. If a record date is fixed, and if Holders



otherwise have a right to revoke their consent under the consent or the consent solicitation statement or other document describing the terms of the consent, then notwithstanding the second to last sentence of the immediately preceding paragraph, those Persons who were Holders at such record date (or their duly designated proxies), and only those Persons, shall be entitled to revoke any consent previously given, whether or not such Persons continue to be Holders after such record date. No such consent shall be valid or effective for more than 90 days after such record date.

An amendment, supplement or waiver with respect to a Series becomes effective upon the (i) receipt by the Company or the Trustee of the requisite consents, (ii) satisfaction of any conditions to effectiveness as set forth in this Indenture or any indenture supplemental hereto containing such amendment, supplement or waiver and (iii) execution of such amendment, supplement or waiver (or the related supplemental indenture) by the Company and the Trustee. After an amendment, supplement or waiver with respect to a Series becomes effective, it shall bind every Holder of such Series, unless it makes a change described in any of clauses (1) through (9) of Section 10.02, in which case, the amendment, supplement or waiver shall bind a Holder of a Security who is affected thereby only if it has consented to such amendment, supplement or waiver and every subsequent Holder of a Security or portion of a Security that evidences the same debt as the consenting Holder's Security; *provided* that no such waiver shall impair or affect the right of any Holder to receive payment of principal of and interest on a Security, on or after the respective due dates expressed in such Security, or to bring suit for the enforcement of any such payment on or after such respective dates without the consent of such Holder.

**Section 10.05**      **Notation on or Exchange of Securities.**

If an amendment, supplement or waiver changes the terms of a Security, the Company may require the Holder of the Security to deliver it to the Trustee, at which time the Trustee shall place an appropriate notation on the Security about the changed terms and return it to the Holder. Alternatively, if the Company or the Trustee so determines, the Company in exchange for the Security shall issue and the Trustee shall authenticate a new Security that reflects the changed terms.

**Section 10.06**      **Trustee to Sign Amendments, etc.**

Subject to Section 7.02(b), the Trustee shall sign any amendment, supplement or waiver authorized pursuant to this Article if the amendment, supplement or waiver does not adversely affect the rights, duties, liabilities or immunities of the Trustee. If it does, the Trustee may but need not sign it. In signing or refusing to sign such amendment or supplemental indenture, the Trustee shall be provided with and shall be fully protected in relying upon, an Officers' Certificate and an Opinion of Counsel as conclusive evidence that such amendment, supplement or waiver is authorized or permitted by this Indenture, and (solely with respect to such Opinion of Counsel) that it will be valid and binding upon the Company and enforceable in accordance with its terms.

**ARTICLE ELEVEN**  
**SECURITIES IN FOREIGN CURRENCIES**

**Section 11.01**      **Applicability of Article.**

Whenever this Indenture provides for (i) any action by, or the determination of any of the rights of, Holders of Securities of any Series in which not all of such Securities are denominated in the same currency, or (ii) any distribution to Holders of Securities, in the absence of any provision to the contrary pursuant to this Indenture or the Securities of any particular Series, any amount in respect of any Security denominated in a Foreign Currency shall be treated for any such action or distribution as that amount of Dollars that could be obtained for such amount on such reasonable basis of exchange and as of the record date with respect to Securities of such Series (if any) for such action, determination of rights or distribution (or, if there shall be no applicable record date, such other date reasonably proximate to the date of such action, determination of rights or distribution) as the Company may specify in a written notice to the Trustee or, in the absence of such written notice, as the Trustee may determine.

**ARTICLE TWELVE  
MISCELLANEOUS**

**Section 12.01     Trust Indenture Act Controls.**

If any provision of this Indenture limits, qualifies or conflicts with another provision which is required to be included in this Indenture by the TIA, the required provision shall control.

**Section 12.02     Notices.**

Any order, consent, notice or communication shall be sufficiently given if in writing and delivered in person or mailed by first class mail, postage prepaid, or delivered by commercial courier service, addressed as follows:

if to the Company:

Arrowhead Pharmaceuticals, Inc.  
177 E. Colorado Blvd., Suite 700  
Pasadena, California, 91105  
Attention: Chief Financial Officer

if to the Trustee:

[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]  
[ \_\_\_\_\_ ]

The Company or the Trustee by notice to the other may designate additional or different addresses for subsequent notices or communications.

Any notice or communication mailed to a Securityholder shall be mailed to him by first class mail, or delivered by commercial courier service, at his address as it appears on the registration books of the Registrar, or, in the case of Global Securities sent electronically in accordance with the procedures of the Depositary, and shall be sufficiently given to him if so sent within the time prescribed.

Failure to send a notice or communication to a Securityholder or any defect in it shall not affect its sufficiency with respect to other Securityholders. If a notice or communication is sent in the manner provided above, it is duly given, whether or not the addressee receives it except that notice to the Trustee shall only be effective upon receipt thereof by the Trustee.

If the Company sends notice or communications to the Securityholders, it shall send a copy to the Trustee at the same time.

In addition to the foregoing, the Trustee agrees to accept and act upon notice, instructions or directions pursuant to this Indenture sent by unsecured e-mail, facsimile transmission or other similar unsecured electronic methods. If the party elects to give the Trustee e-mail or facsimile instructions (or instructions by a similar electronic method) and the Trustee in its discretion elects to act upon such instructions, the Trustee's understanding of such instructions shall be deemed controlling. The Trustee shall not be liable for any losses, costs or expenses arising directly or indirectly from the Trustee's reliance upon and compliance with such instructions notwithstanding such instructions conflict or are inconsistent with a subsequent written instruction. The party providing electronic instructions agrees to assume all risks arising out of the use of such electronic methods to submit instructions and directions to the Trustee, including without limitation the risk of the Trustee acting on unauthorized instructions, and the risk of interception and misuse by third parties.

Notwithstanding any other provision of this Indenture or any Security, where this Indenture or any Security provides for notice of any event to a Holder of a Global Security (whether by mail or otherwise), such notice shall be sufficiently given if given to the Depositary (or its designee) pursuant to the standing instructions from the Depositary or its designee.

**Section 12.03      Communications by Holders with Other Holders.**

Securityholders may communicate pursuant to TIA § 312(b) with other Securityholders with respect to their rights under this Indenture or the Securities. The Company, the Trustee, the Registrar and anyone else shall have the protection of TIA § 312(c).

**Section 12.04      Certificate and Opinion as to Conditions Precedent.**

Upon any request or application by the Company to the Trustee to take any action under this Indenture, the Company shall furnish to the Trustee:

- (1) an Officers' Certificate (which shall include the statements set forth in Section 12.05) stating that, in the opinion of the signers (who may rely upon an Opinion of Counsel with respect to matters of law), all conditions precedent, if any, provided for in this Indenture relating to the proposed action have been complied with; and
- (2) an Opinion of Counsel (which shall include the statements set forth in Section 12.05) stating that, in the opinion of such counsel (who may rely upon an Officers' Certificate or certificates of public officials as to matters of fact), all such conditions precedent and covenants, compliance with which constitutes a condition precedent, if any, provided for in this Indenture relating to the proposed action or inaction, have been complied with.

**Section 12.05      Statements Required in Certificate or Opinion.**

Each certificate or opinion with respect to compliance with a condition or covenant provided for in this Indenture shall include:

- (1) a statement that the person making such certificate or opinion has read such covenant or condition;
- (2) a brief statement as to the nature and scope of the examination or investigation upon which the statements or opinions contained in such certificate or opinion are based;
- (3) a statement that, in the opinion of such person, he has made such examination or investigation as is necessary to enable him to express an informed opinion as to whether or not such covenant or condition has been complied with; and
- (4) a statement as to whether or not, in the opinion of such person, such condition or covenant has been complied with.

**Section 12.06      Rules by Trustee and Agents.**

The Trustee may make reasonable rules for action by or a meeting of Securityholders. The Registrar or Paying Agent may make reasonable rules for its functions.

**Section 12.07      Legal Holidays.**

A "**Legal Holiday**" is a Saturday, a Sunday, a legal holiday or a day on which banking institutions in New York, New York or in the place of payment are not required to be open. If a payment date is a Legal Holiday, payment may be made on the next succeeding day that is not a Legal Holiday, and no interest shall accrue for the intervening period. If this Indenture provides for a time period that ends or requires performance of any non-payment obligation by a day that is not a Business Day, then such time period shall instead be deemed to end on, and such obligation shall instead be performed by, the next succeeding Business Day. A "Business Day" is any day other than a Legal Holiday.

**Section 12.08**     **Governing Law.**

The laws of the State of New York shall govern this Indenture and the Securities of each Series.

**Section 12.09**     **No Adverse Interpretation of Other Agreements.**

This Indenture may not be used to interpret another indenture, loan or debt agreement of the Company or a Subsidiary. Any such indenture, loan or debt agreement may not be used to interpret this Indenture.

**Section 12.10**     **No Recourse Against Others.**

All liability described in Paragraph 12 of the Securities of any director, officer, employee or stockholder, as such, of the Company is, to the fullest extent permitted by applicable law, waived and released.

**Section 12.11**     **Successors and Assigns.**

All covenants and agreements of the Company in this Indenture and the Securities shall bind its successors and assigns. All agreements of the Trustee in this Indenture shall bind its successors and assigns.

**Section 12.12**     **Duplicate Originals.**

The parties may sign any number of copies of this Indenture. Each signed copy shall be an original, but all of them together represent the same agreement. Signatures of the parties hereto transmitted by facsimile or other electronic transmission shall be deemed to be their original signatures for all purposes.

**Section 12.13**     **Severability.**

In case any one or more of the provisions contained in this Indenture or in the Securities of a Series shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Indenture or of such Securities.

**Section 12.14**     **Waiver of Jury Trial.**

EACH OF THE COMPANY AND THE TRUSTEE HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS INDENTURE, THE SECURITIES OR THE TRANSACTION CONTEMPLATED HEREBY.

**SIGNATURES**

IN WITNESS WHEREOF, the parties have caused this Indenture to be duly executed, all as of the date first above written.

**ARROWHEAD PHARMACEUTICALS, INC.**

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

[ \_\_\_\_\_ ], as Trustee

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**EXHIBIT A**

No. \_\_\_\_\_

CUSIP/ISIN No.: \_\_\_\_\_

[Title of Security]

**ARROWHEAD PHARMACEUTICALS, INC.**

a Delaware corporation

promises to pay to \_\_\_\_\_ or registered assigns the principal

sum of \_\_\_\_\_ [Dollars]\* on \_\_\_\_\_.

Interest Payment Dates: \_\_\_\_\_ and \_\_\_\_\_

Record Dates: \_\_\_\_\_ and \_\_\_\_\_

Authenticated: \_\_\_\_\_ Dated: \_\_\_\_\_

**ARROWHEAD PHARMACEUTICALS, INC.**

By: \_\_\_\_\_

Name:

Title:

[\_\_\_\_\_] ,  
as Trustee, certifies that this is one of the Securities referred  
to in the within mentioned Indenture.

By: \_\_\_\_\_  
Authorized Signatory

\* Or other currency. Insert corresponding provisions on reverse side of Security in respect of foreign currency denomination or interest payment requirement.

ARROWHEAD PHARMACEUTICALS, INC.

[Title of Security]

ARROWHEAD PHARMACEUTICALS, INC., a Delaware corporation (together with its successors and assigns, the “**Company**”), issued this Security under an Indenture dated as of \_\_\_\_\_, (as amended, modified or supplemented from time to time in accordance therewith, the “**Base Indenture**”), as supplemented by the Supplemental Indenture dated as of \_\_\_\_\_, (the “**Supplemental Indenture**” and together with the Base Indenture, the “**Indenture**”), by and among the Company and [\_\_\_\_\_] , as trustee (in such capacity, the “**Trustee**”), to which reference is hereby made for a statement of the respective rights, obligations, duties and immunities thereunder of the Company, the Trustee and the Holders and of the terms upon which the Securities are, and are to be, authorized and delivered. All terms used in this Security that are defined in the Indenture shall have the meanings assigned to them therein.

**1. Interest.** The Company promises to pay interest on the principal amount of this Security at the rate per annum shown above. The Company will pay interest semiannually on \_\_\_\_\_ and \_\_\_\_\_ of each year, commencing \_\_\_\_\_, \_\_\_\_\_, until the principal is paid or made available for payment. Interest on the Securities will accrue from the most recent date to which interest has been paid or duly provided for or, if no interest has been paid, from \_\_\_\_\_, \_\_\_\_\_, *provided* that, if there is no existing default in the payment of interest, and if this Security is authenticated between a record date referred to on the face hereof and the next succeeding interest payment date, interest shall accrue from such interest payment date. Interest will be computed on the basis of a 360-day year of twelve 30-day months.

**2. Method of Payment.** The Company will pay interest on the Securities (except defaulted interest, if any, which will be paid on such special payment date to Holders of record on such special record date as may be fixed by the Company) to the persons who are registered Holders of Securities at the close of business on the [Insert record dates] immediately preceding the interest payment date. Holders must surrender Securities to a Paying Agent to collect principal payments. The Company will pay principal and interest in money of [Insert applicable country or currency] that at the time of payment is legal tender for payment of public and private debts.

**3. Paying Agent and Registrar.** Initially, the Trustee will act as Paying Agent and Registrar. The Company may change or appoint any Paying Agent, Registrar or co-Registrar without notice. The Company or any of its Subsidiaries or any of their Affiliates may act as Paying Agent, Registrar or co-Registrar.

**4. Optional Redemption.**<sup>1</sup> The Company may redeem the Securities at any time on or after \_\_\_\_\_, in whole or in part, at the following redemption prices (expressed as a percentage of their principal amount) together with interest accrued and unpaid to the date fixed for redemption:

<u>If redeemed during the twelve-month period commencing on _____ and ending on _____ in each of the following years</u>	<u>Percentage</u>
--	-------------------

[Insert provisions relating to redemption at option of Holders, if any]

Notice of redemption will be sent at least 30 days but not more than 60 days before the redemption date to each Holder of Securities to be redeemed at its registered address. Securities in denominations larger than \_\_\_\_\_<sup>2</sup> may be redeemed in part. On and after the redemption date interest ceases to accrue on Securities or portions of them called for redemption, *provided* that if the Company shall default in the payment of such Securities at the redemption price together with accrued interest, interest shall continue to accrue at the rate borne by the Securities.

<sup>1</sup> If applicable.

<sup>2</sup> Insert applicable denominations and multiples.

**5. Mandatory Redemption.**<sup>3</sup> The Company shall redeem [ ]% of the aggregate principal amount of Securities originally issued under the Indenture on each of [ ], which redemptions are calculated to retire [ ]% of the Securities originally issued prior to maturity. Such redemptions shall be made at a redemption price equal to 100% of the principal amount thereof, together with accrued interest to the redemption date. The Company may reduce the principal amount of Securities to be redeemed pursuant to this Paragraph 5 by the principal amount of any Securities previously redeemed, retired or acquired, otherwise than pursuant to this Paragraph 5, that the Company has delivered to the Trustee for cancellation and not previously credited to the Company's obligations under this Paragraph 5. Each such Security shall be received and credited for such purpose by the Trustee at the redemption price and the amount of such mandatory redemption payment shall be reduced accordingly.

**6. Denominations, Transfer, Exchange.** The Securities are in registered form only without coupons in denominations of \_\_\_\_\_<sup>4</sup> and integral multiples of \_\_\_\_\_ in excess thereof.<sup>5</sup> A Holder may transfer or exchange Securities by presentation of such Securities to the Registrar or a co-Registrar with a request to register the transfer or to exchange them for an equal principal amount of Securities of other denominations. The Registrar may require a Holder, among other things, to furnish appropriate endorsements and transfer documents and to pay any taxes and fees required by law or permitted by the Indenture. The Registrar need not transfer or exchange any Security selected for redemption or purchase, except the unredeemed or unpurchased part thereof if the Security is redeemed or purchased in part, or transfer or exchange any Securities for a period of 15 days before a selection of Securities to be redeemed or purchased.

**7. Persons Deemed Owners.** The registered Holder of this Security shall be treated as the owner of it for all purposes.

**8. Unclaimed Money.** Subject to any applicable abandoned property law, the Trustee and the Paying Agent shall pay to the Company upon written request any money held by them for the payment of principal or interest that remains unclaimed for two years, and thereafter, Holders entitled to the money must look to the Company for payment as general creditors.

**9. Amendment, Supplement, Waiver.** Subject to certain exceptions, the Indenture or the Securities may be amended or supplemented with the consent of the Holders of at least a majority in principal amount of the outstanding Securities of each Series affected by the amendment and any past default or compliance with any provision relating to any Series of the Securities may be waived in a particular instance with the consent of the Holders of a majority in principal amount of the outstanding Securities of such Series.<sup>6</sup> Without the consent of any Securityholder, the Company and the Trustee may amend or supplement the Indenture or the Securities in certain respects as specified in the Indenture.

**10. Successor Corporation.** When a successor corporation assumes all the obligations of its predecessor under the Securities and the Indenture, the predecessor corporation will be released from those obligations.

**11. Trustee Dealings With Company.** Subject to certain limitations imposed by the TIA, the Trustee under the Indenture, in its individual or any other capacity, may make loans to, accept deposits from, and perform services for the Company or its affiliates, and may otherwise deal with the Company or its affiliates, as if it were not Trustee, including owning or pledging the Securities.

<sup>3</sup> If applicable.

<sup>4</sup> Insert applicable denominations and multiples.

<sup>5</sup> Insert applicable denominations and multiples.

<sup>6</sup> If different terms apply, insert a brief summary thereof.



**12. No Recourse Against Others.** A director, officer, employee or stockholder, as such, of the Company shall not have any liability for any obligations of the Company under the Securities or the Indenture or for any claim based on, in respect of or by reason of, such obligations or their creation. Each Holder by accepting a Security waives and releases all such liability. The waiver and release are part of the consideration for the issue of the Securities. The waiver may not be effective to waive liabilities under the federal securities laws.

**13. Discharge of Indenture.** The Indenture contains certain provisions pertaining to defeasance and discharge, which provisions shall for all purposes have the same effect as if set forth herein.

**14. Authentication.** This Security shall not be valid until an authorized signatory of the Trustee signs the certificate of authentication on the other side of this Security.

**15. Abbreviations.** Customary abbreviations may be used in the name of a Holder or an assignee, such as: TEN COM (= tenants in common), TEN ENT (= tenants by the entireties), JT TEN (= joint tenants with right of survivorship and not as tenants in common), CUST (= custodian), and U/G/M/A (= Uniform Gift to Minors Act).

**16. GOVERNING LAW.** THIS SECURITY SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK.

**17. CUSIP and ISIN Numbers.** Pursuant to a recommendation promulgated by the Committee on Uniform Security Identification Procedures, the Company has caused CUSIP and ISIN numbers to be printed on the Securities and has directed the Trustee to use CUSIP and ISIN numbers in notices of repurchase as a convenience to Holders. No representation is made as to the accuracy of such numbers either as printed on the Securities or as contained in any notice of repurchase and reliance may be placed only on the other identification numbers placed thereon.

**18. Copies.** The Company will furnish to any Holder upon written request and without charge a copy of the Indenture and the applicable Authorizing Resolution or supplemental indenture. Requests may be made to: Arrowhead Pharmaceuticals, Inc., 225 South Lake Avenue, Suite 1050, Pasadena, California 91101, Attention: [Chief Financial Officer].

**ASSIGNMENT FORM**

If you the Holder want to assign this Security, fill in the form below:

I or we assign and transfer this Security to \_\_\_\_\_ (insert assignee's social security or tax ID number)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Print or type assignee's name, address, and zip code)

and irrevocably appoint \_\_\_\_\_  
agent to transfer this Security on the books of the Company. The agent may substitute another to act for him.

Date: \_\_\_\_\_

\_\_\_\_\_  
Your signature  
(Sign exactly as your name appears on the other side of this Security)

Signature Guarantee:

\_\_\_\_\_

December 2, 2022

Arrowhead Pharmaceuticals, Inc.  
177 E. Colorado Blvd, Suite 700  
Pasadena, CA 91105

Re: Arrowhead Pharmaceuticals, Inc.  
Registration Statement on Form S-3

Ladies and Gentlemen:

We have acted as counsel to Arrowhead Pharmaceuticals, Inc., a Delaware corporation (the "Company"), in connection with the preparation and filing with the Securities and Exchange Commission (the "Commission") of a Registration Statement on Form S-3 (the "Registration Statement") under the Securities Act of 1933, as amended (the "Securities Act"), relating to the registration under the Securities Act and the proposed issuance and sale from time to time pursuant to Rule 415 under the Securities Act, together or separately and in one or more series (if applicable) of:

(i) the Company's debt securities, which may either be senior debt securities ("Senior Debt Securities"), senior subordinated debt securities ("Senior Subordinated Debt Securities") or junior subordinated debt securities (the "Junior Subordinated Debt Securities" and, collectively with the Senior Debt Securities and the Senior Subordinated Debt Securities, the "Debt Securities");

(ii) shares of the Company's common stock, par value \$0.001 per share (the "Common Stock");

(iii) shares of the Company's preferred stock, par value \$0.001 per share (the "Preferred Stock"); and

(iv) warrants for the purchase of Debt Securities, Common Stock, and Preferred Stock (the "Warrants").

The Debt Securities, Common Stock, Preferred Stock and Warrants are collectively referred to herein as the "Securities." The Debt Securities are to be issued under an indenture substantially in the form attached to the Registration Statement (the "Base Indenture").

In arriving at the opinions expressed below, we have examined originals, or copies certified or otherwise identified to our satisfaction as being true and complete copies of the originals, of the form of the Base Indenture, forms of the Debt Securities, specimen Common Stock and such other documents, corporate records, certificates of officers of the Company and of public officials and other instruments as we have deemed necessary or advisable to enable us to render these opinions. In our examination, we have assumed the genuineness of all signatures, the legal capacity and competency of all natural persons, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as copies. As to any facts material to these opinions, we have relied to the extent we deemed appropriate and without independent investigation upon statements and representations of officers and other representatives of the Company and others.

We have assumed without independent investigation that:

(i) at the time any Securities are sold pursuant to the Registration Statement (the “Relevant Time”), the Registration Statement and any supplements and amendments thereto (including post-effective amendments) will be effective and will comply with all applicable laws;

(ii) at the Relevant Time, a prospectus supplement will have been prepared and filed with the Commission describing the Securities offered thereby and all related documentation and will comply with all applicable laws;

(iii) all Securities will be issued and sold in the manner stated in the Registration Statement and the applicable prospectus supplement;

(iv) at the Relevant Time, all corporate or other action required to be taken by the Company to duly authorize each proposed issuance of Securities and any related documentation (including (i) the due reservation of any shares of Common Stock or Preferred Stock for issuance upon exercise, conversion or exchange of any Securities for Common Stock or Preferred Stock (a “Convertible Security”), and (ii) the execution (in the case of certificated Securities), delivery and performance of the Securities and any related documentation referred to in paragraphs 1 through 4 below) shall have been duly completed and shall remain in full force and effect;

(v) upon issuance of any Common Stock or Preferred Stock, including upon exercise, conversion or exchange of any Convertible Security, the total number of shares of Common Stock or Preferred Stock issued and outstanding will not exceed the total number of shares of Common Stock or Preferred Stock, as applicable, that the Company is then authorized to issue under its certificate of incorporation and other relevant documents;

(vi) in the case of Debt Securities, at the Relevant Time, the relevant trustee shall have been qualified under the Trust Indenture Act of 1939, as amended (the “TIA”), a Statement of Eligibility of the Trustee on Form T-1 shall have been properly filed with the Commission and the relevant Base Indenture shall have been duly executed and delivered by the Company and all other parties thereto and duly qualified under the TIA; and

(vii) at the Relevant Time, a definitive purchase, underwriting or similar agreement and any other necessary agreement with respect to any Securities offered or issued will have been duly authorized by all necessary corporate or other action of the Company duly executed and delivered by the Company and the other parties thereto.

Based on the foregoing and in reliance thereon, and subject to the assumptions, exceptions, qualifications and limitations set forth herein, we are of the opinion that:

1. With respect to any Debt Securities when:
  - a. the terms and conditions of such Debt Securities have been duly established by supplemental indenture or officers' certificate in accordance with the terms and conditions of the relevant Base Indenture,
  - b. any such supplemental indenture has been duly executed and delivered by the Company and the relevant trustee (together with the relevant Base Indenture, the "Indenture"), and
  - c. such Debt Securities have been executed (in the case of certificated Debt Securities), delivered and authenticated in accordance with the terms of the applicable Indenture and issued and sold for the consideration set forth in the applicable definitive purchase, underwriting or similar agreement,

such Debt Securities will be legal, valid and binding obligations of the Company, enforceable against the Company in accordance with their respective terms.

2. With respect to any shares of Preferred Stock, when:
  - a. the certificate of designations relating to such Preferred Stock (the "Certificate of Designations") has been duly executed and filed with the Office of the Secretary of State of the State of Delaware,
  - b. such shares have been issued either (i) in accordance with the applicable definitive purchase, underwriting or similar agreement and for the consideration therefor provided for therein or (ii) upon exercise, conversion or exchange of any Convertible Security and for any additional consideration specified in such Convertible Security or the instrument governing such Convertible Security providing for such conversion or exercise, which consideration (including any consideration paid for such Convertible Security), on a per-share basis, shall in either event not be less than the par value of the Preferred Stock, and
  - c. any such Convertible Security was previously validly issued and is fully paid and non-assessable (in the case of an equity Security) or is a legal, valid and binding obligation of the Company, enforceable against the Company in accordance with its terms,

such shares of Preferred Stock will be validly issued, fully paid and non-assessable.

3. With respect to shares of Common Stock, when:
  - a. such shares of Common Stock have been duly executed (in the case of certificated shares) and delivered either (i) in accordance with the applicable definitive purchase, underwriting or similar agreement for the consideration provided for therein, or (ii) upon conversion or exercise of any Convertible Security, in accordance with the terms of such Convertible Security or the instrument governing such Convertible Security providing for such conversion or exercise, and for any additional consideration specified therein, which consideration (including any consideration paid for such Convertible Security), on a per-share basis, shall in either event not be less than the par value of the Common Stock, and
  - b. any such Convertible Security was previously validly issued and is fully paid and non-assessable (in the case of an equity Security) or is a legal, valid and binding obligation of the Company, enforceable against the Company in accordance with its terms,such shares of Common Stock will be validly issued, fully paid and non-assessable.
4. With respect to any Warrants, when:
  - a. the warrant agreement relating to such Warrants (the "Warrant Agreement"), if any, has been duly executed and delivered by the Company and each other party thereto,
  - b. the terms of the Warrants have been established in accordance with the Warrant Agreement, if any, and the applicable definitive purchase, underwriting or similar agreement, and
  - c. the Warrants have been duly executed (in the case of certificated Warrants) and delivered in accordance with the Warrant Agreement, if any, and the applicable definitive purchase, underwriting or similar agreement for the consideration provided for therein,such Warrants will be legal, valid and binding obligations of the Company, enforceable against the Company in accordance with their terms.

The opinions expressed above are subject to the following exceptions, qualifications, limitations and assumptions:

A. We render no opinion herein as to matters involving the laws of any jurisdiction other than the State of New York and the United States of America and, for purposes of paragraphs 2 and 3 above, the Delaware General Corporation Law. We are not admitted to practice in the State of Delaware; however, we are generally familiar with the Delaware General Corporation Law as currently in effect and have made such inquiries as we consider necessary to render the opinions contained in paragraphs 2 and 3 above. This opinion is limited to the effect of the current state of the laws of the State of New York, the United States of America and, to the limited extent set forth above, the laws of the State of Delaware and the facts as they currently exist. We assume no obligation to revise or supplement this opinion in the event of future changes in such laws or the interpretations thereof or such facts.

B. The opinions above with respect to the Indenture, the Debt Securities, the Warrants, and the Warrant Agreement (collectively, the “Documents”) are each subject to (i) the effect of any bankruptcy, insolvency, reorganization, moratorium, arrangement or similar laws affecting the rights and remedies of creditors’ generally, including without limitation the effect of statutory or other laws regarding fraudulent transfers or preferential transfers and (ii) general principles of equity, including without limitation concepts of materiality, reasonableness, good faith and fair dealing and the possible unavailability of specific performance, injunctive relief or other equitable remedies regardless of whether enforceability is considered in a proceeding in equity or at law.

C. We express no opinion regarding the effectiveness of (i) any waiver of stay, extension or usury laws (ii) provisions relating to indemnification, exculpation or contribution, to the extent such provisions may be held unenforceable as contrary to public policy or federal or state securities laws; (iii) any provision in any Document waiving the right to object to venue in any court; (iv) any agreement to submit to the jurisdiction of any Federal court or (v) any waiver of the right to jury trial.

D. To the extent relevant to our opinions in paragraph 4 and not covered by our opinions in paragraphs 1, 2, and 3, we have assumed that any securities underlying, comprising or issuable upon exchange, conversion or exercise of any Warrants are validly issued, fully paid and non-assessable (in the case of an equity security) or a legal, valid and binding obligation of the issuer thereof, enforceable against such issuer in accordance with its terms.

You have informed us that you intend to issue Securities from time to time on a delayed or continuous basis, and we understand that prior to issuing any Securities pursuant to the Registration Statement (i) you will advise us in writing of the terms thereof, and (ii) you will afford us an opportunity to (x) review the operative documents pursuant to which such Securities are to be issued or sold (including the applicable offering documents), and (y) file such supplement or amendment to this opinion (if any) as we may reasonably consider necessary or appropriate.

We consent to the filing of this opinion as an exhibit to the Registration Statement, and we further consent to the use of our name under the caption “Legal Matters” in the Registration Statement and the prospectus that forms a part thereof. In giving these consents, we do not thereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission promulgated thereunder.

Very truly yours,

/s/ Gibson, Dunn & Crutcher LLP

Client: 04695-00018

December 2, 2022

Arrowhead Pharmaceuticals, Inc.  
177 E. Colorado Blvd, Suite 700  
Pasadena, CA 91105

Re: *Arrowhead Pharmaceuticals, Inc.*  
*Registration Statement on Form S-3*

Ladies and Gentlemen:

We have examined the Registration Statement on Form S-3 (the "Registration Statement"), of Arrowhead Pharmaceuticals, Inc., a Delaware corporation (the "Company"), filed with the Securities and Exchange Commission (the "Commission") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), and the prospectus supplement thereto dated December 2, 2022 (the "Prospectus Supplement"), in connection with the offering by the Company of up to \$250,000,000 of shares of the Company's common stock, par value \$0.001 per share (the "Shares").

In arriving at the opinion expressed below, we have examined originals, or copies certified or otherwise identified to our satisfaction as being true and complete copies of the originals, of specimen Common Stock certificate and such other documents, corporate records, certificates of officers of the Company and of public officials and other instruments as we have deemed necessary or advisable to enable us to render the opinions set forth below. In our examination, we have assumed without independent investigation the genuineness of all signatures, the legal capacity and competency of all natural persons, the authenticity of all documents submitted to us as originals and the conformity to original documents of all documents submitted to us as copies. We have further assumed that all offers and sales of the Shares will comply with the minimum offering price and pricing formula set forth in the authorization of the offering and sale of the Shares by the Company's Board of Directors.

Based upon the foregoing, and subject to the assumptions, exceptions, qualifications and limitations set forth herein, we are of the opinion that the Shares, when issued against payment therefor as set forth in the Registration Statement and the Prospectus Supplement thereto, will be validly issued, fully paid and non-assessable.

We consent to the filing of this opinion as an exhibit to the Registration Statement, and we further consent to the use of our name under the caption "Legal Matters" in the Registration Statement and the Prospectus Supplement. In giving these consents, we do not thereby admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the Rules and Regulations of the Commission.

Very truly yours,

/s/ Gibson, Dunn &amp; Crutcher LLP



**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We hereby consent to the incorporation by reference, in this Registration Statement on Form S-3 ASR of our report dated November 28, 2022, with respect to the consolidated financial statements of Arrowhead Pharmaceuticals, Inc. and Subsidiaries appearing in the Company's Annual Report on Form 10-K for the year ended September 30, 2022.

We also consent to the reference to our Firm under the caption "Experts" in such Registration Statement.

/s/ Rose, Snyder & Jacobs LLP

Rose, Snyder & Jacobs LLP

Encino, California

December 2, 2022

**Calculation of Filing Fee Tables**  
**FORM S-3**  
**Registration Statement under the Securities Act of 1933**  
 (Form Type)  
**Arrowhead Pharmaceuticals, Inc.**  
 (Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered and Carry Forward Securities

	Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price per Unit	Maximum Aggregate Offering Price	Fee Rate (3)	Amount of Registration Fee (3)	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial Effective Date	Filing Fee Previously Paid in Connection with Unsold Securities to Be Carried Forward
<b>Newly Registered Securities</b>												
Fees to Be Paid	Equity	Common Stock, \$0.001 par value per share(1)	Rule 456(b) and 457(r)	(1)	(2)	(2)	(3)	(3)				
Fees to Be Paid	Equity	Preferred Stock, \$0.001 par value per share(1)	Rule 456(b) and 457(r)	(1)	(2)	(2)	(3)	(3)				
Fees to Be Paid	Debt	Debt Securities	Rule 456(b) and 457(r)	(1)	(2)	(2)	(3)	(3)				
Fees to Be Paid	Other	Warrants(1)(4)	Rule 456(b) and 457(r)	(1)	(2)	(2)	(3)	(3)				
Fees to Be Paid	Equity	Common Stock, \$0.001 par value per share	Rule 457(o) and Rule 457(r)	\$250,000,000		\$250,000,000	0.0001102	\$27,550.00				
Fees Previously Paid		N/A	N/A	N/A	N/A	N/A	N/A	N/A				
<b>Carry Forward Securities</b>												
Carry Forward Securities	Unallocated (Universal) Shelf	(5)	415(a)(6)	(5)		\$250,000,000	0.0001298		424B5	333-235324	August 5, 2020	\$32,450
	Total Offering Amounts					\$250,000,000		\$27,550.00				
	Total Fees Previously Paid							\$32,450.00				
	Total Fee Offsets							—				
	Net Fee Due							\$0				

- (1) An indeterminate aggregate initial offering price or number of securities of each identified class is being registered as may from time to time be issued at indeterminate prices and as may be issuable upon conversion, redemption, exchange, exercise or settlement of any securities registered hereunder, including under any applicable antidilution provisions. Any securities registered hereunder may be sold separately or together with other securities registered hereunder.
- (2) The proposed maximum per security and aggregate offering prices per class of securities will be determined from time to time by the Registrant in connection with the issuance by the Registrant of the securities registered hereunder and is not specified as to each class of security. Separate consideration may or may not be received for securities that are issuable on exercise, conversion or exchange of other securities, or that are issued in units.
- (3) In accordance with Rule 456(b) and 457(r) under the Securities Act, the Registrant is deferring payment of all registration fees other than the registration fee due in connection with \$250,000,000 of shares of common stock that may be issued and sold from time to time under the sale agreement prospectus supplement included in this registration statement. Any subsequent registration fees will be paid on a pay-as-you-go basis.
- (4) The warrants covered by this registration statement may be warrants to purchase common stock, preferred stock or other securities of the Registrant.

- (5) Pursuant to Rule 415(a)(6) under the Securities Act, this registration statement includes \$250,000,000 of unsold securities (the “Unsold Securities”) that had previously been registered under the registrant’s registration statement on Form S-3 (File No. 333-235324) initially filed on December 2, 2019, and declared effective on December 2, 2019 (the “Prior Registration Statement”). The registrant paid a filing fee of \$32,450 for an aggregate of \$250,000,000 of securities that could have been issued under the Prior Registration Statement. Pursuant to Rule 415(a)(6), the registrant is carrying forward to this registration statement the Unsold Securities that were previously registered on the Prior Registration Statement, and the aggregate filing fees of approximately \$27,550 previously paid in connection with the Unsold Securities will continue to be applied to the Unsold Securities that are being carried forward to this registration statement. No additional filing fee is due with respect to the Unsold Securities included in this registration statement. Pursuant to Rule 415(a)(6), the offering of the Unsold Securities under the Prior Registration Statement will be deemed terminated as of the time of filing of this registration statement.